Bag Bans: A Failure-Not Success As Claimed

SUCCESS IS NOT MEASURED BY A REDUCTION IN PLASTIC CARRYOUT BAG LITTER, BUT BY THE SUCCESSFUL ACCOMPLISHMENT OF ALL BAG BAN OBJECTIVES AND AN HONEST EVALUATION OF BAG BAN IMPACTS AND RESULTS

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11 November 2013

As more and more communities pass ordinances to ban plastic carryout bags, a key question remains: Are these bag bans successful? Proponents of bag bans are quick to point out that once the bags are banned, fewer plastic bags will be found as litter in the environment. Of course, that is true. If the use of plastic carryout bags is sharply reduced by a bag ban then the quantity of plastic carryout bags found as litter will be similarly reduced and reflected in litter surveys. But does that single measurement signify the success of the ban? Or are there other factors that must be considered before a bag ban can be declared a success? In this paper we will look at this question and attempt to provide a reasonable answer.

Typical Bag Ban

Bag Bans throughout the State of California are very similar to one another. They ban plastic carryout bags and also impose a minimum fee on paper bags primarily to coerce shoppers into using reusable bags. Most bans include exemptions from the paper bag fee for certain low income groups (e.g. food stamp recipients) as well as waivers for plastic carryout bag use by certain non-profit organizations. Produce and product bags without handles are typically exempt along with carryout bags from restaurants.

Typical Bag Ban Objectives

Proponents of Bag bans frequently state that their objective is to reduce plastic bag litter and thereby prevent harm to marine and terrestrial wildlife. However, these are not the sole objectives of a bag ban. The objectives of a typical Bag Ban are normally stated in the accompanying Environmental Impact Report (EIR) or other planning documentation. In the case Santa Barbara, San Mateo, and Ventura Counties the objectives were cited in the respective EIR and are re-stated in Table 1 below. These objectives are fairly common and apply to other bag ban ordinances as well. In addition, Single-Use Bag Ordinances and accompanying documentation fail to outline potential side effects and impacts, and neglect to provide guidelines for conducting an acceptable cost analysis for reaching the stated objectives. In other words, NO cost/benefit analysis was performed.

Analysis of Typical Ordinance Objectives

Like any other project, the success of a project can be determined by analyzing the original project objectives, how well the project lived up to those objectives, and the cost to achieve those objectives. By analyzing the objectives behind the ordinance, we can determine if the goals of the ordinance as expressed in the objectives are achieved.

Table 1. Objectives from Santa Barbara, San Mateo, and Ventura County Final EIRs

	Objectives
1	*Reducing the environmental impacts related to single use plastic carryout bags, such as impacts to biological resources (including marine environments), water quality and utilities (solid waste equipment and facilities)*
2	*Deterring the use of paper bags by retail customers*
3	*Promoting a shift toward the use of reusable carryout bags by retail customers*
4	*Reducing the amount of single-use bags in trash loads to reduce landfill volumes*
5	*Reducing litter and the associated adverse impacts to storm water systems, aesthetics and marine and terrestrial environments*

How well each of the five objectives, in Table 1, is achieved is an important consideration in determining the success of the single-use bag ordinance. This consideration along with the impacts and consequences to both shoppers and the environment is the only fair and equitable way to judge the overall success of a bag ban.

Objective 1: Reducing Environmental Impacts

Objective 1 states as follows: "*Reducing the environmental impacts related to single use plastic carryout bags, such as impacts to biological resources (including marine environments), water quality and utilities (solid waste equipment and facilities)*". While this objective could have been better written, we will look at the overall environmental impact of the ordinance and leave the impact of plastic bag litter for analysis in objective 5. In a paper titled "Bag Bans: Wrong Way to Control Litter" the author included Table 2, showing that ten out of fourteen environmental parameters are greater Post Ban than Pre Ban for Santa Barbara and Ventura Counties. What this means is that based upon the assumptions in the EIR there is a larger negative impact to the environment Post Ban than Pre Ban. (van Leeuwen, Bag Bans: Wrong Way To Control Litter, 2013) Similar results are expected for the San Mateo County EIR. While the higher negative impact is not catastrophic, or even deemed significant, it nevertheless increases rather than decreases the negative environmental impact of a bag ban. Hence, **Objective 1 clearly fails**.

Table 2. Santa Barbara and Ventura County EIR Environmental Parameters

Line	Environmental Impact	Units	Pre Ban	Post Ban	Delta
1	Ozone Emissions	kg	15,140	6,944	(8196)
2	Atmospheric Acidification	kg	713,534	469,227	(244,307)
3	Green House Gas Emissions:				
4	Per Year	Metric Tons	17,553	28,472	10919
5	Per Person	Metric Tons	0.0142	0.0230	0.0088
6	Water Consumption (Ecobilan Data)	Million gallons/year	14.23	22.47	8.24
7	Water Consumption (Boustead Data)	Million gallons/year	25.45	199.53	174.08
8	Water Consumption (Wash Reusable Bags)	Million gallons/year	0	153.3	153.3
9	Waste Water Generation (Ecobilan Data)	Million gallons/year	13.52	17.41	3.89
10	Solid Waste (Ecobilan Data) w/recycling	Short tons	4,730.39	1442.46	(3287.93)
11	Solid Waste (Boustead Data)	Short tons	2902.34	4716.31	1813.97
12	Energy - Ecobilan	Million KWh/Day	0.22	0.12	(0.10)
13	Energy - Boustead	Million KWh/Day	0.25	0.40	0.15
14	Energy Consumption (Wash Reusable Bags)	Million KWh/Year	0	9.94	9.94
15	Eutrophication - Ecobilan	Kg Phosphate/Year	204.4	880.05	675.65

Objective 2: Reduce the Use of Paper Bags

Objective 2 states as follows: "*Deterring the use of paper bags by retail customers*". This means that the ordinance should be designed in such a manner so as to discourage or deter paper bag use, for example, by imposing a fee for each paper bag distributed. The thought is that if a fee was not imposed on paper bags, then plastic bags would just be replaced by paper bags. Even though imposing a fee will not eliminate paper bag use, the fee should be sufficiently high enough to discourage paper bag use. Furthermore, the fee exemption for certain low income groups (e.g. food stamp recipients) is not conducive to lowering paper bag usage rates as these customers are able to receive a free paper bag whenever they shop and have no incentive to adopt using reusable bags. (van Leeuwen, Plastic Bag Ban Creates New Welfare Benefit, 2013)

In the City of Santa Monica, the Team Marine study (see Table 3 below and also Appendix A) shows paper bag usage going from 5% Pre Ban to 23% Post Ban and increasing to 29% one-year after the ban. What this means is that despite the fee, paper bag use increased after the bag ban with a clear **upward** trend. (Team Marine, 2013)

The bag usage data for Santa Monica counted customers who used each of the three (plastic, paper, and reusable) bag types and those who used no bags. The survey did not count the number of bags used. San Jose, on the other hand, counted total customers, customers who used no bags, and the total bags of each type used. This makes comparing results between Santa Monica and San Jose data difficult. The San Jose survey data is located in Table 3 below and Appendix B.

The San Jose survey sampled more customers before the ban than after the ban. In addition, the number of customers who did not use bags increased significantly from 12.9% to 43.5%. By adjusting the San Jose pre-ordinance data to analyze an equal number (i.e. 1000) customers before and after the ban a 19% decrease in paper bag use occurred as a result of the large increase in customers not using bags. If the data is adjusted to compare an equal number of customers who used bags before and after the ban, we see an increase in paper bag use by 25%. Therefore, we conclude that paper bag use actually increased among patrons who used bags.

For both Santa Monica and San Jose, we see paper bag use increasing after implementation of a ban on plastic carryout bags. The fee imposed does not appear to be a significant deterrent and over time people get used to the fee and accept the fee with paper bags usage going up. (Team Marine, 2013) This is to be expected, since the fee imposed on paper bags is financially competitive with the total cost of using reusable bags. (van Leeuwen & Williams, Plastic Bag Alternatives Much More Costly to Consumers, 2013) In time, as more and more people get used to the fee and exasperated with the difficulties of using reusable bags, shoppers will increasingly choose paper bags.

While the goals of Objective 2 are partially met, in that it discourages the outright replacement of plastic bags by paper bags, the ordinance does not discourage paper bag use significantly. Hence, **Objective 2 is considered Marginal**.

Objective 3: Promoting a Shift to Reusable Bags

Objective 3 states as follows: "*Promoting a shift toward the use of reusable carryout bags by retail customers.*" This objective suggests that the ordinance should result in an increase in reusable bag usage once plastic carryout bags are banned. In Table 3, reusable bags usage increased for both the cities of Santa Monica and San Jose. Paper bag use and patrons choosing No bags increased as well.

For the city of Santa Monica the use of reusable bags increased from 10% to 41% immediately after the ban and then settled down to 35% after one year with what appears to be a **downward trend**. We also see that paper bag use increases from 5% to 23% right after the ban and increased to 29% one year after the ban. Patrons who chose No Bag increased from 15% to 36%. In other words, consumers chose No Bags or Paper Bags over reusable bags by 65% to 35% or an almost a 2:1 ratio. Hence, shoppers have largely rejected reusable bags by a 2:1 ratio and the objective of shifting consumers into using reusable bags has produced marginal results and literally **Failed**.

Similar results exist for the City of San Jose (surveys mainly of grocery stores only) where patrons who chose NO bag significantly went up from 12.9% to 43.5%. Similarly, paper bag use increased from 10.3% to 18.8% for an increase of 8.5%, using the adjusted numbers in parentheses. Reusable bag use went up from 2.7% to 36.4% for an increase of 33.7%. Thus patrons chose No bags or paper bags 39.1% over reusable bags 33.7% for a 6:5 ratio.

Table 3. Pre Ban and Post Ban Carryout Bag Usage

Study	Plastic Bags	Paper Bags	Reusable Bags	No Bags or Other
EIR Assumptions§				
Pre Ban	100%	0%	0%	0%
Post Ban	5%	30%	65%	0%
Santa Monica (Team Marine Study)‡				
Pre Ban	69%	5%	10%	15%
Post Ban	0%	23%	41%	36%
Post Ban + 1 Year	0%	29%	35%	36%
San Jose¥				
Pre Ban	85% (74%)	11.9% (10.3%)	3.1% (2.7%)	12.9%
Post Ban	2.3% (1.3%)	33.3% (18.8%)	64.4% (36.4%)	43.5%

§ EIR Assumptions come from the EIRs for San Mateo, Santa Barbara, and Ventura Counties.
‡ Santa Monica Data is based upon the number of customers using each bag type or no bag.
¥ San Jose Data is based upon the quantity of bags used, total customers using bags and no bags. The percentages in parenthesis are adjusted numbers derived by multiplying the percentage times the percentage of people using bags. This allows us to compare results.

While it is true that in both cases, reusable bag usage went up, we clearly see that based upon the data available, shoppers clearly chose the No Bag and paper bag option over reusable bags. This is true not only for grocery stores but for non-grocery stores as well, as can be seen by a brief survey conducted by Stop The Bag Ban which balanced the grocery store surveys with non-grocery store surveys and included in Appendix B. Hence, the objective to shift consumers to using reusable bags **FAILED**.

Objective 4: Reducing Single Use Bags in Trash Loads

Bag ban proponents claim that the bag ban will keep thousands of tons of plastic bags out of the landfill. What they don't tell you is that the total amount put into the landfill as a direct result of the single-use bag ordinance is many times as much as the plastic bags previously put into the landfill!

Table 4 identifies the materials put into the landfill Pre Ban and Post Ban. Since the EIRs assume an initial condition of 100% plastic bag use, we assume that 5% will be recycled and the other 95% will end up in the landfill in a worst case condition. Many of these bags will contain trash. Post Ban we assume that 61% of paper bags end up in the landfill with 39% recycled.[1] In addition, reusable bags made from cotton or Polypropylene (PP) are not recyclable in the United States, we assume that all reusable bags are landfilled each year. This is because the EIR assumes a worst case lifespan for a reusable bag as used once per week for 52 weeks. (van Leeuwen, Fact Sheet - Landfill Impacts LASBVTA, 2013)

In Table 4, Replacement Bags refers to the 40.3% of plastic carryout bags that are reused by consumers as trash can liners or trash bags and will be disposed of in the landfill. Because these bags are banned consumers will purchase replacement bags. Even though these bags are not as likely to become litter, their manufacture, sale, and disposal are a direct result of the ordinance, and must be included in analyzing the impact to the environment. "Other plastic" refers to other plastic bags and plastic wraps that are recycled through the In-Store Recycling Bins that are now landfilled since by law stores are not required to retain the In-Store Recycling Bins and will remove them.

Table 4. Santa Barbara and Ventura County Single-Use Bag Ordinance Landfill Impacts.

	Quantity	Weight per bag (lbs.)	Weight (lbs.)	Weight (tons)
Pre-Ban				
Plastic Carryout Bags	639,152,405	0.01213	7,752,918.68	**3,876.46**
Post Ban				
Plastic Carryout Bags	32,912,070	0.01213	399,223.41	199.61
Reusable Bags	8,228,018	0.42500	3,496,907.84	1,748.45
Paper Bags	156,003,213	0.14875	23,205,477.97	11,602.74
Replacement Bags (40%)	263,296,562	0.01213	3,193,787.30	1,596.89
Other Plastic (Ventura County)	14,507,641	0.140708	2,041,341.09	1,020.67
Total Post Ban				**16,168.37**
Post Ban /Pre Ban Ratio				**4.17**

[1] It is not known if the 39% recycling rate for paper bags will remain valid once consumers pay 10-cents for each paper bag and put a higher value on the paper bag, bags previously received for "free".

While the objective specifically refers to reducing the single use bags in trash loads, from Table 4 it can be seen that the remaining 5% plastic carryout bags plus single use paper bags exceed the weight of the plastic carry out bags Pre Ban. When you take all material, including the disposal of reusable bags, replacement bags, and "other" plastic the total weight disposed Post Ban in more than four times the weight Pre-Ban. (van Leeuwen, Fact Sheet - Landfill Impacts LASBVTA, 2013)

Based upon the objective of reducing single use bags in trash loads, this objective clearly **FAILS**!

Objective 5: Reducing Litter and associated adverse impacts on terrestrial and Marine Environments.

Objective 5 states the following: "*Reducing litter and the associated adverse impacts to storm water systems, aesthetics and marine and terrestrial environments*".

The single-use bag ordinance bans plastic carryout bag distribution at many retail stores sharply reducing the total number of plastic carryout bags distributed; Hence, the number of plastic carryout bags found in litter will be reduced. Since 5% of plastic carryout bags are expected to remain, as time goes on the number of plastic bags found in litter will be reduced, but they will never be totally eliminated.

Furthermore, since plastic bags of all types comprise only 0.6% of roadside litter, banning 95% of one type of bag (the plastic grocery bag) will at the very most reduce litter by a tiny fraction. The actual amount of litter reduction is so small as to be negligible. Since well over 99% of litter remains adverse impacts of litter are not reduced, therefore objective 5 clearly **Fails**. (Stein, 2012)

Conclusion

The bag ban ordinance was proposed as a solution to a variety of complex co-dependent problems, but has failed to achieve the results expected. While it is true that banning plastic bags does reduce the number of carryout bags found in littered areas, the objectives of a bag ban ordinance clearly FAIL in these key areas:

- Higher negative Post Ban impact to the environment.
- Greater use of paper bags including an upward usage trend.
- Rejection of reusable bags in favor of paper and No bags by a 2:1 ratio including downward usage trend.
- Greater Landfill volume and weight of material as a direct result of bag ban.
- Negligible impact on litter.

Proponents will try to spin the data and claim success for a bag ban, but the facts show that a majority of people reject reusable bags in favor of paper bags or no bags at all. Furthermore, the bag bans have cost citizens millions of dollars in pursuing alternatives that are not only time consuming, but have negative side effects and even endanger public health. This paper only examined the stated objectives

of a bag ban and the negative consequences of such a ban were only partially explored as they related to these objectives. However, together with the failure to achieve the key objectives, the negative impacts of bag bans far outweigh any claimed success. Bag bans should be reviewed and repealed due to their negative impact to the citizens and the environment. Bag bans were a bad idea from the beginning, and the evidence is proving that out as time goes on.

About The Authors

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Appendix A

Team Marine Shopping Bag Research Report

Team Marine, a student group from Santa Monica High School, conducted a 19-month long study to examine the effects of the Santa Monica Plastic Bag Ban. The study spanned ten months prior to the ban and 12 months after. A total of 50,400 store patrons were observed at regular stores and at Eco-Friendly stores. (Team Marine, 2013, p. 1)

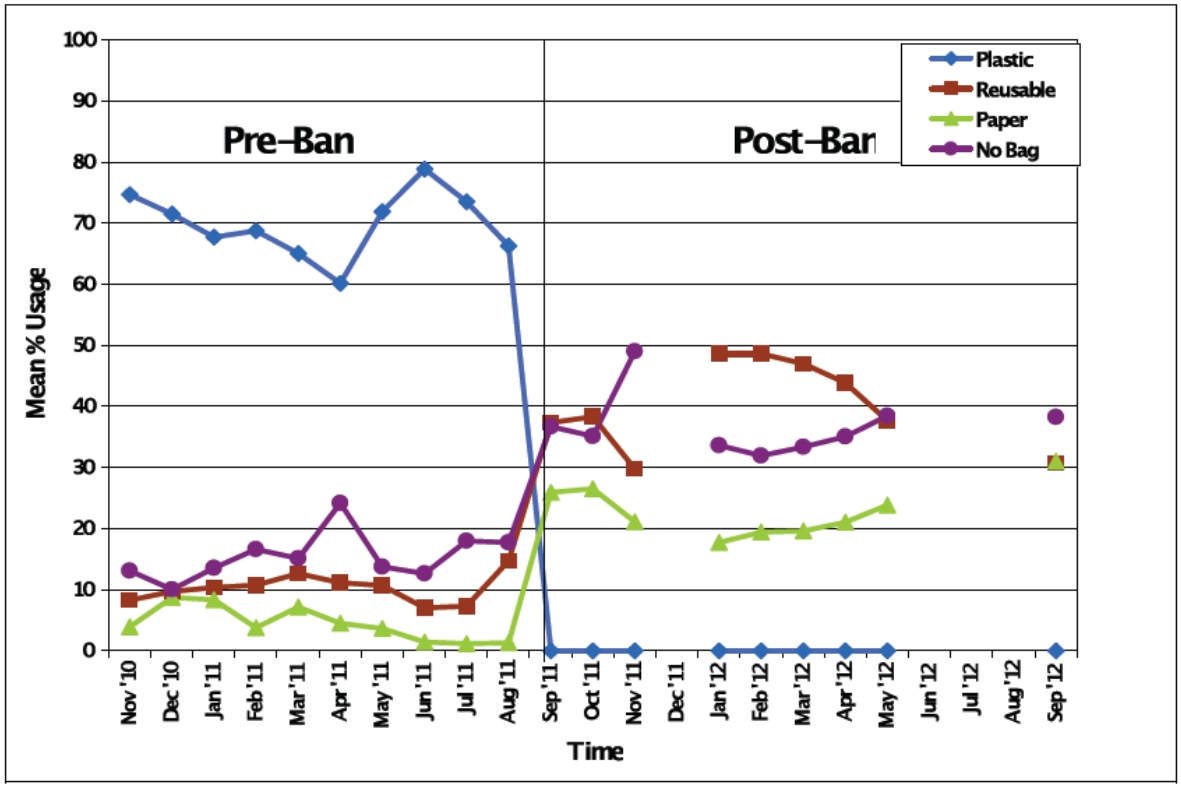

Figure A-1. Mean Percent Usage of Different Bag Choices at Regular Stores

Figure A-1 is copied from the Team Marine Research Report, Page 6, Figure 4. (Team Marine, 2013, p. 6)

This figure shows bag usage data from regular stores. Note that the mean plastic bag usage dropped from a mean 69.41% to 0%. Mean paper bag usage goes from about 4.85% to 23.16% and then rises to about 30% at one year Post Ban. Reusable bag usage increases from 10.44% to 41.25% and then drops to about 30% one year after the ban. The mean No bag option grew from 15.3% to almost 50% and then drops to about 35.59%. The graph shows a downward trend for reusable bags and an upward trend for paper bags and no bag option. Gaps in data are gaps where no data was collected. (Team Marine, 2013, p. 1)

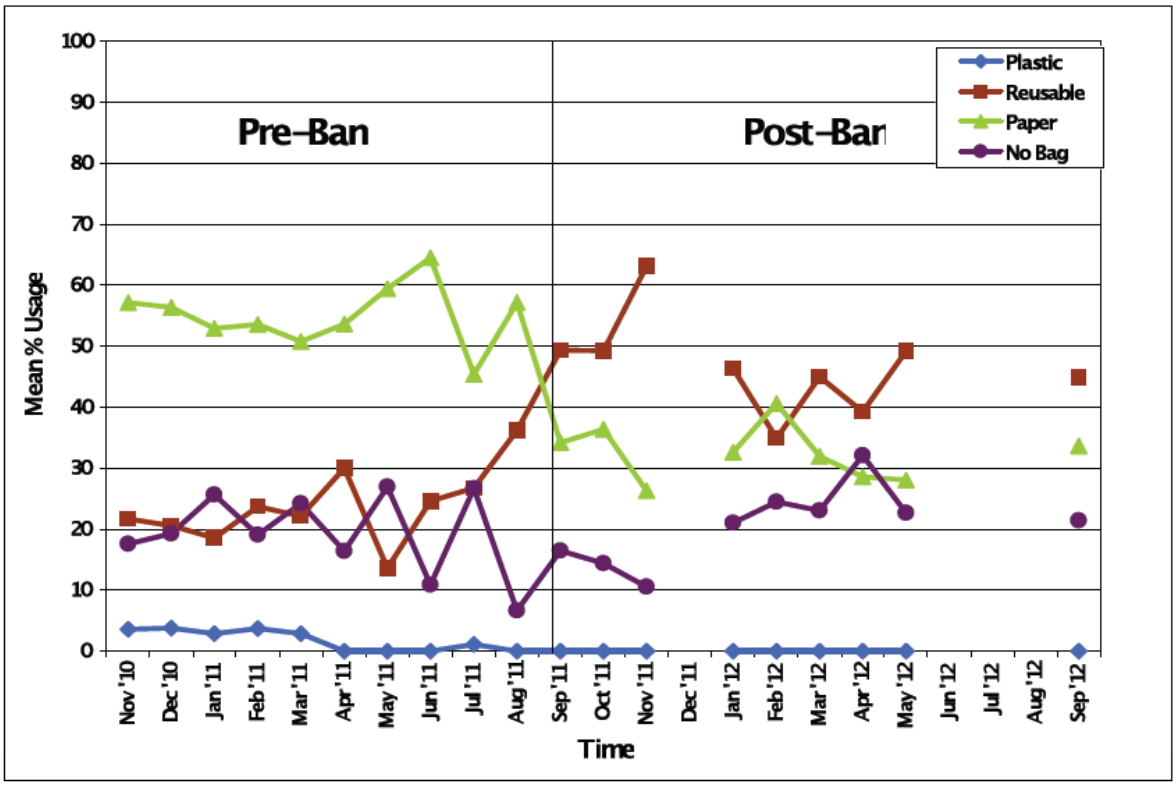

Figure A-2. Mean Percent Usage of Different Bag Choices at Eco-Friendly Stores

Figure A-2 is copied from the Team Marine Research Report, Page 5, Figure 3. (Team Marine, 2013, p. 5)

Eco-Friendly stores are stores like Trader Joe's and Whole Foods that specialize in high end and organic foods and generally have not issued plastic carryout bags but used paper bags instead.

Figure A-2 shows the drop in paper bag usage as a result of the paper bag fee. Mean paper bag use dropped from about 55.4% Pre Ban to 32.62% Post Ban. The mean reusable bag use increased from 23.25% and jumped to over 60% and settled down to 46.68%. The mean No bag use went from 19.22% to 20.70%. The effect of a paper bag fee clearly shows a reduction in paper bag use and increase in reusable bag use at Eco-Friendly stores. (Team Marine, 2013, p. 3)

Appendix B

Table B-1. San Jose Pre Ban and Post Ban Store Bag Usage Observation Data

Survey Year	Total Customers Observed	Customers With No Bag	Customers Who Use Bags		Qty. of Paper Bags	Qty. of Plastic Bags	Qty. of Reusable Bags	Total Bags
2009S	1057	60	997		641	2542	115	3298
2010W	705	67	638		208	3598	77	3883
2010S	1107	243	864		159	1064	73	1296
Pre Ban	**2869**	**370**	**2499**		**1008**	**7204**	**265**	**8477**
Percent	**100%**	**12.9%**	**87.1%**		**11.9%**	**85.0%**	**3.1%**	**100%**
2012S	1068	419	649		317	28	550	895
2012F	1105	526	579		300	15	644	959
Post Ban	**2173**	**945**	**1228**		**617**	**43**	**1194**	**1854**
Percent	**100%**	**43.5%**	**56.5%**		**33.3%**	**2.3%**	**64.4%**	**100%**
Adjusted per 1000 customers Pre Ban and Post Ban								
Pre Ban	**1000**	**129**	**871**		**351**	**2511**	**92**	**2955**
Post Ban	**1000**	**435**	**565**		**284**	**20**	**549**	**853**
Percent Increase/Decrease					**-19%**	**-99%**	**495%**	**-71%**
Adjusted per 1000 customers who used bags Pre Ban and Post Ban								
Pre Ban	**1148**	**148**	**1000**		**403**	**2883**	**106**	**3392**
Post Ban	**1770**	**770**	**1000**		**502**	**35**	**972**	**1510**
Percent Increase/Decrease					**24.6%**	**-98.8%**	**816.9%**	**-55.5%**

Comments:

1. The City of San Jose Bag Usage Surveys conducted before and after the bag ban were badly designed. The total number of customers were counted, customers who chose No bag or hand carried their purchases out of the store, and the quantity of Plastic, Paper and Reusable bags used. The number of customers who used each bag type was not counted or included in the raw data. This makes analysis of trends from before and after the bag ban difficult to analyze. (City of San Jose, 2013)

2. Using the City of San Jose data as presented in the top half of Table B-1, we see that customers who chose not to use a bag increased from 370 Pre Ban to 945 Post Ban or an increase of 12.9% to 43.5%. Paper bag use increased from 11.9% to 33.3%, plastic bag use decreased from 85% to 2.3%. and reusable bags use increased from 3.1% to 64.4%. These percentages are meaningless since they reflect the proportion of all bags that each type reflected Pre and Post Ban. This is like comparing apples and oranges.
3. We note that the total number of customers surveyed Pre Ban is significantly more than Post Ban. Adjusting the data to reflect 1000 customers Pre Ban and Post Ban shows a 19% reduction in paper bag use, 99% reduction in plastic bag use and 495% increase in reusable bags. It should be noted that the number of customers who did NOT use bags increased from 129 to 435 out of a thousand or 237% increase.
4. The San Jose survey focused almost exclusively on grocery stores. However, grocery stores make up only a portion of the total number of stores. No measurements of other stores were done or factored into these results. (See below for a survey of other stores.)
5. When the number of customers is adjusted for 1000 customers who used bags Pre Ban and Post Ban, paper bag use is shown to increase by 24.6% and reusable bags are shown to increase by a whopping 816.9%. The number of customers who chose to forgo bags increased from 148 to 770 for an increase of 420% increase.

"Stop The Bag Ban" Survey Results

To compensate for the omission of non-grocery stores by the City of San Jose bag usage survey, on 7-8 October 2013, the "Stop The Bag Ban" group conducted a Bag Usage survey of non-grocery type stores including Fry's Electronics, Best Buy, Home Depot, Dollar Tree, and Wal-Mart all located in San Jose. Each store was observed for 1 hour and Survey data collected is shown in Table 5, below.

Table 5. Stop The Bag Ban Bag Usage Survey

Store	Customers With No Merchandise	Customers With Merchandise And No Bags	Customers With Purchased Bags	Customers With Reusable Bags	Customers With Free Bags
Home Depot	14	91	0	3	0
Best Buy	38	36	0	2	0
Dollar Tree	5	21	0	4	35
Wal-Mart	37	149	85	33	0
Fry's Electronics	48	103	2	4	0
Total	**142**	**400**	**87**	**46**	**35**
Percentages	**20%**	**56%**	**12%**	**6.5%**	**5%**

Note that 400 customers (56%) purchased merchandise and choose no bags. 87 customers (12%) purchased paper bags and 46 customers (6.5%) brought and used reusable bags. In San Jose, "thick" plastic bags are considered reusable and not subject to regulation. The Dollar Tree store provides these for free rather than face theft of shopping baskets and merchandise. A total of 35 customers (5%) used Dollar Tree free bags. Since Wal-Mart carries a line of groceries, the percentage of reusable bags is higher than the other stores, as is typical of grocery stores where pre-planned purchases are common. Note that over half the customers overall now choose to go without any bags rather than deal with the difficulties of using reusable bags or paying for bags. The number of customers buying paper bags rather than using reusable bags is 2 to 1 and the number of customers choosing any alternative over using reusable bags is about 10:1.

The stated goal of the bag ban in San Jose was to get people to move to using reusable bags. This survey reflects only 8% of patrons fulfilling that goal.