2019 FoLAR Great L.A. River CleanUp Waste Characterization Study

Environmental Resources Planning, LLC
Final Report

Overview

Heavy rains wash bulk trash and floatable items, along with a significant volume of yard waste, into the 51 miles of the Los Angeles (LA) River. This trash comes from the Los Angeles Watershed, which covers an area of more than 800 square miles and a population of approximately nine million.

Friends of the LA River (FoLAR) launched La Gran Limpieza, or the Great Los Angeles River CleanUp in 1989, and in 2019 celebrated their 30th annual event. Since 2009, FoLAR has tracked the total weight of trash removed from the river and has conducted characterization studies to determine what types of trash appear to be entering the river from the surrounding basin. These cleanups and trash characterization studies take place at sites adjacent to the LA River.

A major goal of these trash characterization studies is to generate enough data to estimate how much trash likely enters the river as litter carried through the storm drain system as a means to gague the relative effect of structural controls added to storm drain inlets over the past decade. Thus, larger items in the channel such as shopping carts, tents and furniture represent a different aspect of LA River trash and were not addressed in these studies as these items are too large for volunteers to sort and are not considered litter that found its way into the river through the storm drain system.

FoLAR has trained waste characterization volunteers to follow a specific collection and analysis procedure. After cleanup volunteers collect and place trash from the river channel into 30-gallon bags, they then carry the bags to a central collection point. Roughly five percent of the bagged trash is then randomly chosen by the waste characterization team to be sorted. The results presented here are based on that random sample of all the collected trash. The trash sort is conducted on a large tarp set up for the purpose, with a section marked for each one of the 16 categories shown below:

1. Food Service Packaging: take-out containers, cups, bowls, clamshells
2. Snack and Candy Packaging: chip and confection wrappers
3. Bottles and Cans: CRV beverage containers
4. Bottle Caps
5. Non-CRV Containers: juice boxes, milk cartons
6. Molded Plastic - Non-Beverage: detergent jugs, buckets, shampoo bottles
7. Metal - Non-Beverage
8. Glass - Non-Beverage
9. Cigarette butts and tobacco packaging
10. Foam Packing: non-food service plastic foam packing materials
11. Paper: bags, newspapers, flyers, bus transfers
12. Plastic Film - Other Bags: plastic bags other than food market
13. Plastic Film - Grocery Bags: food market t-shirt bags
14. Plastic Film - Non-Bag: plastic wrap, tarps
15. Clothing and Fabric
16. Other: tennis balls, golf balls, cosmetics, etc.

The waste characterization team opens and empties 30-gallon trash bags and then sorts each item into the appropriate pile on the tarp. Once the tarp area is full, each category of trash is photographed and the contents are bagged separately. The weight of each bag is measured in pounds using a luggage scale, while the volume of each bag is estimated visually. Both numbers are recorded, with 0.1 used when either the weight or volume is deemed to be minimal.

Ideally, a count of items in each bag is also noted along with subtypes in each category and identifiable brand names.

Figure 1, below, shows trash being sorted on a tarp:

Figure 1 - Trash Sort Setup

The tables that follow present data from each of the sites in the order in which they were cleaned, beginning upstream at Sepulveda Basin and continuing downstream to the Willow Street Estuary, near the river mouth in Long Beach.

The areas designated as trash sort sites in 2019 were:
1. Sepulveda Basin
2. Bette Davis Park
3. Fletcher/Bowtie Parcel, south of the Glendale Narrows
4. Compton Creek, behind the Del Amo Metro Station
5. Willow Street Estuary

In 2018, only one site per weekend hosted a trash sort:
1. Sepulveda Basin
2. Fletcher/Bowtie Parcel
3. Willow Street Estuary

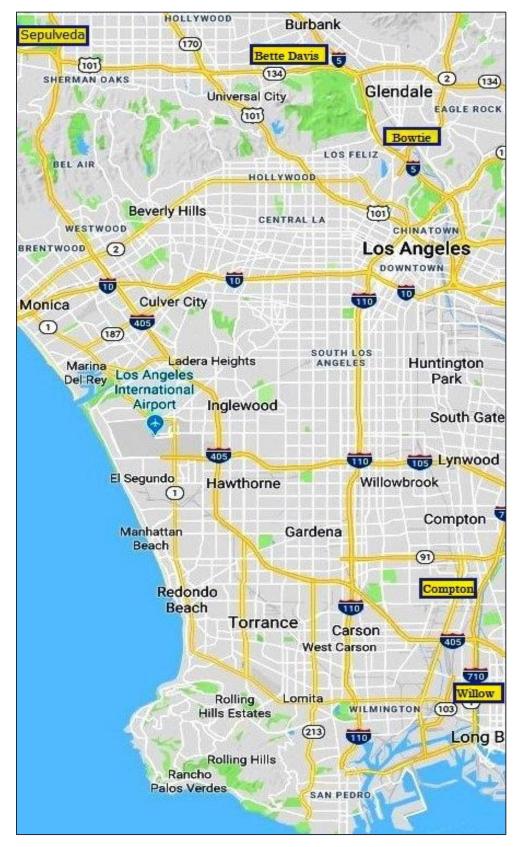The map below (Figure 2) shows the location of the five sites at which trash was collected and sorted in 2019.

Figure 2 - Map of Trash Sort Sites

Sepulveda Basin - Most Prevalent Items:

Tally: *Food Service Packaging* (16.5 percent) and *Plastic Film, Tarps* (12.6 percent)
Weight: *Molded Plastic, Non-Beverage* (19.9 percent), *Other* (17.2 percent)
Volume: *Plastic Film, Tarps* (20.9 percent), *Plastic Film, All other bags* (13.1 percent), *Foam Packing* (13.1 percent) and *Molded Plastic, Non-Beverage* (13.1 percent)

Table 1 - Sepulveda Basin Trash Sort

Sepulveda Basin, April 13, 2019						
Category	**Tally**	**Wt.**	**Bags**	**Tally**	**Wt.**	**Bags**
Food Service Packaging	76	1.1	0.4	16.5%	6.6%	10.5%
Snack & Candy Packaging	57	0.1	0.2	12.4%	0.7%	3.9%
Bottles & Cans, CRV Beverage	1	0.1	0.1	0.2%	0.7%	0.3%
Bottle Caps	9	0.2	0.1	2.0%	1.3%	0.3%
Non-CRV Containers	6	0.2	0.1	1.3%	1.3%	1.3%
Molded Plastic, Non-Beverage	38	3.3	0.5	8.3%	19.9%	13.1%
Metal, Non-Beverage	8	0.9	0.1	1.7%	5.3%	2.6%
Glass, Non-Beverage	7	0.9	0.1	1.5%	5.3%	0.7%
Cigarette Butts	31	0.2	0.1	6.7%	1.3%	0.7%
Foam Packing	48	0.1	0.5	10.4%	0.7%	13.1%
Paper Bags, Newspaper, Etc.	39	0.4	0.2	8.5%	2.6%	5.2%
Plastic Film, All other bags	32	0.7	0.5	7.0%	4.0%	13.1%
Plastic Film, Grocery bags	2	0.2	0.1	0.4%	1.3%	2.6%
Plastic Film, Tarps	58	2.6	0.8	12.6%	15.9%	20.9%
Clothes & Fabric	7	2.6	0.4	1.5%	15.9%	10.5%
Other	41	2.9	0.1	8.9%	17.2%	1.3%
Total	**460**	**16.6**	**3.8**	**100%**	**100%**	**100%**

Sepulveda notes:

Compared to 2018, the number of items tallied at Sepulveda increased by 145 percent, with proportional increases in most categories. The only category showing improvement in 2019 was *Foam Packing*, which decreased by 35 percent.

The total weight of all items surveyed increased from 3.1 pounds to 16.6 pounds, which was due to increases in most categories. Similar to the tally, the only category showing substantial improvement by weight was *Foam Packing*, which decreased by 45 percent.

One large industrial chunk of foam accounted for a substantial portion of the volume and weight of the *Foam Packing* category. Some of the foam items tallied in *Food Service Packaging* appeared to be meat trays, similar to previous years as seen in Figure 3.

Figure 3 - Food Service Items

Bette Davis Picnic Area - Most Prevalent Items:

Tally: *Other* (14.6 percent) and *Food Service Packaging* (12.5 percent)
Weight: *Clothes & Fabric* (26.0 percent) and *Other* (21.1 percent)
Volume: *Metal Non-Beverage* (17.7 percent), *Plastic Film - All other bags* (17.7 percent) and *Other* (17.7 percent)

Table 2 - Bette Davis Trash Sort

Bette Davis Picnic Area, April 13, 2019						
Category	**Tally**	**Wt.**	**Bags**	**Tally**	**Wt.**	**Bags**
Food Service Packaging	59	1.1	0.5	12.5%	1.0%	4.4%
Snack & Candy Packaging	46	0.8	0.3	9.7%	0.7%	2.7%
Bottles & Cans, CRV Beverage	44	2.6	0.8	9.3%	2.2%	6.6%
Bottle Caps	3	0.1	0.0	0.6%	0.1%	0.0%
Non-CRV Containers	6	0.4	0.1	1.3%	0.3%	0.9%
Molded Plastic, Non-Beverage	50	7.0	1.0	10.6%	6.1%	8.9%
Metal, Non-Beverage	7	15.2	2.0	1.5%	13.1%	17.7%
Glass, Non-Beverage	26	1.5	0.0	5.5%	1.3%	0.0%
Cigarette Butts	19	0.0	0.0	4.0%	0.0%	0.0%
Foam Packing	20	0.3	0.0	4.2%	0.2%	0.0%
Paper Bags, Newspaper, Etc.	30	11.2	0.8	6.3%	9.7%	6.6%
Plastic Film, all other bags	58	11.0	2.0	12.3%	9.5%	17.7%
Plastic Film, grocery bags	4	0.1	0.1	0.8%	0.1%	1.2%
Plastic Film, tarp	3	10.0	0.8	0.6%	8.7%	6.6%
Clothes & Fabric	29	30.0	1.0	6.1%	26.0%	8.9%
Other	69	24.4	2.0	14.6%	21.1%	17.7%
Total	**473**	**115.6**	**11.3**	**100%**	**100%**	**100%**

Bette Davis notes:

Bette Davis was last designated as a trash sort site in 2017, and significant changes were seen this year in *Snack & Candy Packaging*, which decreased from 17.3% of all items by tally to 9.7% by tally in 2019, and *Metal – Non-Beverage* which dropped from 10.5% to 1.5% in 2019.

For 2019, the *Other* category at Bette Davis consisted primarily of a number of sports balls and bicycle parts. *Metal, Non-Beverage* included a number of empty paint cans. *Molded Plastic, Non-Beverage* included pieces of different home items.

A variety of beverage containers were found, including sodas, beer, water and juice as seen in Figure 4.

Figure 4 - Beverage Containers at Bette Davis

Fletcher/Bowtie Parcel - Most Prevalent Items:

Tally: *Paper Bags, Newspaper, Etc.* (24.7 percent) and *Snack & Candy Packaging* (13.0 percent)
Weight: *Clothes & Fabric* (49.1 percent) and *Metal, Non-Beverage* (18.5 percent)
Volume: *Clothes & Fabric* (19.2 percent) and *Paper Bags, Newspaper, Etc.* (13.3 percent)

Table 3 – Fletcher/Bowtie Parcel Trash Sort

Fletcher/Bowtie Parcel - April 20,2019						
Category	Tally	Wt.	Vol.	Tally	Wt.	Vol.
Food Service Packaging	132	0.4	1.4	9.9%	1.5%	10.0%
Snack & Candy Packaging	174	0.3	0.8	13.0%	1.4%	5.5%
Bottles & Cans, CRV Beverage	16	0.7	0.3	1.2%	3.1%	2.4%
Bottle Caps	11	0.0	0.0	0.8%	0.0%	0.1%
Non-CRV Containers	19	0.7	0.6	1.4%	2.9%	4.4%
Molded Plastic, Non-Beverage	126	1.6	1.3	9.4%	6.8%	9.2%
Metal, Non-Beverage	93	4.2	1.2	7.0%	18.5%	8.5%
Glass, Non-Beverage	21	0.1	0.1	1.6%	0.4%	0.7%
Cigarette Butts	14	0.1	0.1	1.0%	0.0%	0.0%
Foam Packing	25	0.1	0.2	1.9%	0.4%	1.1%
Paper Bags, Newspaper, Etc.	331	1.2	1.8	24.7%	5.4%	13.3%
Plastic Film, all other bags	59	0.7	1.2	4.4%	3.2%	8.9%
Plastic Film, grocery bags	73	0.3	0.9	5.5%	1.4%	6.6%
Plastic Film, tarp	40	0.2	0.6	3.0%	1.0%	4.5%
Clothes & Fabric	73	11.0	2.6	5.5%	49.1%	19.2%
Other	131	1.0	0.8	9.8%	4.5%	5.5%
	1,338	22.6	13.5	100%	100%	100%

Fletcher/Bowtie notes:

The trash tally at Fletcher/Bowtie involved sorting 130 percent more trash than 2018, and a greater diversity of items was reflected in most categories. Only two categories showed less trash by count in 2019: *Foam Packing*, which dropped 36 percent and *Plastic Film - Other Bags*, which dropped 66 percent. Paper items can be seen in Figure 5 – many of these items appeared to be undamaged and thus recently deposited.

The weights at Fletcher/Bowtie in 2019 were less than the 2018 weights in all but two categories: *Non-CRV Containers*, which increased 33 percent, and *Plastic Film, grocery bags*, which increased from zero to 73 items. Grocery bags have generally not been seen in quantity in the river since they have been banned by local governments, so this was an atypical result.

By volume, all categories increased except for *Foam Packing*, which showed a 40 percent decrease.

Figure 5 - Paper Items at Fletcher/Bowtie

Compton Creek - Most Prevalent Items:

Tally: *Snack & Candy Packaging* (17.6 percent) and *Food Service Packaging* (15.8 percent)
Weight: *Bottles & Cans, CRV Beverage* (19.3 percent) and *Clothes & Fabric* (15.4 percent)
Volume: *Food Service Packaging* (26.1 percent) and *Snack & Candy Packaging* (13.1 percent)

Table 4 - Compton Creek Trash Sort

Compton - April 27,2019						
Category	Tally	Wt.	Vol.	Tally	Wt.	Vol.
Food Service Packaging	107	3.3	2.0	15.8%	14.5%	26.1%
Snack & Candy Packaging	119	1.8	1.0	17.6%	7.7%	13.1%
Bottles & Cans, CRV Beverage	20	4.4	0.8	3.0%	19.3%	9.8%
Bottle Caps	14	0.0	0.0	2.1%	0.0%	0.0%
Non-CRV Containers	9	2.0	0.7	1.3%	8.7%	9.1%
Molded Plastic, Non-Beverage	56	2.4	0.4	8.3%	10.5%	4.6%
Metal, Non-Beverage	64	1.3	0.3	9.5%	5.7%	3.3%
Glass, Non-Beverage	7	0.01	0.01	1.0%	0.0%	0.1%
Cigarette Butts	39	0.1	0.1	5.8%	0.0%	1.3%
Foam Packing	67	0.1	0.3	9.9%	0.4%	3.3%
Paper Bags, Newspaper, Etc.	10	1.3	0.3	1.5%	5.7%	3.3%
Plastic Film, all other bags	55	0.3	0.4	8.1%	1.3%	5.2%
Plastic Film, grocery bags	25	0.9	0.5	3.7%	3.9%	6.5%
Plastic Film, tarp	40	0.7	0.3	5.9%	2.9%	3.3%
Clothes & Fabric	20	3.5	0.5	3.0%	15.4%	6.5%
Other	24	0.9	0.4	3.6%	3.9%	4.6%
Total	676	22.9	7.7	100%	100%	100%

Compton Creek notes:

Compton was last designated as a trash sort site in 2017 and two-year trends opposite to Bette Davis were seen here, with *Snack & Candy Packaging* more than doubling from 6.9% to 17.6% by tally in 2019 and *Metal, Non-Beverage* jumping from 1.3% to 9.5% in 2019.

For 2019, in terms of tally, half of the *Food Service Packaging* was foam, while the other half was paper and rigid items. *Snack & Candy Packaging* was predominantly chips bags as seen in Figure 6.

Much of the food packaging appeared to be recently deposited, likely related to the Del Amo metro stop adjacent to the site.

CRV Beverage Containers comprised almost 20 percent by weight. *Clothes & Fabric* included items such as blankets, jackets and pants.

Figure 6 - Snack Packaging at Compton

Willow Street Estuary - Most Prevalent Items:

Tally: *Food Service Packaging* (23.8 percent) and *Foam Packing* (17.1 percent)
Weight: *Metal, Non-Beverage* (31.4 percent) and *Clothes & Fabric* (21.5 percent)
Volume: *Clothes & Fabric* (16.1 percent) and *Food Service Packaging* (13.3 percent)

Table 5 - Willow Street Estuary Trash Sort

Willow Street Estuary - April 27,2019						
Category	Tally	Wt.	Bags	Tally	Wt.	Bags
Food Service Packaging	342	4.2	1.4	23.8%	4.1%	13.3%
Snack & Candy Packaging	235	3.5	1.0	16.3%	3.5%	9.5%
Bottles & Cans, CRV Beverage	26	3.0	0.4	1.8%	2.9%	3.8%
Bottle Caps	21	0.2	0.2	1.5%	0.2%	1.5%
Non-CRV Containers	16	0.5	0.1	1.1%	0.5%	1.1%
Molded Plastic, Non-Beverage	83	5.5	0.5	5.8%	5.4%	4.7%
Metal, Non-Beverage	78	31.9	1.2	5.4%	31.4%	10.9%
Glass, Non-Beverage	7	0.5	0.1	0.5%	0.5%	0.9%
Cigarette Butts	84	0.9	0.1	5.8%	0.9%	0.8%
Foam Packing	246	2.2	0.7	17.1%	2.2%	6.2%
Paper Bags, Newspaper, Etc.	55	1.3	0.2	3.8%	1.3%	2.2%
Plastic Film, all other bags	79	1.3	1.0	5.5%	1.3%	9.0%
Plastic Film, grocery bags	0	0.0	0.0	0.0%	0.0%	0.0%
Plastic Film, tarp	90	13.2	1.0	6.3%	13.0%	9.5%
Clothes & Fabric	36	21.8	1.7	2.5%	21.5%	16.1%
Other	40	11.4	1.1	2.8%	11.3%	10.4%
Total	1,438	101.5	10.4	100%	100%	100%

Willow notes:

By tally, *Food Service Packaging* decreased as a percentage of trash at Willow from 2018 to 2019 from 38.2 percent to 23.8 percent. *Foam Packing* increased from 11.0% to 17.1% by tally over that same period.

By weight, *Clothes & Fabric* decreased from 33.6 to 21.5 percent, still a significant figure. Some of the *Clothes & Fabric* items at Willow this year can be seen in Figure 7.

By volume, *Food Service Packaging* decreased as a percentage of trash from 18.7 percent to 13.3 percent. During that same period, *Plastic Film – Tarp* decreased from 18.7 percent to 9.5 percent. No grocery bags were found at Willow, contrary to some of the upstream sites.

Figure 7 – Clothes & Fabric items at Willow

Summary of All Sites - Most Prevalent Items:

Tally: *Food Service Packaging* (16.3 percent) and *Snack & Candy Packaging* (14.4 percent)
Weight: *Clothes & Fabric* (24.7 percent) and *Metal, Non-Beverage* (19.2 percent)
Volume: *Clothes & Fabric* (13.2 percent) and *Food Service Packaging* (12.1 percent)

Table 6 - Summary Trash Sort

2019 FoLAR Summary						
Category	Tally	Wt.	Bags	Tally	Wt.	Bags
Food Service Packaging	716	10.0	5.7	16.3%	3.6%	12.1%
Snack & Candy Packaging	631	6.5	3.2	14.4%	2.3%	6.8%
Bottles & Cans, CRV Beverage	107	10.8	2.2	2.4%	3.9%	4.8%
Bottle Caps	58	0.6	0.2	1.3%	0.2%	0.4%
Non-CRV Containers	56	3.7	1.6	1.3%	1.3%	3.3%
Molded Plastic, Non-Beverage	353	19.8	3.6	8.1%	7.1%	7.7%
Metal, Non-Beverage	250	53.5	4.7	5.7%	19.2%	9.9%
Glass, Non-Beverage	68	3.0	0.2	1.6%	1.1%	0.5%
Cigarette Butts	187	1.1	0.2	4.3%	0.4%	0.4%
Foam Packing	406	2.8	1.6	9.3%	1.0%	3.3%
Paper Bags, Newspaper, Etc.	465	15.5	3.2	10.6%	5.6%	6.9%
Plastic Film, all other bags	283	14.0	5.1	6.5%	5.0%	10.8%
Plastic Film, grocery bags	104	1.5	1.6	2.4%	0.5%	3.5%
Plastic Film, tarp	231	26.7	3.4	5.3%	9.6%	7.3%
Clothes & Fabric	165	69.0	6.2	3.8%	24.7%	13.2%
Other	305	40.6	4.3	7.0%	14.5%	9.1%
Total	**4,385**	**279.0**	**46.9**	**100%**	**100%**	**100%**

Summary Notes:

Comparing the changes in percentage of each type of river trash year over year provides some useful insights. The ranking of categories remained consistent overall between 2018 and 2019. *Plastic Film – Other Bags* dropped as a percentage of trash by tally (16.1 percent in 2018 to 6.5 percent in 2019).

Close observation of the trash reveals two distinct categories: items that appear to have made their way downstream through the storm drain system, and items that appear to have been discarded directly into the river. This former grouping correlates with the categories most prevalent by tally while the latter matches with the categories most prevalent by weight.

The items most prevalent by tally at each of the sites were *Food Service Packaging* and *Snack & Candy Packaging*, which includes many commonly littered items that can be considered highly mobile as they are light weight and easily wind-blown. Compared to most of the other categories, many of these packaging items examined during the trash sort appeared less weathered as if they had been in the river for a shorter period of time.

The percentage of both of these categories increases as the sites move downstream as shown in Table 7. These results suggest two trends with these highly mobile items: there is a heavier accumulation as the adjacent neighborhoods downstream become denser and more urbanized, and these light items tend to travel downstream and accumulate toward the mouth of the river.

Table 7 – Downstream Changes in Food Service/Snack & Candy Packaging

Category	Sepulveda	Bette Davis	Bowtie	Compton	Willow
Food Service Packaging	16.5%	12.5%	9.9%	15.8%	23.8%
Snack & Candy Packaging	12.4%	9.7%	13%	17.6%	16.3%

Measured by weight, *Clothes & Fabric*, *Metal, Non-Beverage* and *Plastic Film, tarp* were the most prevalent items at virtually every site as shown in Table 8. In most cases, these items appeared to have be related to homeless camps that were observed around the various cleanup sites (Figure 8). The amount of these heavy, less mobile items that were likely directly deposited into the river appeared to vary based on the relative density of homeless encampments in each area. This source of river trash will likely require a much different strategy for achieving reductions.

Table 8 – Downstream Changes in Heavier Categories of Trash

Category	Sepulveda	Bette Davis	Bowtie	Compton	Willow
Clothes & Fabric	2.6 lbs.	30.0 lbs.	11.1 lbs.	3.5 lbs.	21.8 lbs.
Metal, Non-Beverage	0.9 lbs.	15.2 lbs.	4.2 lbs.	1.3 lbs.	31.9 lbs.
Plastic Film, tarp	2.6 lbs.	10.0 lbs.	0.2 lbs.	0.7 lbs.	13.2 lbs.

Figure 8 - Homeless Camp at Willow

Comparing the year-over-year changes in the makeup of the total amount of trash could indicate trends with litter in the surrounding watershed.

Table 9 - Change in Trash Composition

Changes by Percentage of Trash Type: 2018-2019			
Category	**Tally**	**Wt.**	**Bags**
Food Service Packaging	**-8.5**	**-6.4**	-1.6
Snack & Candy Packaging	+0.6	-1.4	-1.7
Bottles & Cans, CRV Beverage	+0.3	+1.5	+2.8
Bottle Caps	-0.2	0.0	+0.2
Non-CRV Containers	+0.6	+0.6	+2.5
Molded Plastic, Non-Beverage	+1.2	-0.4	-0.3
Metal, Non-Beverage	+2.1	-1.5	**+4.7**
Glass, Non-Beverage	+1.3	+0.8	-0.3
Cigarette Butts	+2.1	0.0	-1.0
Foam Packing	-4.0	-0.3	-2.8
Paper Bags, Newspaper, Etc.	**+7.2**	+2.5	**+4.5**
Plastic Film, all other bags	**-9.6**	-2.4	-0.3
Plastic Film, grocery bags	+1.2	+0.4	+1.2
Plastic Film, tarp	+2.4	**+6.1**	-0.5
Clothes & Fabric	-1.1	-2.7	-1.6
Other	+4.4	+3.3	-5.8

Table 9 compares the changes in percentage of total trash from all sites cleaned in 2019 to all sites cleaned in 2018.

Looking back further, trends by tally over the past two years are consistent with these results, with a doubling of both *Cigarette Butts* from 2% to 4.3% and *Plastic Film, tarp* from 2.6% to 5.3%, with a significant ongoing drop in *Plastic Film, all other bags* from 21.9% in 2017 to 6.5% in 2019.

The largest changes by each measure are highlighted in bold. For instance, *Food Service Packaging*, which comprised 24.9 percent of all trash tallied in 2018 decreased 8.5 percentage points in 2019 to 16.4 percent. This category showed significant decreases by both tally and weight.

Plastic Film, all other bags decreased by all three measures, but most significantly by tally where it decreased by 9.6 percentage points. This reduction appears to be associated with recent restrictions on plastic bags in surrounding jurisdictions. However, the largest increase by tally was with *Paper Bags, Newspapers* with 7.2 percent growth, which suggests that the material of the bags may have switched but the underlying litter behavior has not changed.

Plastic Film, tarp, a category associated with homeless camps, showed the highest increase by weight (6.1 percentage points).

Metal, Non-Beverage, another category associated with homeless camps, showed the largest increase by volume at 4.7 percent.

Observations

Overall, the results of FoLAR's cleanup efforts and its trash characterization study show that a very wide variety of materials are occasionally discarded improperly without regard to the impacts they can cause. Trash found in the LA River encompasses a broad range of items representing what people typically use in their daily lives and could be considered as a representative snapshot of trash found throughout LA County.

Data from the 2019 LA River cleanup continues to show that, under normal conditions, lighter and less dense components of trash, which tend to be more mobile, are also more likely to find their way to a site further downstream and become a larger percentage of trash found toward the river mouth. This suggests that strategically timed cleanups in the downstream areas known to have large accumulations of these more mobile items would be an effective supplement to the structural controls and other methods already employed upstream.

Items such as food service and snack packages, beverage containers and packing materials mostly appear to be recently littered items that are blown into the LA River after being littered in adjacent areas. This suggests that a more active effort to clean up and prevent litter in densely populated downstream areas would have a direct impact on the amount of trash that escapes into the river and eventually the ocean.

The large number of heavier items found in the 2019 cleanup continues to suggest that heavy rains and steep slopes in the upper reaches of the watershed are able to generate enough force to wash a wide variety of discarded items down the LA River, regardless of weight.

A sampling of such trash found in a previous LA River cleanup is shown in Figure 9.

Figure 9 - FoLAR Trash Sample

Since much of the trash found in the LA River is similar to the types of litter typically found on streets in the surrounding neighborhoods, reducing street litter and installing structural controls to exclude trash from stormdrains should be the most effective opportunities to prevent the largest amount of trash from escaping into the LA River and subsequently wash out to the Pacific Ocean.

Effective Trash Abatement

Reduction of trash in the LA River that originates as litter from the surrounding watershed will be best achieved by a combination of source reduction, such as street sweeping to catch trash before it is flushed into storm drains during heavy rain events, along with uniform structural controls, such as catch-basin covers prevent large trash items from washing into stormdrains that empty into the River. Figure 9 shows why it is especially important to ensure that full-capture systems continue to be installed in all high-generation areas upstream: any trash not captured upstream will inevitably make its way to communities further downstream.

Results of both this trash characterization as well as the total tonnage of trash removed from the river show that highly mobile litter tends to migrate downriver quickly until the river current is countered by the tidal action from the Pacific Ocean, which occurs at the soft-bottom section immediately downstream from the Willow Street Overcrossing. Thick grasses and other vegetation trap much of this trash, which accumulates from spring through fall until eventually the first heavy rains create the "First Flush" and sweep months of trash out to sea in a matter of hours. FoLAR has been strongly advocating for a series of systematic cleanups to be held at Willow Street from August when a majority of the trash has made it downriver, until early October preceding the typical start of the rainy season in Los Angeles. This simple tactic would likely prevent tons of trash from being flushed into the sea.

Addressing the problem of trash generated by the growing number of homeless encampments in and around the LA River Basin will be key to continued progress with litter and stormwater trash abatement programs. Failure to provide trash collection at homeless camps means that this trash will be left in the river, which just creates a much more expensive problem as it is washed into the Pacific. Many of our new neighbors residing within the banks of the LA River are eager to help keep the surroundings clean, but they lack the means to remove the trash. Partnerships should be explored to reduce the impacts of the dramatic increase in the number of people making the River their home.

Funding public education to reinforce the connection between litter on neighborhood streets and how that litter can be washed into the River when it rains, provided by FoLAR (see Figure 10) and others, helps to discourage direct dumping and wind-deposited trash that is not addressed by structural controls. These will be particularly effective when focused in high-generation and hot-spot areas.

Figure 10 - FoLAR's River Rover

Developing partnership programs with entities such as the LA County Metro Transit Authority can help prevent littering at Metro stops, which will keep these items from later becoming trash in the LA River.

Finally, Los Angeles County has installed a trash boom at the mouth of the Los Angeles River in the Port of Long Beach. This device is used to intercept, collect and remove floating and partly submerged debris in order to reduce the amount of trash that would otherwise make its way to recreational areas, aquatic habitats or ultimately the Pacific Ocean. These types of structural controls are an effective means of demonstrably preventing trash from escaping into the ocean.

Figure 11 - Long Beach Trash Boom

Identifying major sources of the litter captured by floating barriers such as the one shown in Figure 11 presents a meaningful opportunity to implement targeted enforcement of existing litter ordinances. Such enforcement efforts will send a clear message that the community considers littering of any kind to be unacceptable. It will also help achieve the goal of a cleaner LA River.