

San Jose Litter Surveys Examined: Plastic Bag Ban Completely Unjustified!

BAG BAN PROPONENTS CLAIM LITTER SURVEYS SHOW SUCCESS OF BAG BAN, BUT THE DATA SHOWS THE INSIGNIFICANCE OF THE PROBLEM AND REFLECTS A HUGE WASTE OF MONEY AND RESOURCES

SAN JOSE NOW ADMITS STORM DRAIN REDUCTION CLAIMS WERE INFLATED DUE TO ERROR IN COMPUTATION

CITY REPORTS FAIL TO SHOW A SINGLE PENNY IN COST SAVINGS TO THE CITY, WHILE CITIZENS SPEND MILLIONS PER YEAR TO COMPLY WITH A MISGUIDED BAG BAN THAT REDUCES CLEANUP BY INSIGNIFICANT AMOUNTS

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The City of San Jose, to their credit, is one of the few cities that conducted litter surveys both before and after the city's bag ban. Results showing the percentage reduction of single-use plastic carryout bags (i.e. plastic grocery bags) as a component of litter have been cited by the city as proof that the city's bag ban is effective. Likewise, environmental groups nationwide have touted these same results as a justification for promoting new bag bans and opposing repeal efforts. Unfortunately, the City of San Jose did not conduct litter surveys in a controlled and scientific manner, did not correctly analyze survey data, and did not put survey results into proper perspective. As a result, the data collected is unreliable for computing a meaningful figure of merit, such as the percent reduction in plastic carryout bag litter resulting from the city's plastic bag ban.

Yet, despite these shortcomings, the litter surveys did reveal several surprising facts that have escaped the notice of city officials, the media, and those in other cities who cite San Jose's claims:

- 1) That only **half** of ALL plastic bag litter found in sampled areas on city streets and creeks consists of single-use plastic carryout bags; hence, a bag ban would at most eliminate only about half of all plastic bag litter.
- 2) That only about **10%** of litter in creeks consists of single-use plastic carryout bags; hence, a bag ban affects at most **10%** of ALL litter in creeks, leaving the remaining **90% unresolved**. Therefore, all of the cost and cleanup efforts still need to be implemented since this will not meet the **100%** reduction goal required under the federal Clean Water Act.
- 3) That the number of single-use plastic carryout bags found during all of the litter surveys in 2009, 2010, and 2011 (prior to the bag ban) average only **1,000** bags per year, or less than **1** for every **1,000** people, or the equivalent of what **two (2)** people out of a population of more than **1 million** would use annually!

The use of unreliable and questionable survey data to project large percentage reductions of an insignificant number of littered plastic grocery bags combined with a complete lack of evidence of any

cost savings to the city or to the people show that the bag ban was never justified from the beginning, and that the ongoing cost burden to San Jose families is likewise unjustified.

City of San Jose

The City of San Jose is located in Santa Clara County at the southerly end of San Francisco Bay. San Jose is the largest city in Northern California and the third largest in the state with a population of 1,000,536 people. (California Department of Finance, 2014) The City of San Jose, surrounding hillsides, and local creeks and waterways comprise an area of approximately 205 square miles. (City of San Jose, 2010)

Carryout Bag Usage

Although the exact number of single-use paper and plastic carryout bags used in the city is unknown, the city estimated that **68 million** paper bags and **500 million** single-use plastic carryout bags were used every year prior to the bag ban. In fact, the Draft EIR estimated that **511** plastic carryout bags were used per person per year. (City of San Jose, 2010). This estimate means that a family of four would use **2,044** plastic grocery bags per year, or about **40** plastic grocery bags per week! While this number is highly questionable, it was used by San Jose and many other cities in their justification of bag bans.

Every man, woman, and child in the city of San Jose is estimated to use 511 plastic carryout bags per year; therefore, a family of four would use an estimated 2,044 plastic carryout bags per year, or almost 40 every week. (City of San Jose, 2010)

San Jose Single-Use Carryout Bag Ordinance

The San Jose city council approved and adopted the Single-Use Carryout Bag Ordinance on January 11, 2011. The ordinance is also known as the Bring Your Own Bag (BYOB) ordinance. (Hawkins, 2011) The ordinance became effective January 1, 2012 and is the nation's most stringent plastic bag ban applicable to all retail establishments and not just supermarkets and convenience stores. (Dubois, 2011) The ordinance bans most plastic carryout bags and places a fee of 10-cents on each paper bag, which after two years was to increase to 25-cents. The automatic fee increase for paper bags was later rescinded by the city council in September 2013 because the proponents claimed that the 10 cent charge was a sufficient penalty to keep people from switching to paper bags. (Taber, 2013)

San Jose Claims Success of Plastic Carryout Bag Ban

Ten months after the City of San Jose implemented a Plastic Bag Ban, Kerrie Romanov, Director of Environmental Services for the City of San Jose, issued a [memorandum](#) dated November 20, 2012 to the San Jose City Council claiming success of the Plastic Bag Ban (San Jose ordinance #28877). Romanov claimed this success was based upon two factors: (1) the reduction in the number of plastic bags collected during litter surveys; and (2), a "behavior change in bag use" evidenced by an increased use of reusable bags and a decreased use of single-use bags by shoppers. (Romanov, 2012)

The memorandum reported a **59%** reduction in plastic bag litter on city streets and neighborhoods; a **60%** reduction in in creeks; and an **89%** reduction in storm drains (recently revealed to have been a calculation error, and was actually **62%**). (Romanov, 2012) (van Leeuwen, San Jose Miscalculates Plastic Bag Litter Reduction in Storm Drain System, 2015) These figures, particularly the higher value of **89%**, have been widely quoted by bag ban proponents not only in California but nationwide as empirical evidence that bag bans “work.”

San Jose Claims of Success Questioned

The claims of success by the City of San Jose were questioned by two citizens groups [Stop the Bag Ban](#) and [Fight the Plastic Bag Ban](#) who obtained the raw data from the litter surveys, via a public records request, and reviewed and analyzed the findings.

In a paper titled “[Rebuttal of the San Jose Bag Ban Results](#)” the authors contend that the memorandum is biased, factually incorrect, completely neglects a cost/benefit analysis, and fails to raise critical questions. It also contends that the litter surveys conducted by the City of San Jose were done in an unscientific and uncontrolled manner. (Williams & van Leeuwen, 2013)

In a follow-on paper titled “[San Jose’s Bag Ban Useless in Solving Litter Problems – Should be Rescinded](#)” the author contends that the bag ban failed to significantly reduce litter, as evidenced by an environmental complaint from the State of California and by lawsuits threatened from environmental organizations. In other words, the plastic bag ban was implemented at great initial and ongoing costs, but did not solve litter problems and therefore should be rescinded. (van Leeuwen, San Jose’s Bag Ban Useless in Solving Litter Problems – Should be Rescinded, 2015)

Litter Survey “Common Sense” Guidelines

When conducting “before” and “after” litter surveys to measure the historical increase or decrease of a particular item, such as single-use plastic carryout bags, there are some common sense guidelines that should be followed in order to obtain meaningful results. These guidelines simply stated are as follows:

1. The survey methodology should be the same at every location surveyed.
2. The locations surveyed “before” and “after” should be the same.
3. The physical area surveyed “before” and “after” should be the same.
4. The survey period (time from last cleanup to the survey event) should be the same.
5. The survey periods should be sufficiently long enough to account for seasonal variations.

The reader should note that each litter survey location is unique and has its own litter accumulation rate, litter characteristics (types of litter items found), and litter sources. This should be obvious; for example, a creek survey location downstream from a homeless encampment or a storm drain outfall might accumulate more litter than a similar location further upstream. In addition, weather events such as wind and rain can affect survey results by moving litter into or out of the survey area.

In addition to the above common sense guidelines, the parameters or limitations of the litter surveys should be examined and questioned. These include:

1. Is the survey measuring the right thing (i.e. the bags that are getting cleaned up anyway, or the bags that escape litter control and collection efforts and end up in the ocean)?
2. Are the survey locations appropriate so that results can be extrapolated on a city wide basis (would bags found on the side of the freeway be meaningful for the rest of the city not near a freeway, or are litter “hot spots” reflective of the city as a whole)?
3. If banned items (such as plastic grocery bags) are still present, where did they come from?
4. If items not targeted for a ban (such as candy wrappers or paper bags or other plastic bags) also decrease or increase how does that affect the conclusion about the item targeted by the ban?

The failure to observe these common sense guidelines decreases the validity of survey results for the purposes of measuring an increase or reduction of a particular litter item after an event such as implementation of a plastic bag ban.

San Jose Litter Surveys

The City of San Jose conducted on-land, creek, and storm drain litter surveys. Surveys were conducted both before and after implementation of the city’s plastic bag ban.

Table 1. Summary of On-Land Litter Surveys

Litter Audit Year	Number of Sites	Total Litter Items	Plastic Bag Type	Number of Plastic Bags	Plastic Bags Per Site	Percent of Total Litter
Pre Ban						
2009	48	7,917	Plastic Carryout Bags	387	8.1	4.9%
			Other Plastic Bags	256	5.3	3.2%
2010	59	7,784	Plastic Carryout Bags	409	6.9	5.3%
			Other Plastic Bags	207	3.5	2.7%
2009 Plus 2010	107	15,701	Plastic Carryout Bags	796	7.4	5.1%
			Other Plastic Bags	463	4.6	2.9%
Post Ban						
2012	31	3,679	Plastic Carryout Bags	76	2.5	2.1%
			Other Plastic Bags	81	2.6	2.2%

On-Land Litter Surveys

On Land Litter Surveys were conducted in 2009, 2010, and in 2012. Litter surveys were conducted along streets and sidewalks for a length of 100 feet in certain residential, commercial, and light industrial areas. Trash collected was sorted and characterized and the results recorded. (Romanov, 2012, p. 3) Results of the litter surveys for both “plastic carryout bags” and “other plastic bags” are summarized in Table 1. The table shows the number of sites surveyed, total litter items found, plastic bag type, number

of plastic bags found, number of plastic bags per site, and plastic bags as a percent of total litter found. The plastic bag type is either “plastic carryout bags” consisting of plastic grocery bags or “other plastic bags” consisting of all other plastic bags including zip-lock bags, trash bags, product bags, etc.

City of San Jose’s Evaluation of On-Land Litter Reduction

The City of San Jose evaluated the results of the On-Land Litter Assessment in the November 2012 [memorandum](#). In the memo, data from the 2009 and 2010 Litter Assessments were combined together as Pre Ban data. The Post Ban data was obtained from the 2012 Litter Assessment. Data in Table 1 summarizes the on-land survey data for 2009, 2010 and 2012 and follows the analysis as documented in the memorandum. For plastic carryout bags, Table 1 shows **796** plastic carryout bags Pre Ban out of a total of **15,701** litter items or **5.1%**. The Post Ban data showed **76** plastic carryout bags out of **3,679** litter items or **2.1%**. (Romanov, 2012, p. 6)

The city calculates the reduction in on-land plastic bag litter from the reduction in percent of total litter as follows:

$$\text{Percent On Land Reduction} = \frac{\text{Pre Ban Percent of Total Litter} - \text{Post Ban Percent of Total Litter}}{\text{Pre Ban Percent of Total Litter}} \times 100\%$$

$$\text{Percent On Land Reduction} = \frac{5.1\% - 2.1\%}{5.1\%} \times 100\% = 58.8\% \text{ or } 59\%$$

The reduction of “**other plastic bags**” as a percent of total litter decreases from **2.9%** to **2.2%** can be calculated in the same way as above and yields a **24%** reduction. There was no explanation offered by the city as to why there was also a reduction in “**other plastic bags**”, bags that were not banned.

Critical Analysis of San Jose’s On-Land Litter Survey

First, taking a closer look at the City of San Jose’s analysis above, we observe a **24%** reduction in “other plastic bags” as a percentage of total litter. This indicates that, had there been no bag ban, it would be perfectly reasonable to expect that plastic carryout bags would have been reduced by about the same amount. Therefore, to isolate the reduction in plastic grocery bags directly attributed to a bag ban, we have to calculate an “Adjusted Pre Ban Percent of Total Litter” which subtracts out the **24%** general reduction of litter and use the adjusted value in calculations as shown below to produce the Bag Ban Percent On-land Reduction.

$$\text{Adjusted Pre Ban Percent of Total Litter} = \text{Pre Ban Percent of Total Litter} * \left(1 - \frac{\text{Percent Reduction in Litter}}{100\%}\right)$$

$$\text{Adjusted Pre Ban Percent of Total Litter} = 5.1\% * \left(1 - \frac{24\%}{100\%}\right) = 3.876\%$$

$$\text{Bag Ban Percent On Land Reduction} = \frac{3.876\% - 2.1\%}{3.876\%} \times 100\% = 45.8\% \text{ or } 46\%$$

As can be seen from the above calculations, the actual reduction attributed to a bag ban after correcting for a general reduction in all litter is about **46%** and much less than the **59%** calculated by the city of San Jose.

Second, in Table 1, Summary of On-Land Litter Surveys, we observe that data from **48** sites in the 2009 Litter Survey were added to the **59** sites in the 2010 litter survey to obtain Pre Ban data for a total of **107** sites and that only **31** sites were surveyed Post Ban. What is disturbing is that more sites were surveyed Pre Ban than Post Ban and from the source data we see that many of the sites surveyed Post Ban were not surveyed Pre Ban, thereby making Pre Ban to Post Ban comparisons relatively meaningless. For example, a Pre Ban litter survey next to a liquor store could not be compared to a Post Ban litter survey in a high-end residential area to determine the percentage decrease of plastic grocery bags in San Jose. That would be comparing apples with oranges.

As stated earlier, each survey location is unique and by not surveying the exact same locations before and after a plastic bag ban, the use of survey results to establish a figure of merit such as the percent reduction of plastic carryout bags is highly questionable.

Since “other plastic bags” were not banned, the **24%** reduction is an indication that less litter was collected or that the surveys included sites with different litter accumulation rates and different litter characteristics. For example, if you divide the total litter items by the number of survey sites, you will find that the 2012 survey has only **118** litter items per site compared to the 2009 survey that has **164** litter items per site. Whether this is due to a shorter time period since the previous cleanup, comparing dissimilar survey sites, less rain during the period, or some other factor is never discussed or explained in the San Jose memo or any of the source data files.

Another factor is to look at the quantity of plastic bags retrieved from the litter surveys Pre Ban and Post Ban. In 2009, the litter survey collected **387** plastic carryout bags and in 2010 collected **409** plastic carryout bags for a total of **796** plastic carryout bags Pre Ban. **It should be noted that for each year of the litter survey, fewer plastic carryout bags were collected than what would be used by a single person in an entire year out of a population of more than 1 million!**

The city of San Jose calculates the reduction in on-land plastic carryout bag litter from the reduction in percent of total litter, as explained above. Another method would be to compute the reduction in the average number of plastic bags per survey site (shown in Table 1) from **7.4** to **2.5** which produces a **66%** reduction in plastic carryout bags. Similarly, a reduction from **4.6** to **2.6** produces a **44%** reduction for “other plastic bags”. Since these other plastic bags were not banned, how do you explain the **44%** reduction in “other plastic bags” other than a general reduction in litter? As we did above, we can adjust the percent reduction of plastic carryout bags by the **44%** reduction in “other plastic bags” to show a **40%** reduction in plastic carryout bags verses the **66%** originally calculated.

Based upon the factors explained above, our analysis is that the on-land litter survey was not conducted using the common sense guidelines identified in this paper; or better said, the survey was not conducted in a controlled and scientific manner. The fact that some locations were surveyed more than once and others only once and the fact that the 2012 survey shows a reduction in total litter including a reduction in “other plastic bags” (which were not banned) is a strong indication that the results are highly questionable.

Based upon the above, we conclude that results reported in the City of San Jose [memorandum](#) for the On-Land Litter Survey are **unsound**. (Romanov, 2012, p. 6)

Creek Litter Surveys

Creek litter surveys were conducted in 2010, 2011, and 2012. Litter surveys of creeks were conducted over a standardized length of 300 feet at each surveyed location. The litter surveys in 2010 and 2011 were conducted Pre Ban and the 2012 litter survey was conducted Post Ban.

Table 2 shows the number of sites surveyed, total litter items found, plastic bag type, number of plastic bags found, number of plastic bags per site, and plastic bags as a percent of total litter found. The plastic bag type is either “plastic carryout bags” consisting of plastic grocery bags or “other plastic bags” consisting of all other bags including zip-lock bags, trash bags, product bags, etc.

City of San Jose’s Evaluation of Creek and River Litter Reduction

In Table 2, Creek Litter Survey Results, the City of San Jose combined the Pre Ban data from the 2010 and the 2011 Creek Litter Surveys for a total of **15 Sites**, **22,205** litter items including **2,037** single-use plastic carryout bags for an average of **136** plastic bags per site. The Post Ban data are taken from the 2012 Creek Litter Survey for a total of **10 Sites** with **14,017** litter items and **513** single-use plastic carryout bags for an average of **51** bags per site. Plastic carryout bags were shown as **12.2%** of total litter in 2010, **8.2%** of total litter in 2011, and **3.7%** of total litter in 2012. The city calculates the overall creek reduction by calculating the reduction of **9.2%** to **3.7%** of total litter for a reduction of **59.8%** or rounded to **60%**. (Romanov, 2012, p. 6)

Table 2. Creek Litter Survey Results

Litter Audit Year	Number of Sites	Total Litter Items	Plastic Bag Type	Number of Plastic Bags	Plastic Bags Per Site	Percent of Total Litter
Pre Ban						
2010	5	5,502	Plastic Carryout Bags	670	134	12.2%
			Other Plastic Bags	235	47	4.3%
2011	10	16,703	Plastic Carryout Bags	1367	137	8.2%
			Other Plastic Bags	1673	167	10.0%
2010 Plus 2011	15	22,205	Plastic Carryout Bags	2037	136	9.2%
			Other Plastic Bags	2408	161	10.8%
Post Ban						
2012	10	14,017	Plastic Carryout Bags	513	51	3.7%
			Other Plastic Bags	864	86	6.2%

In Table 2, for comparison purposes, the plastic bag category “Other Plastic Bags” is included. For the 2010 Plus 2011 Pre Ban surveys a total of **2408** other plastic bags are shown for a **161** other plastic bags per site and Post Ban for a total of **864** other plastic bags or **86** other plastic bags per site. The reduction

in other plastic bags is calculated by calculating the reduction of total litter from **10.8%** to **6.2%** for a reduction of **42.6%**. **Note that “other plastic bags” are more numerous than plastic carryout bags.**

Critical Analysis of San Jose Creek and River Litter Survey

First, taking a closer look at the City of San Jose’s analysis above, we first observe a **42.6%** reduction in “other plastic bags”. As previously [shown](#), a new “Adjusted Pre Ban Percent of Total Litter” must be calculated to subtract out the **42.6%** due to a general decrease in litter, decreasing the Pre Ban value of **9.2%** to **5.28%**. We then calculate the percentage reduction from **5.28%** to **3.7%** to obtain a **30%** reduction directly attributed to the bag ban vice the original **60%** originally calculated (reduction from **9.2%** to **3.7%**) by the City of San Jose.

Second, taking a critical look at Table 2, we note that Pre Ban data from the **5** sites in the 2010 Litter Survey were added to the **10** sites in the 2011 litter survey for a total of **15** sites. In reviewing the results for the 2010 and 2011 litter surveys, we discovered that some locations were surveyed in both the 2010 and 2011 litter surveys and others were sampled only once. Another thing we note is that in the 2012 litter surveys only **10** locations were surveyed Post ban of which only **five (5)** were surveyed Pre Ban. This means that the locations surveyed before and after the ban were not the same and the use of these survey results to establish a figure of merit is questionable.

The city of San Jose calculates the reduction in Creek plastic bag litter from the reduction in the percent of total litter, as explained above. Another method would be to compute the reduction in the average number of plastic bags per survey site (shown in Table 2) from **136** to **51** which produces a **62.5%** reduction in plastic carryout bags. Similarly, there was a reduction in “other plastic bags” from **161** to **86** which produces a **46.5%** reduction. Since these “other plastic bags” were not banned, how do you explain the **46.5%** reduction in “other plastic bags” other than a general reduction in litter? For our alternative method, we can also adjust the percent reduction of plastic carryout bags by the **46.5%** reduction in “other plastic bags” using the same calculations shown previously which also yields a **30%** reduction in plastic carryout bags directly due to the bag ban vice the **62.5%** reduction originally calculated.

The fact that “other plastic bags” show a **42.6%** reduction and that 5 of the 10 sites surveyed Post Ban were not surveyed previously, is a strong indication that the data is unreliable, or that other factors are contributing to an overall reduction of trash.

Based upon the factors explained above, our analysis is that the creek litter survey was conducted in an unscientific manner and that the results are at best questionable.

Therefore, we conclude that the analysis in the City of San Jose memorandum for the Creek Litter Survey is basically **unsound**. (Romanov, 2012, p. 6)

Storm Drain Litter Surveys

Storm drain catch basins, retrofitted with trash capture screens, were repeatedly sampled in order to establish an accumulation rate for plastic bags in storm drain system. A total of 69 storm drains were so

outfitted in different areas including residential, retail, commercial, light industrial, roadway, and urban park locations. The storm drain catch basin litter survey in addition to counting plastic bags measured the volume and weight of the different litter items including debris (leaves, grass clippings, etc.).

City of San Jose’s Analysis of Storm Drain Litter Rate

Table 1 in the 2012 [memorandum](#) from the City of San Jose shows the Pre Ban average of **3.6** plastic carryout bags per inlet per year was reduced to a Post ban average of **0.4** plastic carryout bags per inlet per year. This was claimed by the city of San Jose as a reduction of **89%** (Romanov, 2012, p. 6), and which was recently shown to be in error. (van Leeuwen, San Jose Miscalculates Plastic Bag Litter Reduction in Storm Drain System, 2015) The analysis was based upon **80** bags Pre-Ordinance and **9** bags Post Ordinance from a total of **25** sites surveyed before and after the bag ban for a total reduction of **71** plastic bags. No data for the category of “other plastic bags” was collected. (City of San Jose, 2012)

Critical Analysis of Storm Drain Catch Basin Litter Survey

The City of San Jose used a spreadsheet to record survey results and to calculate the percent reduction in plastic carryout bags found in the storm drain system. **The analysis performed by the City of San Jose incorrectly calculated the percent reduction by referencing the wrong column in computing the Post Ban average of plastic bags per inlet per year.** The number used as the Post Ban average (i.e. **0.4** plastic bags per inlet per year) refers to gallons per day and not to bags per day. The correct numbers are a reduction from an average of **3.6** plastic bags per inlet per year to **1.4** plastic bags per inlet per year for an overall **62%** reduction. In a [letter](#) dated February 12, 2015 the Santa Clara Valley Urban Runoff Pollution Prevention Program confirmed the error and determined that the correct value is **62%**. (van Leeuwen, San Jose Miscalculates Plastic Bag Litter Reduction in Storm Drain System, 2015)

The analysis in Table 3, Storm Drain Survey Results, is similar (at a summary level rather than detail level) to the analysis conducted by San Jose in computing the percent reduction of plastic bag litter. While more sites were surveyed than those listed in the table, data was selected from 25 locations that were surveyed before and after the plastic bag ban. The number of bags is divided by the total survey days to calculate the number of bags per inlet per day which is then multiplied by 365 to develop the bags per inlet per year. The plastic bag reduction is then calculated from the reduction in the average bags per inlet per year of **3.6135** to **1.387** for a **61.6%** reduction. This figure can then be rounded up to **62%**.

Table 3. Storm Drain Survey Results

Litter Audit	Number of Sites	Total Survey Days	Number of Bags	Bags per Inlet per Day	Bags per Inlet per Year	Percent Reduction
<i>Pre Ban</i>						
Events 1-3	25	8,083	80	0.0099	3.6135	
<i>Post Ban</i>						
Event 4	25	2,398	9	0.0038	1.387	
<i>Post Ban Reduction</i>						61.6%

Looking back at the raw source data, we note that **69** storm drains catch basins were sampled during Pre Ban Events 1-3 and that the average number of plastic carryout bags per inlet per day is **0.0061**. Multiplying that number by 365 gives us **2.2** plastic bags per inlet per year. This is much less than the **3.61** calculated by the City of San Jose for the **25** selected storm drain inlets. No explanation for the difference was provided by San Jose, although we suspect it has to do with the larger sample size.

The small sample size was one of the issues we brought up in a previous article "[Rebuttal of the San Jose Bag Ban Results](#)" that the 25 storm drain inlets sampled is too small a sample size to provide meaningful results. (Williams & van Leeuwen, 2013) The following paragraph describes the San Jose storm drain system:

The City's storm sewer network is a storm water collection system that includes more than 1,150 miles of storm sewer pipelines, 29,900 storm drain inlets, 1,500 storm outfalls, and over 4,500 miles of curb and gutter. Various channels, culverts, ditches, detention and debris basins make up the remainder of the system. The storm sewer system is designed to convey storm water away from developed areas to local creeks and rivers, and ultimately, to San Francisco Bay. (City of San Jose, 2012)

As can be seen from the above paragraph, the San Jose storm drain system with **29,900** storm drain inlets requires data from a much larger sample size than **25** storm drain inlets to calculate a meaningful reduction in storm drain plastic bag litter.

Based upon the above, we conclude that the analysis in the City of San Jose memorandum for the Creek Litter Survey is **not only unsound but incorrect**. (Romanov, 2012, p. 6)

Overview of Litter Survey Results

The City of San Jose conducted the litter surveys primarily as a tool to characterize litter in selected locations with the goal of identifying the number of plastic grocery bags found in the litter stream and measuring the success of the city's plastic bag ban. We give the city credit for conducting litter surveys before and after their bag ban, even though they miscalculated the reduction in plastic bag litter in the storm drain system, and failed to follow common sense survey guidelines in conducting litter surveys.

To our knowledge, the City of San Jose never extrapolated survey results to the entire city in order to estimate the magnitude of the problem posed by plastic carryout bags littered city wide. Also, since two-thirds of all plastic bag litter (See Table 4) was found in creeks, to the best of our knowledge, the City of San Jose never investigated the source of that plastic bag litter. This litter could have originated from the more than 1200 storm drain outfalls, from homeless encampments along creek beds (some of which were just recently cleaned up), or from recreational use of local creeks. Certainly knowing the origin of that plastic bag litter, or for that matter all litter in creek beds, is essential to devising an effective strategy to eliminate that litter and to meet the requirements of the federal Clean Water Act.

One point often left out of the discussion is the presence of significant quantities of “other plastic bags” (defined as Zip-Lock, plastic trash bags, product bags, etc.) that were also collected during the On-Land and the Creek Litter Surveys. In Table 1, we see a total of **463** “other plastic bags” collected Pre Ban compared to **796** retail plastic carryout bags. In Table 2 we see a total of **2,408** “other plastic bags” collected Pre Ban compared to **2,037** retail plastic carryout bags. What this means is very simple. Other plastic bags are just as numerous as plastic grocery bags. A plastic bag ban will still leave significant quantities of other plastic bags on city streets and in creeks. **To be specific, less than HALF of all plastic bags in city streets and local creeks will be affected by a bag ban!**

Pre Ban Survey Results show that only HALF of all plastic bag litter consists of single-use plastic bags; hence, the effectiveness of a bag ban is limited to eliminating only HALF of all Pre Ban plastic bag litter!

Another point often left out of the discussion, is that creek litter surveys show only **9.1%** of litter prior to the bag ban consists of plastic carryout bags. This means that the maximum impact of a bag ban is to remove only **9.1%** of all litter, falling far short of the **100%** litter reduction requirement of the federal Clean Water Act. In other words, the bag ban is the wrong solution to effectively address the litter problem

Pre Ban Survey Results show that only 9.1% of litter in creeks consists of single-use plastic bags; hence, the maximum effectiveness of a bag ban is limited to eliminating only 9.1% of creek litter and falling well short of the 100% litter reduction required by the federal Clean Water Act!

In Table 4, below, the Summary of Litter Survey Results, the number of sites surveyed and the number of plastic bags found are identified, including values for the claimed percent reduction.

Several general observations can be made. First, the number of sites surveyed Pre Ban is much larger than Post Ban. Second, we notice how many plastic carryout bags were found. **A total of 2,913 plastic carryout bags were found Pre Ban and 598 plastic carryout bags Post Ban for a net reduction of 2,315 plastic bags.**

In fact, if you take the Pre Ban Total of **2,913** plastic carryout bags, round that up for an average of **1,000** plastic bags per year that would be **1 plastic bag per year for every 1,000 citizens** in the city of San Jose! Furthermore, the average of **1,000** plastic bags per year is less than what **two (2)** people in the City of San Jose with a population of **more than 1 million** would use in an entire year! In other words, more than **1 million** people had the safety and convenience of using plastic grocery bags taken away from them because of a small number of plastic bags that were littered and equivalent to what just **two (2)** people use annually!

Table 4. Summary of Litter Survey Results

Litter Audit	Number of Sites	Number of Plastic Carryout Bags	Percent Reduction
Pre Ban			
On-Land Survey	107	796	
Creek Survey	15	2,037	
Storm Drain Survey	158	86	
Pre-Ban Total		2,913	
Post Ban			
On-Land Survey	31	76	59%
Creek Survey	10	513	60%
Storm Drain Survey	69	9	62%
Post Ban Total		598	

Values in red are corrected values.

Only 2,913 single-use plastic bags were collected in the 2009, 2010, and 2011 San Jose Litter Surveys averaging just about 1,000 plastic bags per year or 1 plastic bag for every 1,000 citizens in the City of San Jose. This is less than the annual number of plastic grocery bags used by just two (2) citizens out of a population of more than 1 million!

Furthermore, the average of **1,000** plastic bags per year is only **0.0002%** of the **500 million** plastic carryout bags bag ban proponents claim are used per year in the city of San Jose. Even if you multiply that by a hundredfold that still gets you less than **0.02%**. Clearly, **the number of plastic bag littered per year do not rise to the level that requires a drastic solution such as a bag ban** instead of more traditional litter cleanup and abatement methods.

Putting Things in Perspective

A rational person, would take a step back, look at all of this information and put it in perspective. This can be done by asking some questions.

The first question that should be asked is this: If you completely ban a product, what reduction would you expect to see of that product as a component of litter? Of course, you would expect a **100%** reduction. So the obvious point here is that litter surveys can only verify the logical outcome of a complete ban of plastic carryout bags. They are not a grand revelation that proves the success of a bag ban, but only that if you ban an item, it will disappear. But it does raise another question as to how **40%** (or higher) of the plastic carryout bags still remain? Logic would imply that **40%** of the people must have started shopping outside of San Jose. We expect the number of plastic bags found to continue to reduce as virtually all of the cities around San Jose have now followed San Jose and implemented their own bag bans, thus not allowing people who seek the convenience of a free plastic carryout bag to be able to find it anywhere.

The second question that should be asked is if two-thirds of all single-use plastic carryout bags were found in creeks but still made up less than **10%** of the litter, is a plastic bag ban the right solution to meeting the **100%** reduction required by the federal Clean Water Act or should a different solution be found and pursued?

The third question that should be asked is this: Was the littered plastic grocery bags ever really a significant problem to begin with? That would require a cost/benefit analysis, as briefly addressed in the next section.

Bag Ban Cost Verses Benefits

The cost to residents of complying with the plastic carryout bag ban is estimated in the article "[Rebuttal of the San Jose Bag Ban Results](#)". The article uses bag usage statistics from the City of Santa Monica that are very similar to San Jose's bag usage statistics and show that the cost to bring purchases home increased from **\$15,063,711.90** to **\$38,069,244.21** for a net cost increase of **\$23,005,532.31 per year**.

Previously, we discussed that over three years of Pre Ban litter surveys only **2,913** plastic bags were collected which we rounded up and averaged at **1,000** plastic bags per year. If we assume that this is only **1%** of all plastic bags littered (and multiply the litter survey results by 100), the cost would be **\$23 million / 100,000** or **\$230** per plastic bag per year.

It costs San Jose residents \$230 to eliminate each littered plastic carryout bag!

Can bag banners claim that bag bans are a success when it cost residents **\$230** to eliminate each littered plastic carryout bag? **Imagine, if you will; the city paying someone \$230 for each littered plastic carryout bag they picked up, and by just picking up two (2) littered plastic bags per day, they would earn more than a \$100,000 per year! Just think, if the person was industrious, and picked up 20 littered plastic carryout bags per day, they could earn more than a \$1 million per year! Wouldn't it be great to live that well off from the huge government waste created by the bag ban?**

With an estimated cost of \$230 for each plastic bag eliminated from the environment, it should be obvious that traditional litter abatement methods would be far less costly and far more effective than a bag ban.

And those cost figures did not even include the hundreds of thousands of dollars spent by the City of San Jose to implement the bag ban or the costs incurred by retail stores!

Summary

Since 2012, other cities in the region have also implemented bans on plastic grocery bags. Therefore new litter surveys should show an even greater reduction in plastic grocery bags as part of the litter stream. But even if a **100%** reduction in plastic grocery bags is achieved, the achievement is INCONSEQUENTIAL because the Pre Ban litter surveys show that an INSIGNIFICANT number of plastic

grocery bags are littered! Furthermore, the Pre Ban litter surveys show that “other plastic bags” are just as prevalent as single-use plastic carryout bags and will not be affected by a bag ban.

Achieving a 100% reduction in plastic grocery bag litter is INCONSEQUENTIAL because an INSIGNIFICANT number of plastic grocery bags are littered!

The claims made by the City of San Jose that the on-land litter surveys were a **59%** reduction, a **60%** reduction from creek litter surveys, and an **89%** reduction (later corrected to **62%** due to a calculation error) for storm drain surveys. However, these were never corrected for the general reduction in litter. We show above that the actual reduction attributed to the bag ban for the on-land litter survey is **46%** and the creek litter survey is **30%**.

As stated earlier in this article, the City of San Jose did not conduct litter surveys in a controlled and scientific manner that would lend credibility to measuring a reduction of plastic carryout bag litter. That said, the litter surveys did reveal several surprising facts that have escaped the notice of city officials, the media, and many others! What were those facts?

- 1) That only **2,913** plastic carryout bags were collected in litter surveys conducted over three years before the plastic bag ban was implemented.
- 2) That that “other plastic bags” are **just as numerous** as plastic grocery bags and will still remain on city streets, in creeks, and in storm drains despite the bag ban!
- 3) That a bag ban will reduce litter in Creeks by at most **10%** and falling well short of the **100%** reduction required by the federal Clean Water Act.
- 4) That the **2,913** plastic carryout bags collected over three years of Pre Ban litter surveys reflect less than what **two (2)** residents out of a population of more than **1 million** would in that time period!

In other words, the bag ban is **OVERKILL** for an insignificant problem that is better and much more efficiently dealt with by traditional litter abatement methods, including the installation of storm drain trash capture devices, removing homeless encampments from creeks, and increased litter collection. These methods alone, which the city is being forced to do anyway, would have easily solved any problems with plastic grocery bag litter and done a lot more to remove other litter including other plastic bags! (van Leeuwen, San Jose’s Bag Ban Useless in Solving Litter Problems – Should be Rescinded, 2015)

Had the San Jose’s City Council and City Staff just put the Pre Ban Litter Survey results into proper perspective, they could have avoided imposing a bag ban and implemented traditional litter abatement strategies instead at a much lower cost. Instead, a politically correct City Council implemented a bag ban costing residents more than \$23 million dollars annually not to mention the nearly \$1 million wasted by the city to implement the bag ban, or the costs incurred by retailers. San Jose’s own litter surveys show that the bag ban did not solve litter problems and therefore constitutes an enormous

waste of money. In addition, the inconvenience, frustration, and aggravation experienced by San Jose residents and shoppers could also have been avoided.

In the meantime, until the city repeals their plastic bag ban, residents will spend over \$230 annually for each plastic grocery bag that was eliminated from the environment. San Jose's bag ban is a bad deal for residents!

There is no logical reason to expect that results at the statewide level would be any different; therefore, the statewide bag ban should also be repealed, since it multiplies this enormous financial waste many times over and over!

About The Authors

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