

# Attitudes Toward Littering

Fall 2016

Department of Philosophy

**PIONEERS FOR SUSTAINABLE COMMUNITIES REPORT**



[This page intentionally blank]

## **ACKNOWLEDGEMENTS**

This report was made possible by the collaboration and support of the City of Hayward, including:

The City Council: Barbara Halliday (mayor), Sara Lamnin, Francisco Zermenio, Marvin Peixoto, Al Mendall, Elisa Marquez, and Mark Salinas

The City Manager, Kelly McAdoo

Managements Analyst, Laurel James (and P4SC program coordinator for the City)

City Employees who helped plan and implement the projects: Erik Pearson, Mary Thomas, Jeff Krump, Elisa Wilfong, Michael Loconte, and Chris Sturken

There was also a great deal of support from CSUEB including: Lonny Brooks, Nina Haft, Jiansheng Guo, Yungi Liu, Andrea Wells, Mary D'Alleva, and Jessica Weiss

This pioneering year of P4SC would not have been possible without the generous support of Cal State East Bay President, Leroy M. Morishita.



## About Pioneers for Sustainable Communities

Pioneers for Sustainable Communities (P4SC) is a year-long partnership between Cal State East Bay and a community partner that represents local or regional government. P4SC is one of a network of campuses nationwide—the EPIC-N Network—that have adopted a model of using course-based, faculty-lead, student research to support the sustainability goals of local communities. P4SC focuses on sustainability, social justice, and quality of life in the San Francisco East Bay region. It leverages the expertise of faculty and the enthusiasm, time, and innovative ideas of students, providing thousands of hours of research to support local partner sustainability programs including: data acquisition and analysis, stakeholder surveys, geo-spatial mapping and referencing used to establish socio-environmental baselines, track progress, and facilitate planning and communications.

- **P4SC Reports** present the final results of one or more full-time equivalent courses devoted to a single P4SC project.
- **P4SC Mini-Reports** present the results of partial courses devoted to a PSC project, typically used for projects in progress.

## About Cal State East Bay

Cal State East Bay's beautiful main campus is located in the Hayward hills with panoramic views of the San Francisco Bay shoreline. Situated above the city of Hayward, the campus offers an ideal setting for teaching and learning and yet easy access to the many cities along the bay. The University has a satellite campus in Concord, a professional development center in Oakland, and a significant presence online. Founded in 1957, Cal State East Bay is one of 23 universities of the California State University system (CSU). With an enrollment of over 15,800 students, Cal State East Bay is recognized as a regionally engaged and globally oriented university with a strong commitment to academic innovation, student success, engaged service learning, diversity, and sustainability.

## P4SC Directors and Staff

Karina Garbesi, P4SC Co-Director, Professor and Director of the Environmental Studies Program, Department of Anthropology, Geography, and Environmental Studies, Cal State East Bay

Craig Derksen, P4SC Co-Director, Assistant Professor of Philosophy, Department of Philosophy, Cal State East Bay

Audrey Wade, P4SC Program Coordinator, Cal State East Bay

*With support from Jillian Buckholz, Director of the Office of Sustainability*



## About the City of Hayward

The City of Hayward was incorporated in 1876. With a population of 150,000, Hayward is the sixth largest city in the Bay Area and proudly the second most diverse City in California. A Charter City, Hayward operates under the Council-Manager form of government with a directly elected Mayor and six member City Council. Hayward is a full service City comprised of thirteen departments providing services ranging from public safety and public works to library and community services. The City strives to be a safe, clean, green, and thriving community for all of its residents. To learn more about the City of Hayward, visit [www.Hayward-ca.gov](http://www.Hayward-ca.gov).





---

# Attitudes Toward Littering

## REPORT AUTHORS

Kane Shotz

Craig Derksen

## COURSE PARTICIPANTS

### P4SC Instructor

Craig Derksen Ph.D.

Assistant Professor of Philosophy

PHIL3151 Environmental Ethics

### P4SC Student Participants

The Students of Fall 2016 CSUEB PHIL3151 Environmental Ethics including:

Shavar Belgrave

Chloe Blancas

Seth Blatt

Martha Bravo-Rios

Julio Campos

Nestor Castro

Nathanael Detlefsen

Antoinette Franklin

Bradley Heusdens

Andrew Marten

Andres Navarro

Jaqueline Paine

Wesley Passman

Kane Shotz

Shanee Sims

Shruti Sivasubramanian



---

# Pioneers for Sustainable Communities: Attitudes Toward Littering

---

## TABLE OF CONTENTS

---

1. Objectives
2. Methods
3. Anti-Littering Campaigns
4. Reviewing Some Scholarship
5. The Disconnect
6. The Value of Outreach
7. Conclusion
8. References

---

## OBJECTIVES

---

The City of Hayward has identified prevention of littering as a route toward greater sustainability. They are partnering with California State University, East Bay to help meet these ends. To establish solid foundations for this strategy we are starting with a course in environmental ethics. The course will target ideas and behaviors as they relate to littering, first at the ideological and global level and gradually getting less abstract and more specific down to the littering behavior in Hayward.

---

## METHODS

---

The students for this class were asked to research and reflect at the same time. Rather than just report on others' work or deploy a pre-defined methodology, students were asked to refine their own process as they worked and produce information that they perceived as valuable based on the understanding that they gleaned from the process. The students were not completely free however, they were trained in methods to find, filter, organize, categorize, and present with an emphasis on being useful and




---

valuable. They were also tasked with identifying and exploring the theoretical basis of claims. With these methods the students were set loose on the world to discover and explore as many sources as they could. This was supplemented by visits from experts as well as a survey of litter in the city of Hayward, the results of which were submitted to the city. This report is a refinement of the results that this process produced, often in the various students' voices.

Litter is a complicated subject. Its complexity is from its contradiction. When the class started discussing litter it was obvious that it was perceived as bad (universally) but not that bad (individually), dangerous (if overdone) but not that bad (if it is done in limited degrees), something that people should not do but something that people will do (and that is ok). Basically the perception was that it was bad but not bad enough to take action. With this in mind the class started to consider anti littering campaigns and how they might influence people to take action. From there the students develop categories based on how they saw the organization of the information.

---

## ANTI-LITTERING CAMPAIGNS

---

### List of Campaigns:

Although anti-littering campaigns can take many forms, the ones that seem to be the most effective find creative ways to argue their point. Sometimes what seems to make these campaigns effective is not so much the content of their argument, but how they plan the campaign and how well it is executed. The main goal of public outreach is to create a lasting impression on the viewer. One of the biggest problems that campaigns face is how to go about doing this. There are a lot campaigns that have taken a creative approach to solving littering problems often with much success.

Sometimes, more than one method can be employed to achieve more success in public outreach. A proposed project in San Mateo, CA laid out a plan to use local citizen, school and business involvement and volunteer efforts to clean up trash in neighborhoods and other areas.<sup>1</sup> This program took a community based approach to solving the problem, by having neighborhood leaders, school children and businesses clean up trash in their respective areas. This encouraged a sense of pride for the residents' community that would connect to a perceived obligation for ones' own neighborhood, school or business front. What is unique about this program idea is that it emphasized the residents' responsibility over the city governments. Having the government organize these events could encourage citizens to take responsibility where they would not simply by themselves.

The *Don't Mess With Texas* campaign has received a great deal of attention. It used a variety of strategies as well, rather than a single one. One technique they used was to get celebrities that are from Texas to take selfies promoting the *Don't Mess With Texas* logo.<sup>2</sup> A page on the website for the campaign allows people to report a litterer



---

that they see on the road, by providing the website with their license plate number if it is registered in Texas, the make and color of the car, where and when the person witnessed the event. The potential litterer gets sent a litter bag and a letter telling them not to mess with Texas after the information is compared with the DMV records.<sup>3</sup> The campaign also performed studies on attitudes and behavior. In the 2013 version, it describes the people that are most likely to litter. "In general, the incidence of littering skews somewhat toward males, but more heavily toward Millennials, Hispanics, singles, and households with young children."<sup>4</sup> Most cigarette smokers who littered their cigarette butts out the window believed that cigarette butts counted as litter. They mostly did so out of habit and claimed they would not do so if there was a more convenient way to dispose of them.<sup>5</sup> This campaign performed sociological studies of Texas' local population and used this information to improve its effect on public outreach. They not only gathered information on who was more likely to litter, but also on who the campaign was reaching. For example, in the 2013 study it found that in Spanish-dominant areas, there were higher amounts of litter and a lower awareness of the true meaning of the campaign.<sup>6</sup> Information such as this can be useful when trying to develop a plan for a campaign.

The city of San Jose proposed a strategy in 2014 to reduce their litter problem by dividing their outreach campaigns into two categories: one for the general public and one for school-age children. The programs geared towards the general public include one day litter pick-up events such as the *Great American Litter Pick-Up Day*. During events such as these, the city helps train and recruits residents to pick up trash off of the street. The Environmental Services Department (ESD) in San Jose also teams up with local creek cleanup organizations such as Friends of Los Gatos Creek, the Guadalupe River Park Conservancy, and Restore Coyote Creek to help remove trash from the waterways. For school-age children, the city provides something called the *Zun Zun Program*. This uses interactive assemblies to educate kids about littering, with the goal of making education fun. They also have something called the "Be the Street" program which uses a community-based social marketing technique to educate kids. This program was so successful in gaining public attention that it used a video campaign contest to achieve 6.5 million impressions on Pandora, Facebook, and KTVU. Also the city was working on a pilot for a multi-city block art project that would show students the path that trash takes when traveling to the creek. In addition to this the ESD hosted the *Bay Area Trash Summit* in 2013. Over 300 people from 130 government agencies, nonprofits and businesses attended and discussed ideas for solutions to the common littering problems they faced.<sup>7</sup>

Some campaigns focus on cleanup events to solve their trash problem. The city of San Jose also has a program called *SHED*, that provides materials and training for residents to perform trash cleanup events, even for large groups.<sup>8</sup>

Wake County, North Carolina launched a campaign called *86it* to reduce litter in its community. The county will send residents a cleanup kit with everything they need to organize a trash cleanup event if they fill out a form. Afterwards they mail the kit back.<sup>9</sup> This technique seems to be aimed at convincing residents that they are responsible for




---

cleaning up litter in their community. Through this sense of responsibility, agencies encourage residents to perform cleanup events by providing them with all of the necessary materials. They are trying to create the impression that the only thing holding residents back from this is the lack of materials. Otherwise, providing them wouldn't be worth the county or city's time to begin with. This technique might temporarily reduce litter, however without dealing with the problem of what is causing the litter in the first place, it is likely to come back once removed. Unless there is a community willing to continually engage in these cleanup efforts once the trash builds up again, it is unlikely that this technique can make a real difference reducing litter.

The *Keep Virginia Beautiful* campaign attempts to get residents to pick up the trash themselves by creating a one bag of trash challenge. They encourage residents to grab a bag of trash and one of recycling as well off of the streets, take a picture of it and tag the photo with #OneBagofTrashVa. Then they are encouraged to tag their friends and family with hopes that they will also accept the challenge.<sup>10</sup> Once again we see the motivation of shame and the emphasis on the cleanup. What is different about this technique from the other two is that it attempts to use social media to spread its message, so it might have more of a chance of reaching out to a greater audience. However, the same problem exists with this technique as well. If people are still littering, then people will have to continually cleanup the trash. Even if everybody picks up a bag of trash and recycling, it will eventually come back.

This program will also send residents of North Carolina car magnets, stickers or litter bags upon request if they take a pledge online not to litter and to encourage their family and friends not to do so as well. At the bottom of the webpage for this campaign is a number which appears to be the amount of people which have taken this pledge so far.<sup>11</sup> This seems to appeal to people wanting to be accepted as part of the group, using peer pressure to encourage them to not litter. They encourage people to take the pledge by giving them free things which in return become further advertisement for the campaign.

Some programs attempt to use details and facts to convince the public to stop littering. The organization *Keep America Beautiful* launched the *Cigarette Litter Prevention Program*. This is based on spreading awareness of the problems caused by cigarette butt littering. It claims that many people do not consider cigarette butts litter and when disposal facilities are near, less people litter them.<sup>12</sup> This is an attempt to deal with a bigger issue by starting small and specifically. By offering statistics and starting with the biggest source of litter, *Keep America Beautiful* is attempting to tackle a big problem one step at a time in a practical way. By informing the public of the problem, they hope to convince them through education. The *Keep Oakland Beautiful* campaign in Oakland, CA is funded by a Cigarette Litter Prevention Program (CLPP) Grant from *Keep America Beautiful* (KAB). It used this money to put in ashtrays and ads telling people to put out their cigarette butts properly.<sup>13</sup> This is another example of a campaign focusing on a specific problem. KAB seems to be very focused on cigarette butts since they are such a big problem. The link to the grant application on KAB's website says: "Keep America Beautiful awards CLPP grants to its affiliates, local governments,




---

business improvement districts, downtown associations, parks and recreation areas, and other organizations dedicated to eradicating litter and beautifying their communities.<sup>14</sup> Although they are a national organization, they work with local governments and organizations to help solve America's litter problem.

An organization called *Litter Free Long Beach* have a *No Litter Zone* program where local businesses can take a pledge to remove litter from their business area and become a member. This allows them to post a *No Litter Zone* window cling on their shop windows, giving them recognition from the public for their environmentally friendly practices. If more than 50% of all businesses in Long Beach join, then the organization claims that they will post the businesses names on the website, giving these businesses further recognition. In addition to this, the organization allows businesses and individuals to sponsor events such as cleanups and gives recognition to those who sponsored these events.<sup>15</sup> This is an example of a campaign giving incentive to community members to get them involved in cleanup efforts. This is potentially a good way to get people involved; however the same problem that exists in many other campaigns exists here as well. The source of the litter is not being addressed.

The city of New York, NY has released a series of campaigns with a focus on reducing trash before it becomes litter. An ad campaign that was released by *GreenNYC* called the *Bring Your Own Effort*, was very effective at getting people to bring their own bags to the grocery store, mugs to places such as cafes and bottles while traveling to reduce the amount of trash and recycling produced. In 2015 the city released plans to fix or install 500 public water fountains and water bottle refilling stations. It also released plans for its *Water on the Go* program, which was supposed to provide temporary stations for people to refill their water bottles during the summer months.

The city also has an *Adopt a Basket* program where local business and community groups make sure that trash can liners in busy areas are changed, so trash doesn't escape the bins, and to encourage people to use them.<sup>16</sup> *GreenNYC* also released ads about changing residents' overall lifestyles in order to combat not just littering, but several environmental problems such as greenhouse gas emissions and pollution from pesticides.<sup>17</sup> This creates an interesting goal, which becomes not just to be courteous of one's local environment, but the overall environment as a whole. Indeed, litter is one part of a list of environmental problems. By including it in an overall campaign to get people to be environmentally friendly, *GreenNYC* is seeking to kill multiple birds with one stone and make the viewer feel that the problem is bigger than just litter. One effect of this might be more motivation to take action since there is more of a problem.

The Tennessee Department of Transportation (TDOT) has a *Litter Grant Program* to partner with different organizations that can help reduce the state's litter problem. In 1981, the soft drink and malt beverage industry lobbied to impose a tax on their products in the state, and the funds received from this were used to clean trash off of Tennessee's roadways. TDOT claims to have had a lot of success with this program, and it has removed over 300,000 tons of litter total since it began in 1983. Another organization that the TDOT has partnered with is *Keep Tennessee Beautiful* (KTnB).



KTnB focuses on public outreach and education, and has plans for campaigns such as *Trashercise* (which aims to combat both litter and obesity through trash cleanup), *Paint the State Green* (which focuses on community cleanup on a *Great American Cleanup Event*), and a KTnB Childrens' Book (meant to instill Tennessee pride into children and will developed by the well-known author and illustrator Guy Gilchrist).<sup>18</sup> Although the cleanup element is still present in these campaigns, there is also an effort to create a sense of responsibility among corporations, and reduce litter by affecting children through trying to invoke pride in how they view their community.

The Washington State Department of Ecology released a 3 year campaign plan titled *Litter and it Will Hurt* in 2001. Behind the campaign is the assumption that about half of the people in Washington State litter occasionally but can be persuaded not to.<sup>19</sup> The people who are the target audience of this campaign since they are the largest contributors are all people driving vehicles on roads. The campaign plan also says that the campaign will target people who don't litter but still drive as well. It seems to focus on making people aware that there are fines for littering, and making litterers believe that "their littering will be noticed and they could be caught". One of the strategies is an 800 phone number for people to report litter with. Other ways to change behavior that are stressed are the distribution of litter bags, promotion of tarps/cargo nets in order to secure truck beds, availability of disposable cigarette pouches, and increasing the number of litter receptacles and making them "cooler".<sup>20</sup> In order to gain corporate sponsorships to fund the campaign, the Department of Ecology teamed up with Belo Marketing Solutions/Northwest and Entercom Inc. which were two of the biggest broadcasting firms in Washington. They also notice the need to partner with other state agencies to complete their goals.<sup>21</sup> Since they believed that states which have litter prevention education and abatement programs for at least 5 years have the most success in litter reduction, they planned a long-term campaign. This focused on males since they made up 75% of typical litterers, and people between the ages 12-34 depending on the area.<sup>22</sup> Wholesalers, retailers and manufacturers of many commonly littered items were forced to pay a litter tax which funded this campaign. The plan not only attempted to collaborate with other government agencies, but also non-profits, and the companies which payed the litter tax.<sup>23</sup> There was a plan to advertise the campaign through local news agencies.<sup>24</sup> There was also a plan to get people to go on talk radio and describe the negative effects of litter.<sup>25</sup> Findings from pre-test focus groups conducted by the Department of Ecology found that providing a fear of punishment for littering was more effective than trying to convince litterers that it was easy not to litter.<sup>26</sup> This campaign plan took an authoritative stance on reducing litter.

Scotland launched an outreach campaign in 2014 called *Towards a Litter Free Scotland*. It planned on tackling Scotland's litter problem through prevention and not through simply cleaning it up. The methods it employed were information, infrastructure and enforcement. This worked through education, communication with the public, increasing public disposal facilities, enforcement of laws, and encouraging local community action/responsibility.<sup>27</sup> One key point that the plan relied on was the idea that areas which are already filled with litter encourage litterers to put more of it there.<sup>28</sup> There was a plan to give incentives to local communities to encourage them to




---

clean up areas which are not currently being cleaned and boost pride in peoples' communities. They would get to choose where this cleanup would be and would give communities control of their own environment in this sense.<sup>29</sup> One way they believed outreach could affect the public's actions was through providing an accessible, consistent message to encourage people to change their behavior.<sup>30</sup> It emphasized how increasing public recycling facilities would reduce litter and utilize reusable resources more. Another focus was how encouraging people to use reusable containers and recyclable packaging materials more would reduce trash. Getting businesses to change their packaging to create less trash was as well.<sup>31</sup>

Montgomery County, MD launched the *White Oaks Community Pilot* in order to solve the trash issue, and stop trash from getting into the Anacostia River and its Tributaries. The county decided to launch this pilot program in order to meet the EPA standards program and to learn where and why trash originates in areas, using the White Oak neighborhood as an example.<sup>32</sup> This area was selected because it already had very high levels of trash. They observed the storm drains, waterways, bus stops, streets in the area, and every piece of trash they could find in them. They had a neighborhood cleanup on earth day in which 50 volunteers cleaned up enormous amounts of trash. The conclusion from the study and follow up observation was that the area still had a large trash problem and needed further efforts to reduce litter. The study recommends having property owners put signs up discouraging people from dumping and littering on their property. It also recommends educating the public about the problem and speculates that the large amount of languages and transient nature of the residents in this neighborhood could be a big contributing factor.<sup>33</sup> A paper bag fee which was put into place in 2012 that required all retailers to charge 5 cents for paper bags, reduced the total paper bag usage by more than half in the first year. Of this fee, 1 cent went to the retailer and 4 cents to the Water Quality Protection Charge.<sup>34</sup>

The California Department of Transportation (Caltrans) published a *Litter Abatement Plan* in 2007. Its goals were to "measure performance, employ physical intervention and mechanical device innovations, emphasize litter policies and enforcement, partner with stakeholders, and increase public awareness".<sup>35</sup> It claims roads and freeways as the most common areas where trash occurs.<sup>36</sup> This is another example of a multifaceted approach to solving litter problems, with an emphasis on the freeways and roadsides. Caltrans is an agency which deals specifically with the roadsides in California, however even though their jurisdiction overlaps with the city of Hayward's, their goal is different. Hayward's trash problem according to the California Department of Water Resources relates to keeping trash out of the MS4s or waterways. Caltrans is concerned with keeping trash off of the roadsides. Although eventually the trash on the roads has potential to wash into the MS4s, this report makes no mention of regulation by the Department of Water Resources. The concern seems to be to reduce littering and improve the appearance of the environment.<sup>35</sup>

The city of Toronto's *Livegreen* organization released an ad campaign that which rearranges letters on trash in order to shame litterers. The ads say "littering says a lot about you" and rearranges trash in order for it to say words like lazy, selfish, and pig.<sup>37</sup>




---

This is unique because it takes objects that everybody is familiar with, such as an empty bag of Lays, Reeses Pieces, or a Gatorade bottle that is in a familiar form. They are laid out in a patch of grass, or on a sidewalk. Then Livegreen placed them in a way which portrays a message that viewers might not have normally got from them. The ads use a combination of humor and shame which is unique.

The city of Hayward, CA holds a contest once a year called *Hayward Shines*. Kids in grades 1-12 are encouraged to pick up trash, take photos of it, and throw it away. The kid and school who pick up the most trash get cash. The student with the most creative photo will be awarded too. This contest lasts for a month. The student has to download an app on their mobile phone to enter.<sup>38</sup> This is a unique approach because the campaign uses a competition to encourage more cleanup, and includes social media and smart phones in the methods for competition. This has the potential to engage more students than a simple litter pickup event would.

The city of Sydney, Australia launched a program to install *Reverse Vending Machines* (RVMs) to reduce litter in the city. They leased these machines through the company Envirobank Recycling, and the way that they work is by scanning the barcodes of beverage containers. The pedestrian inserts an empty plastic or aluminum beverage container into a slot on the machine, and gets to choose between a number of prizes that they will be entered for a chance to win. The machine automatically sorts out trash and unrecyclable material and crushes the acceptable beverage containers, which makes it so the machines can store up to 3,000 containers before requiring emptying. The machines automatically communicate to the service provider their level of fullness as well. The city placed these machines in busy areas that were also littering hot spots and launched a well targeted marketing campaign in order to inform the public and get them to use the machines. One of the main goals of this campaign was to change the attitudes of the public, by getting them to view their trash as valuable. Their target audience was workers, shoppers, tourists and residents among others. They put posters up around the areas, advertised on the machines themselves by showing the rewards on the display screen, put a page on the city of Sydney website, and other forms of advertisement.<sup>39</sup> Announcements were made on social media and television outlets about the machines.<sup>40</sup> The city spent \$22,006 on the machines, \$67,000 on marketing and \$29,600 on project evaluation costs. This is probably in Australian Dollars, but the source doesn't specify.<sup>41</sup> The city of Sydney was impressed by the results of this trial and will be using the RVM technology in the future once the company develops more advanced models.<sup>42</sup>

---

## REVIEWING SOME SCHOLARSHIP

---

With so many campaigns trying a variety of approaches it seems obvious that there would be work done of which approaches are best. There has been much research into the approaches as well as attempts to find technological innovations.




---

A study on the effect that ad campaigns for environmentally friendly products have on college students when they are and aren't deceptive was conducted.<sup>43</sup> The study says in the conclusion: "Deceptive ad claims may have little positive influence on consumers, and they have the potential to lead to negative consequences."<sup>44</sup> This suggests that viewers can tell when an ad is being deceptive. This indicates that for environmental ad campaigns, persuasion should not rely on false claims. Facts should be well supported and documented.

The *Ballot Bin* is a creative product which encourages people to put their cigarette butts into a bin by letting them voice their opinion on issues and questions. The person puts the cigarette butt into the hole which corresponds to the question they would like to answer. The website for the product claims that discounts and customization are a possibility for large orders.<sup>45</sup> Hubbub is the company which creates these and other products designed to encourage public engagement on environmental problems.<sup>46</sup> This product takes an interactive approach to prevent littering which attempts to make it fun not to litter.

The Alice Ferguson Foundation (AFF) along with the Metropolitan Washington Council of Governments (A network of government, business and concerned citizens in the Washington D.C. area) created the *Potomac River Outreach and Awareness Campaign for Trash* (PROACT). In order to create a successful campaign, these organizations commissioned *OpinionWorks* which was a local observer of public opinion, to conduct an opinion study throughout the region of the Potomac River watershed in the Washington D.C. area.<sup>47</sup> The results indicate that although litterers agree that laws make it less likely for people to litter, most think that they will not get caught despite them. The data shows that they are correct about this. They seem to have a very small chance of actually getting into trouble for littering. Also, most litterers seem to do so because of a combination of beliefs that: their litter isn't a big deal, they don't want to be around trash in their personal space, and that it is convenient for them to simply toss their trash.<sup>48</sup> Some litterers even seem to believe that they are helping people by littering. This can take the form of creating jobs for people in environmental agencies or "fun" weekend activities for cleanup crews. Litterers seemed to respond best to ads that were short, not too wordy, animated, shocking (like the Truth tobacco ads), demonstrative of the process where trash gets washed into rivers through witnessing it first-hand, featuring vulnerable children and/or celebrities or sports heroes.<sup>49</sup>

The State of Georgia's *Litter Abatement and Prevention Initiative* and the Georgia Governor's Office performed a study "to determine Georgia residents' opinions on litter, littering practices, and anti-littering programs in Georgia". It was published in 2006 and includes phone surveys of Georgia residents about their opinions on littering.<sup>50</sup> 39% of those interviewed defined litter as trash on the roadsides.<sup>51</sup> This is interesting because they do not take into account trash that is not along roadsides. The study says: "Of those who think it is acceptable to litter, the most popular acceptable reason to litter is when there is no trash receptacle nearby or when what is thrown out is biodegradable."<sup>52</sup> This indicates that many people do not view holding onto their trash until a trash can is reached as a viable option, and biodegradable material is not seen as



trash. The study says that 72% of Georgia residents believe that litterers will not be caught or punished for doing so by law enforcement.<sup>53</sup> It also says that 80% of Georgia residents support having the names of those who get caught and fined for littering posted in the newspaper. 77% believed that this would be at least somewhat effective in helping reduce litter in Georgia as well.<sup>54</sup> According to the study: "Georgia residents consider four agencies/entities to be most responsible for educating the public about litter issues and litter prevention in Georgia: schools (28%), state government (non-specific) (25%), local government (22%), and parents/family (21%)."<sup>55</sup> This indicates that people expect their government and government run agencies to be the most responsible for educating the public about litter. A survey was also created for KAB and the Georgia Department of Community Affairs in 2006. It notices that improperly covered trucks can be a major source for trash along roadsides.<sup>56</sup> It describes how litter can cost even more than clean-up costs in the long run by discouraging tourism, which damages the economy of the region.<sup>57</sup>

A brewery in Delray Beach, Florida called Saltwater Brewery has developed a biodegradable six pack holder with rings which can be eaten by marine life.<sup>58</sup> That is because they are made from wheat and barley. There is a possibility that if major manufacturers started using these rings then the price to produce them would drop considerably.<sup>59</sup>

The Department of Environment, Climate Change, and Water (DECCW) in New South Wales (NSW), Australia released a litter report for 2010 as part of a requirement for the state by the Protection of the Environment Operations Act. This was put into effect in 1997 and requires the DECCW to perform a littering report about significant areas once every two years.<sup>60</sup> It describes how the most littered items were cigarettes, although the largest amount by volume was plastics. The next largest by volume was paper products. The most littered areas in NSW were "industrial areas, car parks and along highways".<sup>61</sup> The report also describes how seasonal fluctuation of trash levels is common.<sup>62</sup> Metals were the third largest material littered by volume and glass was the fourth.<sup>63</sup> It also describes the areas with the highest to lowest amount of litter after the previously mentioned ones: beaches, residential sites, shopping centers, then recreational parks.<sup>64</sup>

NSW also released a review of litter research done by the Institute for Rural Futures, University of New England NSW in 2007. In the review it claims that the main causes of littering are: laziness, a perception that litter is not an important environmental concern, a feeling that someone else is paid to clean it up (especially in places like stadiums or theatres), location and a desire to not collect trash, and the type of item that it is. It also says that there is not solid enough evidence to claim that young people are the main cause of littering. However, many people may be more likely to litter if in a group. Older people may be less likely to admit to littering than young people as well.<sup>65</sup> It describes how placing more trash cans and ashtrays at a site had a greater influence on active than passive littering. Offering rewards for people who collected litter also showed positive results even when the awards were small. Ads which showed damage to animals or the environment showed a positive effect on young people



as well.<sup>66</sup> It describes how consumers have come to expect convenience from products. Part of this philosophy of convenience leads to a desire to dispose of the product conveniently once the consumer is done with it. Littering is considered the best way of doing this, putting at least some responsibility in the hands of the manufacturers who produce these items. Positive feedback loops for litter filled areas are described. When a person sees a littered area, they think that control has been relaxed in this location, leading many to dump more items at this site.<sup>67</sup> It claims that the soap and cleaning product industry has contributed to the increase in litter in public spaces by emphasizing the dirtiness of these public spaces. They encourage people to increase the cleanliness of their homespace in order to separate themselves from this dirty image so they can sell people more of their products. The effect that this has had on public space has been to increase the public's perception of them as dirty places, thus lowering the cleanliness standards that they held towards these areas. This is somewhat of a positive feedback loop. The dirtier people think that they are, the dirtier they become.<sup>68</sup> It describes how Norway has created a graded system of taxation for drink containers. The more the containers are recollected after use, the lower the tax is on these containers.<sup>69</sup> This makes sense since money is being made back through recycling them. This also gives an incentive to its citizens to recycle more. A project in New Zealand to clean a park saw a lot of success in part because both the adults and children were educated. This contributed because the parents were seen as role models to the kids so they had an influence through their own education even if they were not directly responsible for the littering.<sup>70</sup> It describes how children learn their disposal habits on the playground. It stresses the importance of litter education in primary and secondary schools.<sup>71</sup> It says that litter monitoring is a key practice to discovering ways to solve the problems associated with it.<sup>72</sup> At least it would help to identify the materials which contribute most to litter in order to get companies to not produce these as much if possible.

The EPA of New South Wales in Australia released a litter prevention project kit which claims that research shows that people do not want to be recognized as a litterer, and they usually do it alone. People who littered usually believed it was somebody else's responsibility to clean it up.<sup>73</sup>

A study was conducted where the teachers rewarded the students with occasional movies in exchange for keeping a clean schoolyard. This program was incredibly successful, and even when trash was introduced which the students didn't create, they still cleaned it up.<sup>74</sup> Another study found that messages making explicit demands for people not to litter actually made them want to litter more.<sup>75</sup> Another article on the subject suggests that not only are litterers not negatively reinforced properly to prevent them from gaining habits for littering, but people that don't litter are also not positively reinforced properly. This gives little incentive to do the right thing which plays a role in the littering problem that we have.<sup>76</sup>

The *Environmental Literacy Grant competition* is awarded to K-12 schools by the National Oceanic and Atmospheric Administration for environmental programs that fit its goals. Under the Advancing the Field section it says: "Projects and partners receiving support from NOAA are evaluated on their use of activity-specific, evidence-



based practices.<sup>77</sup> The U.S. EPA has awarded a total of \$244,428 in environmental education grants for three different organizations in Northern California. These are the Plumas Audubon Society in Quincy, CA, Education Outside in San Francisco, CA, and the Napa County Resource Conservation District in Napa, CA. An article says: "The grant funds will be used to educate students on the effects of climate change on wildlife, help elementary students understand the science behind their local watersheds, and to engage high-school students in stewardship, conservation, and natural resource management issues in their local community."<sup>78</sup>

---

## THE DISCONNECT

---

One of the most striking things to the class was that most anti littering campaigns have not focused on prevention. The contradictions that we mentioned above make dealing with litter at the source difficult. This has resulted in the emphasis on clean up that is apparent in the campaigns above. More than that it has resulted in a question of who is responsible for litter control. Since it is against the law then it is obviously the purview of law enforcement, but due to the lack of perceived severity as well as difficulty of enforcement that assignment is inadequate. What most people do not realize is that the result has been to assign the responsibility for littering to the groups in charge of protecting one of the locations that litter could harm, the water. While this made sense to the students it was obvious that they had to change their approach to litter to think about it in these terms. We found that for most people there was a significant disconnect between how they usually thought about litter and its protection by the Water Board.

The city of Hayward's Clean Water Program makes sure that the city complies with the requirements of the discharge permit given by the EPA to comply with the Clean Water Act of 1972.<sup>79</sup> The City of Hayward's *Measure C Graffiti & Illegal Dumping Strike Team* cleans up trash when illegal dumping occurs.<sup>80</sup> The page where you can fill out the form describing the illegal dumping that was witnessed for the Strike Team to clean up is called an Access Hayward Request. This site takes a lot of clicks to get to on the city website, and if I did not stumble across it searching the site I probably would have never known that this request was an option. There is a topic category of "Trash and Debris-Private Property" under the highlighted section "Community Appearance-Neighborhoods-City Codes". "Streets, Sidewalks and Lights" is a different highlighted section under the topic categories. This one contains the option "Trash and Debris-Public Property". I am guessing that these are the topics that must be selected for a formal complaint to be placed about trash on the streets or on somebody's property. However, I couldn't find any clear instructions on how to file a complaint other than to just fill out the form. This whole process is confusing and likely leads to people not wanting to put all of the effort into filing the request in the first place. If this process was



---

easier and better known among the public, the city would likely have a much easier time locating where the major trash areas are in Hayward.<sup>81</sup>

In a report describing a plan to reduce its trash problems, the city of Hayward describes the requirement that the Municipal Regional Stormwater Permit (MRP) has placed on the city of Hayward to reduce the amount of trash which enters its Municipal Separate Storm Sewer Systems (MS4s) by 40% by July 1, 2014.<sup>82</sup> It describes the outreach programs that were being planned to be implemented. These include handing out information at several street fairs, participation and funding of the regional Bay Area Stormwater Management Agencies Association Youth Outreach Campaign aimed at 16-24 year olds, The Countywide Program which conducts stormwater pollution prevention and anti-littering outreach to school-age children through contracts with five environmental education organizations through the Clean Water Program, media relations plans and projects for both of these agencies, and community outreach events which include a "litter outreach" kit that is given away. The city of Hayward received a total litter reduction credit of 8% for these four outreach methods.<sup>83</sup> The city's efforts to prevent trash from entering the bay are focused on enforcing littering laws, public outreach/education, street sweeping, installing trash capture devices inside MS4s, creek/channel/shoreline cleanup, banning single-use plastic bags and polystyrene foam food containers from being used by businesses, and improving management of trash bins/containers.<sup>84</sup> What is interesting is that trash cleanup efforts before trash enters the waterways are limited to street sweeping and creek/channel/shoreline cleanup. This is a result of the Water Board measuring litter for the city of Hayward in terms of how much of it ends up in the bay. The problem with this is that not all litter that is in the city enters the MS4s, and technically the city could be meeting the requirements placed on it by the MRP and still have many areas filled with litter. This requirement does help reduce the amount of trash which ends up in San Francisco Bay, however trash which doesn't enter the MS4s is a problem in Hayward as well. Since the Water Board seems to be the main agency which is in charge of ensuring that litter is being regulated/monitored in Hayward, it would be helpful in keeping the city clean if there was some sort of credit given to the city for reducing its overall litter problem instead of just what enters the MS4s. In an updated 2014 version of the previous report, it describes the different outreach programs that the city of Hayward participates in to reduce the trash load and comply with the MRP. These include distributing anti-littering materials at community events, organizing trash pick-up events, a quarterly newsletter distributed to businesses and residents, working with k-12 schools to educate students about the harms of littering and encourage students to stop littering at school and outside, the *Be the Street* youth anti-littering campaign which includes ads played online and in movie theatres, working with the Alameda County Clean Water Program (ACCWP) to study effective outreach methods at experimental sites in Livermore and possibly more areas, the Public Information and Participation (PIP) program which aims to influence both intentional and unintentional littering through public service announcements, online and movie theater advertising, and participating in outreach events, and the city's trash container management program (which includes putting




---

outreach materials on trash containers with the goal of encouraging residents to use them and improve water quality).<sup>85</sup>

The California EPA website for the San Francisco Bay Regional Water Quality Control Board discusses the Municipal Regional Stormwater Permit (MRP). This appears to be phase 1 of the National Pollutant Discharge Elimination System (NPDES), which aims to regulate stormwater discharge for urban areas with populations of over 100,000 people. Phase 2 of this program issues a General Permit for Discharge of Storm Water from small MS4s (municipal separate storm sewer systems) for all small MS4s in urbanized areas not covered by Phase 1. What is worth noting here is that the city and county of San Francisco are listed under the municipalities covered under the general permit instead of the MRP, even though its population is well over 100,000 and it is not just the most densely populated city in the Bay Area, but one of the most in the country. The counties which contain the other major population centers of the Bay Area including San Jose are all covered under the MRP.<sup>86</sup>

The CA Regional Water Quality Control Board released a report in 2007, which describes its *Surface Water Ambient Monitoring Program* (SWAMP). This program assesses trash levels in streams around the Bay Area to discover where the high trash areas are.<sup>87</sup> This program is part of an effort for the Water Board to find which water bodies should be included in Section 303(d) of the Clean Water Act as impaired by trash.<sup>88</sup> This means that the water bodies aren't meeting water quality standards. SWAMP scores these water bodies while taking into account both qualitative and quantitative levels of trash, and the impact that this causes to both humans and wildlife. The document describes the two main reasons for trash in streams in the S.F. Bay region as direct littering/dumping and downstream transport and accumulation.<sup>89</sup>

The Bay Area Stormwater Management Agencies Association (BASMAA) released a report on San Francisco Bay Area stormwater trash generation rates in June 2014. It says that the MRS permit for the S.F. Bay Area requires municipalities to reduce their stormwater discharge to the point of "no adverse impacts" to the water bodies by 2022.<sup>90</sup> The report describes how there was not a significant correlation between the size of the drainage area and the amount of trash found in inlet areas in the study. However, it says that this was due to other contributing factors, and that drainage area has a significant influence on the amount of trash which enters inlets nonetheless.<sup>91</sup>

Caltrans released a trash load reduction plan report for the San Francisco Bay Region in 2016. It describes public outreach programs that Caltrans has implemented to encourage Californians to litter less. The *Don't Trash California* and *Protect Every Drop* campaigns focused on educating the public about the problem of trash entering the storm drain systems.<sup>92</sup> What is interesting about this is that Caltrans seems to be mainly focused on the issue of the storm drains and not of trash in general. This might send a message to the public that littering is OK as long as it does not enter the storm drain systems. A campaign that lists other problems associated with litter as well might be more effective in reducing it.




---

## THE VALUE OF OUTREACH

---

While the students were impressed with the possibility of clean up and infrastructure they did not wish to ignore the possible benefits from outreach. We made a point of looking for indicators of the value of these programs.

The CA Department of Education describes the need for environmental education, the lack of funding available and the potential for higher standards for CA public schools in a report for a plan for environmental education that they developed in 2015.<sup>93</sup> It says that: "State-level funds generally come from two sources, the Environmental License Plate (ELP) and the Office of Education and the Environment (OEE). ELP funds have traditionally been the CDE's primary source of funding for state environmental education programs like the CREEC Network. The CDE receives about \$400,000 per year from the ELP, and this limited funding means that regional CREEC coordinators only serve a few hours each week, greatly limiting their capacity. The OEE provides funding for the EEI and implementing the EEI curriculum. The OEE receives approximately \$2 million a year for the EEI from environmental SPECIAL funds..."<sup>94</sup> The CREEC stands for the CA Regional Environmental Education Community. It is unlikely that for the nation's most populated state, this small amount of money is enough to teach children effectively about environmental issues. Outreach programs are possibly one way that this lack of funding for education can be remedied to an extent. It is likely that they will not be as effective as a well-funded education system on environmental problems such as littering, but may be the next best thing. Outreach programs also have the benefit of potentially reaching a wider audience than just school-age children.

A study on how to reduce litter performed from a behavioral science perspective in 2013, talks about the problem of habituation. This means that people become unaffected by certain stimuli over time after repeated exposure. This could pose a problem to litter reduction because signs and bins which are designed to grab peoples' attention and encourage them not to litter may be overlooked after repeated exposure. A possible solution is to have multiple different signs and colored or designed bins so people don't get exposed to the same ones too much.<sup>95</sup> It also describes positive reinforcement methods that have had success in reducing litter. One was a zoo that traded vouchers for trash collected by its patrons. Another is in Germany where a small redemption value is given to people who return their beverage containers to grocery stores. Chances to win prizes have also been given to people in exchange for trash collecting scavenger hunts in places like Singapore. Although negative reinforcement has seen some success, it seems to be more successful when coupled with positive reinforcement as well. The report makes the claim that all behavior that exists is a result of it being reinforced. Research shows that people are more effective at changing others' behavior through engagement than a leaflet or pamphlet tends to be. It also says that




---

law enforcement and fines are not likely to be effective unless there is a real threat to the perpetrator of being caught.<sup>96</sup> It describes how young people are more likely to not litter if education programs about the subject are fun.<sup>97</sup> The report says that people are more likely not to litter if there is a bin nearby, so putting more bins on the streets means less trash. It also talks about the Broken Windows Theory which suggests that if an area already has trash, people are more likely to litter there than if it doesn't.<sup>98</sup> Setting achievable goals and celebrating when they are achieved ensures reinforcement, while using a combination of this and a variety of other interventions is the most behaviorally sound way to achieve lasting change.<sup>99</sup> The report claims that railway stations had the highest amount of litter.<sup>100</sup> It talks about how when strangely shaped bins were placed in public spaces, people flocked to use them when compared with normal looking bins.<sup>101</sup> This indicates that fun designs decrease littering when it comes to trash and recycle bins.

The Mariscopa Association of Governments (MAG) released the *Don't Trash Arizona* litter prevention and education program in 2006. They conducted secondary research on litter campaigns throughout the world, and also several surveys/investigations to learn about the attitudes of the residents of Arizona, and how attitudes have changed over the years. The initial investigation found: "The secondary research found that litterers were predominately single males, aged 18 to 24—with a secondary tier of litterers aged 25 to 34. They tend to be smokers, eat/buy fast food two times per week or more, frequent bars and nightclubs, and drive pickup trucks. According to the Transportation Research Board, 55 percent of littering is deliberate, while 45 percent occurs "accidentally" when items blow or fall off vehicles. Littering most often takes place when drivers are alone, and many reported that they did not consider small items like cigarettes and candy wrappers to be litter."<sup>102</sup> It describes the percentage of the population interviewed as 46% accidental litterers in 2015.<sup>103</sup> This suggests that almost half of all people that litter may not have the intention to litter. Educating them through an outreach program may help to get people to be more careful since these accidental litterers still may care about the environment.

*Hubbub* is a non-profit organization which used to be called *Neat Streets*. They have done many different ad campaigns and partnered with the city of Westminster in 2015 which helped reduce chewing gum litter by 54% by June and 26% in July.<sup>104</sup> This is the same organization which created and distributes the Ballot Bin that was previously mentioned.

In the *Alameda County Clean Water Program* litter reduction manual, a study is mentioned which claims that in Livermore, CA, 3 multi-family dwellings (MFDs) were observed. One was a control group and nothing was done to the environment around the complex. Another had the area around it cleaned to see if people would litter less if they thought others were doing so too. The last one was exposed to outreach programs of various sorts. The MFD with the outreach programs saw the biggest decrease in litter by both volume and pieces counted individually. The one which was normally litter-free saw a small increase in litter count, but a large decrease in trash by volume, and although the control site had a small decrease in litter count, it had a significant rise in




---

trash by volume. The site with the outreach program had the greatest reduction of overall trash by a significant amount.<sup>105</sup>

The Texas Department of Transportation (TxDOT) conducted a follow-up litter prevention study for the *Don't Mess With Texas* litter campaign in 2009, which indicates that kids which grew up exposed to the campaign are less likely to litter than kids who weren't.<sup>106</sup> This is evidence that ad campaigns can have an impact on kids' habits towards littering. A campaign plan from Washington state, claims that during the first 6 years of the *Don't Mess with Texas* campaign, visible litter on the streets of Texas was reduced by 72% and that this campaign was so successful in part because of the strict fines, the targeting of young males as an audience, and "Texas incorporated litter prevention information in driver's education and license renewal information".<sup>107</sup> It describes the average taxpayer cost "over the years" in 2001 as 7 cents per resident in media buys per year for the entire state.<sup>108</sup> It has been speculated that the *Don't Mess With Texas* ad campaign was so successful because the people who were probably littering were "macho" guys. One of the ads featured in the campaign which includes two famous football players. One suggests that he wants to beat up litterers.<sup>109</sup> These ads appeal to the people who were littering and it seems like they effectively got them to do so less. A study done by a behavioral science organization on littering notes the *Don't Mess with Texas* campaign as creating a 72% reduction in litter from 1986 to 1990. Reasons for their success are noted as: "leverages the pride that Texans have for their state and includes reinforcers such as an "adopt-a highway" scheme, various social events to clean up litter and phone apps to make it easier (less punishing) to report littering".<sup>110</sup> The fact that this campaign leveraged the pride of the people of Texas seems to have contributed to its success. It seems that the more pride people have for the place where they live, the less likely they are to litter there.

---

## CONCLUSION

---

While there is a great deal of information to be had, one thing is striking; dealing with littering required a lot of transitions from small scale to large and back again. It is strange for a group to deal with a behavior that seems so small but has the potential for an impact when widespread. No individual behavior is problematic on its own, but as multiple people start to act or if people develop bad habits, then problems are inevitable. In this way, littering might be a demonstration for sustainability as a whole and the challenges it might face.

---

## REFERENCES

---



---

- 1) Scheidt, Sarah. "Administrative Report". *City of San Mateo*, 2 June 2015, pp.1-2, <http://www.cityofsanmateo.org/DocumentCenter/View/46022>. Accessed 8 Feb. 2017.
- 2) "Celebrity Selfies". *Don't Mess with Texas*, 2017, <http://www.dontmesswithtexas.org/the-campaign/celebrity-selfies/>. Accessed 8 Feb. 2017.
- 3) "Report a Litterer". *Don't Mess with Texas*, 2017, <http://www.dontmesswithtexas.org/get-involved/report-a-litterer/>. Accessed 8 Feb. 2017.
- 4) "2013 Litter Attitudes And Behaviors". *Texas Department of Transportation, Don't Mess with Texas*, 3 April 2013, p.5 par.3, [http://www.dontmesswithtexas.org/docs/DMWT\\_2013\\_Attitudes\\_Behaviors\\_Full\\_Report.pdf](http://www.dontmesswithtexas.org/docs/DMWT_2013_Attitudes_Behaviors_Full_Report.pdf). Accessed on 8 Feb. 2017.
- 5) "2013 Litter Attitudes And Behaviors". *Texas Department of Transportation, Don't Mess with Texas*, 3 April 2013, p.47 , [http://www.dontmesswithtexas.org/docs/DMWT\\_2013\\_Attitudes\\_Behaviors\\_Full\\_Report.pdf](http://www.dontmesswithtexas.org/docs/DMWT_2013_Attitudes_Behaviors_Full_Report.pdf). Accessed on 8 Feb. 2017.
- 6) "2013 Litter Attitudes And Behaviors". *Texas Department of Transportation, Don't Mess with Texas*, Executive Summary, 3 April 2013, p.5, [http://www.dontmesswithtexas.org/docs/DMWT\\_2013\\_Attitudes\\_Behaviors\\_Exec\\_Summary.pdf](http://www.dontmesswithtexas.org/docs/DMWT_2013_Attitudes_Behaviors_Exec_Summary.pdf). Accessed on 8 Feb. 2017.
- 7) Romanow, Kerrie. "Memorandum". *City of San Jose*, 12 Feb. 2014, p.2 par. 4-p.4 par. 3, <http://www.sanjoseca.gov/DocumentCenter/View/27328>. Accessed 8 Feb. 2017.
- 8) "Anti-Graffiti/Litter". *City of San Jose*, par.2, <http://www.sanjoseca.gov/index.aspx?NID=592>. Accessed 8 Feb. 2017.
- 9) "Check Out an 86It Litter Kit". *86it.com*, <http://www.86it.com/litter-clean-up-kit/>. Accessed 8 Feb. 2017.
- 10) "Are You Ready for a Challenge?". *Keep Virginia Beautiful*, <http://keepvirginiabeautiful.org/2016/09/29/are-you-ready-for-a-challenge/>. Accessed 8 Feb. 2017.
- 11) "Pledge For Swag". *86it.com*, <http://www.86it.com/swag/>. Accessed 8 Feb. 2017.



---

12) "The Problem and Facts". *Cigarette Litter Prevention Program, a Keep America Beautiful Initiative*, Keep America Beautiful, 2017, <https://www.kab.org/cigarette-litter-prevention/problem-and-facts>. Accessed 8 Feb. 2017.

13) "Litter Awareness and Prevention". *Keep Oakland Beautiful*, 2012, <http://keepoaklandbeautiful.org/projects/litter-awareness-and-prevention/>. Accessed on 11 Feb. 2017.

14) "Grant Info". *Keep America Beautiful*, 2017, <https://www.kab.org/cigarette-litter-prevention/grant-information>. Accessed on 11 Feb. 2017.

15) "Partnerships: No Litter Zone". *Litter Free Long Beach*, [http://litterfreelb.org/partnerships/NLZ\\_details.htm](http://litterfreelb.org/partnerships/NLZ_details.htm). Accessed on 9 Feb. 2017.

16) "New York City Launches Campaign To Reduce Litter, Improve Waterways". *Water Environment Federation*, 23 Nov. 2015, <http://stormwater.wef.org/2015/11/new-york-city-launches-campaign-reduce-litter-improve-waterways/>. Accessed on 9 Feb. 2017.

17) "Lifestyle Tips:". *GreenNYC*, City of New York, 2016, <http://www1.nyc.gov/site/greenyc/small-steps/lifestyle.page>. Accessed on 9 Feb. 2017.

18) "Litter Grant Program". *Tennessee Department of Transportation*, <https://www.tn.gov/tdot/article/beautification-litter-grant>. Accessed on 9 Feb. 2017.

19) "Litter and it Will Hurt". *Washington State Department for Ecology*, Sharp Hartwig Inc., 30 June 2001, p.3 par.1, <https://fortress.wa.gov/ecy/publications/documents/0107043.pdf>. Accessed on 9 Feb. 2017.

20) "Litter and it Will Hurt". *Washington State Department for Ecology*, Sharp Hartwig Inc., 30 June 2001, p.3 par.3-p.4 par.6, <https://fortress.wa.gov/ecy/publications/documents/0107043.pdf>. Accessed on 9 Feb. 2017.

21) "Litter and it Will Hurt". *Washington State Department for Ecology*, Sharp Hartwig Inc., 30 June 2001, p.5, <https://fortress.wa.gov/ecy/publications/documents/0107043.pdf>. Accessed on 9 Feb. 2017.

22) "Litter and it Will Hurt". *Washington State Department for Ecology*, Sharp Hartwig Inc., 30 June 2001, p.17 par.1, <https://fortress.wa.gov/ecy/publications/documents/0107043.pdf>. Accessed on 9 Feb. 2017.



23) "Litter and it Will Hurt". *Washington State Department for Ecology*, Sharp Hartwig Inc., 30 June 2001, p.21 par.4-p.23, <https://fortress.wa.gov/ecy/publications/documents/0107043.pdf>. Accessed on 9 Feb. 2017.

24) "Litter and it Will Hurt". *Washington State Department for Ecology*, Sharp Hartwig Inc., 30 June 2001, p.38, <https://fortress.wa.gov/ecy/publications/documents/0107043.pdf>. Accessed on 9 Feb. 2017.

25) "Litter and it Will Hurt". *Washington State Department for Ecology*, Sharp Hartwig Inc., 30 June 2001, p.40, <https://fortress.wa.gov/ecy/publications/documents/0107043.pdf>. Accessed on 9 Feb. 2017.

26) "Litter and it Will Hurt". *Washington State Department for Ecology*, Sharp Hartwig Inc., 30 June 2001, p.140, <https://fortress.wa.gov/ecy/publications/documents/0107043.pdf>. Accessed on 9 Feb. 2017.  
Conclusion, Accessed on 9 Feb. 2017.

27) "Zero Waste Towards a Litter Free Scotland: a Strategic Approach to Higher Quality Local Environments". *Natural Scotland*, 2014, p.5, <http://www.gov.scot/Resource/0045/00452542.pdf>. Accessed on 9 Feb. 2017.

28) "Zero Waste Towards a Litter Free Scotland: a Strategic Approach to Higher Quality Local Environments". *Natural Scotland*, 2014, p.7 par.3, <http://www.gov.scot/Resource/0045/00452542.pdf>. Accessed on 9 Feb. 2017.

29) "Zero Waste Towards a Litter Free Scotland: a Strategic Approach to Higher Quality Local Environments". *Natural Scotland*, 2014, p.11, <http://www.gov.scot/Resource/0045/00452542.pdf>. Accessed on 9 Feb. 2017.

30) "Zero Waste Towards a Litter Free Scotland: a Strategic Approach to Higher Quality Local Environments". *Natural Scotland*, 2014, p.14, <http://www.gov.scot/Resource/0045/00452542.pdf>. Accessed on 9 Feb. 2017.

31) "Zero Waste Towards a Litter Free Scotland: a Strategic Approach to Higher Quality Local Environments". *Natural Scotland*, 2014, p.16-17, <http://www.gov.scot/Resource/0045/00452542.pdf>. Accessed on 9 Feb. 2017.

32) "Public Outreach and Stewardship Workplan Practice #3 Anti-Littering Outreach and Stewardship Campaign Project- White Oak Neighborhood Anti-Littering Pilot". *County of Montgomery*, September 2014, p.1, <https://www.montgomerycountymd.gov/DEP/Resources/Files/ReportsandPublications/Water/Countywide%20Implementation%20Strategy/White-Oak-Anti-litter-Factsheet.pdf>. Accessed on 9 Feb. 2017.




---

33) "Public Outreach and Stewardship Workplan Practice #3 Anti-Littering Outreach and Stewardship Campaign Project- White Oak Neighborhood Anti-Littering Pilot". *County of Montgomery*, September 2014, p.2 par.4-p.4, <https://www.montgomerycountymd.gov/DEP/Resources/Files/ReportsandPublications/Water/Countywide%20Implementation%20Strategy/White-Oak-Anti-litter-Factsheet.pdf>. Accessed on 9 Feb. 2017.

34) "Anacostia Watershed Restoration White Oak Watershed Trash Management and Anti-Litter Campaign". 12, Sept. 2013, [http://www.anacostia.net/Archives/AWMC/documents/AWMC\\_Trash\\_Mgmt\\_update\\_20130912MC.pdf](http://www.anacostia.net/Archives/AWMC/documents/AWMC_Trash_Mgmt_update_20130912MC.pdf). Accessed 10 Feb. 2017.

35) Kempton, Will. "Memorandum". *California Department of Transportation*, 1 May 2007, p.iii, [http://adopt-a-highway.dot.ca.gov/LitterAbatementPlan\\_04-19-11.pdf](http://adopt-a-highway.dot.ca.gov/LitterAbatementPlan_04-19-11.pdf). Accessed 10 Feb. 2017.

36) Kempton, Will. "Memorandum". *California Department of Transportation*, 1 May 2007, p.3, [http://adopt-a-highway.dot.ca.gov/LitterAbatementPlan\\_04-19-11.pdf](http://adopt-a-highway.dot.ca.gov/LitterAbatementPlan_04-19-11.pdf). Accessed 10 Feb. 2017.

37) Dovas. "Clever Anti-Littering Ads Use Trash To Mock Litterers". *Bored Panda*, 2015, <http://www.boredpanda.com/anti-littering-ad-campaign-toronto-livegreen/>. Accessed 10 Feb. 2017.

38) "HAYWARD STUDENTS ENLISTED TO COMBAT LITTER WITH #HAYWARDSHINES". *City of Hayward*, 2016, <https://library.hayward-ca.gov/discover/news/mar16/hayward-students-enlisted-combat-litter-haywardshines>. Accessed on 11 Feb. 2017.

39) "Reverse Vending Machine Trial Project Evaluation Report". *City of Sydney*, p.9, [http://www.cityofsydney.nsw.gov.au/\\_data/assets/pdf\\_file/0006/262149/Reverse-Vending-Machine-Evaluation-Report-V2-accessible.pdf](http://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0006/262149/Reverse-Vending-Machine-Evaluation-Report-V2-accessible.pdf). Accessed on 11 Feb. 2017.

40) "Reverse Vending Machine Trial Project Evaluation Report". *City of Sydney*, p.21, [http://www.cityofsydney.nsw.gov.au/\\_data/assets/pdf\\_file/0006/262149/Reverse-Vending-Machine-Evaluation-Report-V2-accessible.pdf](http://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0006/262149/Reverse-Vending-Machine-Evaluation-Report-V2-accessible.pdf). Accessed on 11 Feb. 2017.

41) "Reverse Vending Machine Trial Project Evaluation Report". *City of Sydney*, p.23, [http://www.cityofsydney.nsw.gov.au/\\_data/assets/pdf\\_file/0006/262149/Reverse-Vending-Machine-Evaluation-Report-V2-accessible.pdf](http://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0006/262149/Reverse-Vending-Machine-Evaluation-Report-V2-accessible.pdf). Accessed on 11 Feb. 2017.

42) "Reverse Vending Machine Trial Project Evaluation Report". *City of Sydney*, p.26, [http://www.cityofsydney.nsw.gov.au/\\_data/assets/pdf\\_file/0006/262149/Reverse-Vending-Machine-Evaluation-Report-V2-accessible.pdf](http://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0006/262149/Reverse-Vending-Machine-Evaluation-Report-V2-accessible.pdf). Accessed on 11 Feb. 2017.



---

43) Newell, Stephen J., et al. "THE EFFECT OF MISLEADING ENVIRONMENTAL CLAIMS ON CONSUMER PERCEPTIONS OF ADVERTISEMENTS". *Journal of Marketing Theory and Practice*, Vol. 6, No. 2 (Spring, 1998), p.48 par.1, Taylor & Francis, Ltd., <http://www.jstor.org.proxylib.csueastbay.edu/stable/pdf/40469900.pdf>. Accessed on 11 Feb. 2017.

44) Newell, Stephen J., et al. "THE EFFECT OF MISLEADING ENVIRONMENTAL CLAIMS ON CONSUMER PERCEPTIONS OF ADVERTISEMENTS". *Journal of Marketing Theory and Practice*, Vol. 6, No. 2 (Spring, 1998), p.58 par.2, Taylor & Francis, Ltd., <http://www.jstor.org.proxylib.csueastbay.edu/stable/pdf/40469900.pdf>. Accessed on 11 Feb. 2017.

45) <http://ballotbin.co.uk/>. Accessed on 11 Feb. 2017.

46) Perella, Maxine "A National Litter Strategy Requires Fresh Thinking". *Recycling and Waste World*, 15 June 2016, <http://www.recyclingwasteworld.co.uk/opinion/a-national-litter-strategy-requires-fresh-thinking/141885/>. Accessed on 11 Feb. 2017.

47) "Public Opinion Study Results: Why People Litter in the Potomac River Watershed 2008". *OpinionWorks Inc.*, p.2 par.1, [http://40a1ec41n0mq2k888u1n7gst.wpengine.netdna-cdn.com/wp-content/uploads/2012/08/08\\_OpinionWorksSurvey.pdf](http://40a1ec41n0mq2k888u1n7gst.wpengine.netdna-cdn.com/wp-content/uploads/2012/08/08_OpinionWorksSurvey.pdf). Accessed on 11 Feb. 2017.

48) "Public Opinion Study Results: Why People Litter in the Potomac River Watershed 2008". *OpinionWorks Inc.*, p.3, [http://40a1ec41n0mq2k888u1n7gst.wpengine.netdna-cdn.com/wp-content/uploads/2012/08/08\\_OpinionWorksSurvey.pdf](http://40a1ec41n0mq2k888u1n7gst.wpengine.netdna-cdn.com/wp-content/uploads/2012/08/08_OpinionWorksSurvey.pdf). Accessed on 11 Feb. 2017.

49) "Public Opinion Study Results: Why People Litter in the Potomac River Watershed 2008". *OpinionWorks Inc.*, p.4, [http://40a1ec41n0mq2k888u1n7gst.wpengine.netdna-cdn.com/wp-content/uploads/2012/08/08\\_OpinionWorksSurvey.pdf](http://40a1ec41n0mq2k888u1n7gst.wpengine.netdna-cdn.com/wp-content/uploads/2012/08/08_OpinionWorksSurvey.pdf). Accessed on 11 Feb. 2017.

50) "GEORGIA RESIDENTS' OPINIONS ON LITTER AND ANTI-LITTERING PROGRAMS IN GEORGIA". *Responsive Management*, p.i, 2006, [http://www.litteritcostsyou.org/docs/PK\\_AttitudeSurveyReport.pdf](http://www.litteritcostsyou.org/docs/PK_AttitudeSurveyReport.pdf). Accessed on 11 Feb. 2017.

51) "GEORGIA RESIDENTS' OPINIONS ON LITTER AND ANTI-LITTERING PROGRAMS IN GEORGIA". *Responsive Management*, piii., 2006, [http://www.litteritcostsyou.org/docs/PK\\_AttitudeSurveyReport.pdf](http://www.litteritcostsyou.org/docs/PK_AttitudeSurveyReport.pdf). Accessed on 11 Feb. 2017.




---

52) "GEORGIA RESIDENTS' OPINIONS ON LITTER AND ANTI-LITTERING PROGRAMS IN GEORGIA". *Responsive Management*, p.iv par.1, 2006,  
[http://www.litteritcostsyou.org/docs/PK\\_AttitudeSurveyReport.pdf](http://www.litteritcostsyou.org/docs/PK_AttitudeSurveyReport.pdf). Accessed on 11 Feb. 2017.

53) "GEORGIA RESIDENTS' OPINIONS ON LITTER AND ANTI-LITTERING PROGRAMS IN GEORGIA". *Responsive Management*, p.iv par. 7, 2006,  
[http://www.litteritcostsyou.org/docs/PK\\_AttitudeSurveyReport.pdf](http://www.litteritcostsyou.org/docs/PK_AttitudeSurveyReport.pdf). Accessed on 11 Feb. 2017.

54) "GEORGIA RESIDENTS' OPINIONS ON LITTER AND ANTI-LITTERING PROGRAMS IN GEORGIA". *Responsive Management*, p.v par,2, 2006,  
[http://www.litteritcostsyou.org/docs/PK\\_AttitudeSurveyReport.pdf](http://www.litteritcostsyou.org/docs/PK_AttitudeSurveyReport.pdf). Accessed on 11 Feb. 2017.

55) "GEORGIA RESIDENTS' OPINIONS ON LITTER AND ANTI-LITTERING PROGRAMS IN GEORGIA". *Responsive Management*, p.vi par.2, 2006,  
[http://www.litteritcostsyou.org/docs/PK\\_AttitudeSurveyReport.pdf](http://www.litteritcostsyou.org/docs/PK_AttitudeSurveyReport.pdf). Accessed on 11 Feb. 2017.

56) "Final Report: GEORGIA 2006 VISIBLE LITTER SURVEY A Baseline Survey of Roadside Litter". *R.W. Beck*, Jan. 2007, p.7,  
<http://www.litteritcostsyou.org/docs/2006%20Georgia%20Litter%20Report %20Final%20.pdf>. Accessed on 11 Feb. 2017.

57) "Final Report: GEORGIA 2006 VISIBLE LITTER SURVEY A Baseline Survey of Roadside Litter". *R.W. Beck*, Jan. 2007, p.9 par.4,  
<http://www.litteritcostsyou.org/docs/2006%20Georgia%20Litter%20Report %20Final%20.pdf>. Accessed on 11 Feb. 2017.

58) Ruth, Lisa M. "Saving the Ocean: Saltwater Brewery's Edible 'Plastic' Rings". *Communities Digital News*, 2015, <http://www.commdiginews.com/health-science/saving-the-ocean-saltwater-brewerys-edible-plastic-rings-64231/>. Accessed on 12 Feb. 2017.

59) Galanty, Heather. "Saltwater Brewery Creates Edible Six-Pack Rings". *craftbeer.com*, Brewers Association, 2017, <https://www.craftbeer.com/editors-picks/saltwater-brewery-creates-edible-six-pack-rings>. Accessed on 12 Feb. 2017.

60) "NWS Litter Report 2010". *Department of Environment, Climate Change and Water NSW*, Sep. 2010, p.2 par.1, <http://www.epa.nsw.gov.au/resources/litter/100785-NSW-litter-rpt10.pdf>. Accessed on 12 Feb. 2017.

61) "NWS Litter Report 2010". *Department of Environment, Climate Change and Water NSW*, Sep. 2010, p.3, <http://www.epa.nsw.gov.au/resources/litter/100785-NSW-litter-rpt10.pdf>. Accessed on 12 Feb. 2017.



---

62) "NWS Litter Report 2010". *Department of Environment, Climate Change and Water NSW*, Sep. 2010, p.4, <http://www.epa.nsw.gov.au/resources/litter/100785-NSW-litter-rpt10.pdf>. Accessed on 12 Feb. 2017.

63) "NWS Litter Report 2010". *Department of Environment, Climate Change and Water NSW*, Sep. 2010, p.11, <http://www.epa.nsw.gov.au/resources/litter/100785-NSW-litter-rpt10.pdf>. Accessed on 12 Feb. 2017.

64) "NWS Litter Report 2010". *Department of Environment, Climate Change and Water NSW*, Sep. 2010, p.14, <http://www.epa.nsw.gov.au/resources/litter/100785-NSW-litter-rpt10.pdf>. Accessed on 12 Feb. 2017.

65) Reeve, Ian et al. "Lessons from the Litter-ature". *NSW Office of Environment and Heritage*, 2013, p.7, Institute for Rural Futures, University of New England NSW, <http://www.epa.nsw.gov.au/resources/education/130689LitterRpt.pdf>. Accessed on 12 Feb. 2017.

66) Reeve, Ian et al. "Lessons from the Litter-ature". *NSW Office of Environment and Heritage*, 2013, p.9, Institute for Rural Futures, University of New England NSW, <http://www.epa.nsw.gov.au/resources/education/130689LitterRpt.pdf>. Accessed on 12 Feb. 2017.

67) Reeve, Ian et al. "Lessons from the Litter-ature". *NSW Office of Environment and Heritage*, 2013, pp.11-12, Institute for Rural Futures, University of New England NSW, <http://www.epa.nsw.gov.au/resources/education/130689LitterRpt.pdf>. Accessed on 12 Feb. 2017.

68) Reeve, Ian et al. "Lessons from the Litter-ature". *NSW Office of Environment and Heritage*, 2013, p.13 par.7-p.14, Institute for Rural Futures, University of New England NSW, <http://www.epa.nsw.gov.au/resources/education/130689LitterRpt.pdf>. Accessed on 12 Feb. 2017.

69) Reeve, Ian et al. "Lessons from the Litter-ature". *NSW Office of Environment and Heritage*, 2013, p.20, Institute for Rural Futures, University of New England NSW, <http://www.epa.nsw.gov.au/resources/education/130689LitterRpt.pdf>. Accessed on 12 Feb. 2017.

70) Reeve, Ian et al. "Lessons from the Litter-ature". *NSW Office of Environment and Heritage*, 2013, p.21 par.6, Institute for Rural Futures, University of New England NSW, <http://www.epa.nsw.gov.au/resources/education/130689LitterRpt.pdf>. Accessed on 12 Feb. 2017.



71) Reeve, Ian et al. "Lessons from the Litter-ature". *NSW Office of Environment and Heritage*, 2013, p.23 par.5, Institute for Rural Futures, University of New England NSW, <http://www.epa.nsw.gov.au/resources/education/130689LitterRpt.pdf>. Accessed on 12 Feb. 2017.

72) Reeve, Ian et al. "Lessons from the Litter-ature". *NSW Office of Environment and Heritage*, 2013, p.24, Institute for Rural Futures, University of New England NSW, <http://www.epa.nsw.gov.au/resources/education/130689LitterRpt.pdf>. Accessed on 12 Feb. 2017.

73) "NSW Litter Prevention Kit". *State of NSW and Environment Protection Authority*, 2013, p.27, <http://www.epa.nsw.gov.au/resources/litter/130799-lpk-effective-litter-prevent.pdf>. Accessed on 12 Feb. 2017.

74) Gendrich, John G. et al. "A Student-Based Anti-Litter Program for Elementary Schools". *Education and Treatment of Children*, Vol. 5 No. 4, 1982, pp.321-335, West Virginia University Press, [http://www.jstor.org/stable/42898720?seq=1#page\\_scan\\_tab\\_contents](http://www.jstor.org/stable/42898720?seq=1#page_scan_tab_contents). Accessed on 12 Feb. 2017.

75) Reich, John W. and Jerie L. Robertson. "Reactance and Norm Appeal in Anti-Littering Messages". *Journal of Applied Social Psychology*, 9: pp.91–101, <http://onlinelibrary.wiley.com/doi/10.1111/j.1559-1816.1979.tb00796.x/full#publication-history>. doi:10.1111/j.1559-1816.1979.tb00796.x. Accessed on 12 Feb. 2017.

76) Baltes, Margret M., and Scott C. Hayward. "Application And Evaluation Of Strategies To Reduce Pollution: Behavioral Control Of Littering In A Football Stadium." *Journal Of Applied Psychology* 61.4 (1976): 501-506. PsycARTICLES. Web. 11 Dec. 2016.

77) "Environmental Literacy Program". *National Oceanic and Atmospheric Administration*, <http://www.noaa.gov/office-education/elp>. Accessed on 12 Feb. 2017.

78) "Environmental Education Grants to Conservation Organizations in California". *AG Net West Radio Network*, 16 Nov. 2016, <http://agnetwest.com/2016/11/16/environmental-education-grants-conservation-organizations-california/>. Accessed on 12 Feb. 2017.

79) "Clean Water Program". *City of Hayward*, 2016, <http://hayward.prod.acquia-sites.com/services/city-services/clean-water-program>. Accessed on 12 Feb. 2017.

80) "MEASURE C GRAFFITI & ILLEGAL DUMPING STRIKE TEAM". *City of Hayward*, 2016, <http://www.hayward-ca.gov/your-government/departments/street-maintenance-division/programs/measure-c-graffiti-illegal-dumping-strike-team>. Accessed on 12 Feb. 2017.



---

81) *City of Hayward*, 2017, <http://user.govoutreach.com/hayward/support.php>. Accessed on 12 Feb. 2017.

82) "Baseline Trash Load and Short-Term Trash Load Reduction Plan". *City of Hayward*, 1 Feb. 2012, p.1 par.1-3,

[http://www.waterboards.ca.gov/sanfranciscobay/water\\_issues/programs/stormwater/MRP/02-2012/Counties/Alameda/Hayward.pdf](http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/MRP/02-2012/Counties/Alameda/Hayward.pdf). Accessed on 12 Feb. 2017.

83) "Baseline Trash Load and Short-Term Trash Load Reduction Plan". *City of Hayward*, 1 Feb. 2012, p.17-19,

[http://www.waterboards.ca.gov/sanfranciscobay/water\\_issues/programs/stormwater/MRP/02-2012/Counties/Alameda/Hayward.pdf](http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/MRP/02-2012/Counties/Alameda/Hayward.pdf). Accessed on 12 Feb. 2017.

84) "Baseline Trash Load and Short-Term Trash Load Reduction Plan". *City of Hayward*, 1 Feb. 2012, p.31

[http://www.waterboards.ca.gov/sanfranciscobay/water\\_issues/programs/stormwater/MRP/02-2012/Counties/Alameda/Hayward.pdf](http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/MRP/02-2012/Counties/Alameda/Hayward.pdf). Accessed on 12 Feb. 2017.

85) "Long-Term Trash Load Reduction Plan and Progress Assessment Strategy". *City of Hayward*, 1 Feb. 2014, pp.41-45,

[http://www.swrcb.ca.gov/rwqcb2/water\\_issues/programs/stormwater/MRP/C10/2014/Alameda\\_County/Hayward\\_2-14\\_Trash\\_Long\\_Term.pdf](http://www.swrcb.ca.gov/rwqcb2/water_issues/programs/stormwater/MRP/C10/2014/Alameda_County/Hayward_2-14_Trash_Long_Term.pdf). Accessed on 12 Feb. 2017.

86) "Municipal Stormwater Program". *State of California*, 2017,

[http://www.waterboards.ca.gov/rwqcb2/water\\_issues/programs/stormwater/Municipal/index.shtml](http://www.waterboards.ca.gov/rwqcb2/water_issues/programs/stormwater/Municipal/index.shtml). Accessed on 12 Feb. 2017.

87) "A Rapid Trash Assessment Method Applied to Waters of the San Francisco Bay Region: Trash Measurement in Streams". *California Water Boards*, April 2007, p.1

<http://www.waterboards.ca.gov/sanfranciscobay/docs/swamptrashreport.pdf>. Accessed on 12 Feb. 2017.

88) "A Rapid Trash Assessment Method Applied to Waters of the San Francisco Bay Region: Trash Measurement in Streams". *California Water Boards*, April 2007, p.3 par.4,

<http://www.waterboards.ca.gov/sanfranciscobay/docs/swamptrashreport.pdf>. Accessed on 12 Feb. 2017.

89) "A Rapid Trash Assessment Method Applied to Waters of the San Francisco Bay Region: Trash Measurement in Streams". *California Water Boards*, April 2007, pp.9-11

<http://www.waterboards.ca.gov/sanfranciscobay/docs/swamptrashreport.pdf>. Accessed on 12 Feb. 2017.



---

90) "San Francisco Bay Area Stormwater Trash Generation Rates". *Bay Area Stormwater Management Agencies Association*, 20 June 2014, p.vii, [http://www.waterboards.ca.gov/sanfranciscobay/water\\_issues/programs/stormwater/MRP/BASMAA\\_Trash\\_Generation\\_Rates\\_Final\\_Report.pdf](http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/MRP/BASMAA_Trash_Generation_Rates_Final_Report.pdf). Accessed on 12 Feb. 2017.

91) "San Francisco Bay Area Stormwater Trash Generation Rates". *Bay Area Stormwater Management Agencies Association*, 20 June 2014, p.33 par.3-4, [http://www.waterboards.ca.gov/sanfranciscobay/water\\_issues/programs/stormwater/MRP/BASMAA\\_Trash\\_Generation\\_Rates\\_Final\\_Report.pdf](http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/MRP/BASMAA_Trash_Generation_Rates_Final_Report.pdf). Accessed on 12 Feb. 2017.

92) "Caltrans Trash Load Reduction Workplan for the San Francisco Bay Region". *California Department of Transportation*, 24 June 2016, pp.11-12, [http://www.waterboards.ca.gov/sanfranciscobay/board\\_info/agendas/2016/August/caltrans/Ttrash\\_Load\\_Reduction\\_Workplan%20\(CLEAN\)%202016-07-13.pdf](http://www.waterboards.ca.gov/sanfranciscobay/board_info/agendas/2016/August/caltrans/Ttrash_Load_Reduction_Workplan%20(CLEAN)%202016-07-13.pdf). Accessed on 12 Feb. 2017.

93) "A Blueprint for Environmental Literacy". *California State Superintendent of Public Instruction Tom Torlakson's statewide Environmental Literacy Task Force*, Californians Dedicated to Education Foundation, 2015, Executive Summary par.1-5, <http://www.cde.ca.gov/pd/ca/sc/environliteracyblueprint.asp>. Accessed on 13 Feb. 2017.

94) "A Blueprint for Environmental Literacy". *California State Superintendent of Public Instruction Tom Torlakson's statewide Environmental Literacy Task Force*, Californians Dedicated to Education Foundation, 2015, Status of Funding for Environmental Literacy par.2, <http://www.cde.ca.gov/pd/ca/sc/environliteracyblueprint.asp>. Accessed on 13 Feb. 2017.

95) Waghorn-Lees, Claire et al. "Litter Reduction from a Behavioural Science Perspective". *Holling Consulting*, Jan. 2013, p.11, <http://www.reachingresults.com/wp/wp-content/uploads/2013/05/Littering-from-a-Behavioural-Science-Perspective.pdf>. Accessed on 13 Feb. 2017.

96) Waghorn-Lees, Claire et al. "Litter Reduction from a Behavioural Science Perspective". *Holling Consulting*, Jan. 2013, p.12 par.4-p.14, <http://www.reachingresults.com/wp/wp-content/uploads/2013/05/Littering-from-a-Behavioural-Science-Perspective.pdf>. Accessed on 13 Feb. 2017.

97) Waghorn-Lees, Claire et al. "Litter Reduction from a Behavioural Science Perspective". *Holling Consulting*, Jan. 2013, p.15 par.4, <http://www.reachingresults.com/wp/wp-content/uploads/2013/05/Littering-from-a-Behavioural-Science-Perspective.pdf>. Accessed on 13 Feb. 2017.

98) Waghorn-Lees, Claire et al. "Litter Reduction from a Behavioural Science Perspective". *Holling Consulting*, Jan. 2013, p.16, <http://www.reachingresults.com/wp/wp->




---

[content/uploads/2013/05/Littering-from-a-Behavioural-Science-Perspective.pdf](http://www.reachingresults.com/wp/wp-content/uploads/2013/05/Littering-from-a-Behavioural-Science-Perspective.pdf). Accessed on 13 Feb. 2017.

99) Waghorn-Lees, Claire et al. "Litter Reduction from a Behavioural Science Perspective". *Holling Consulting*, Jan. 2013, p.17 par.1-2, <http://www.reachingresults.com/wp/wp-content/uploads/2013/05/Littering-from-a-Behavioural-Science-Perspective.pdf>. Accessed on 13 Feb. 2017.

100) Waghorn-Lees, Claire et al. "Litter Reduction from a Behavioural Science Perspective". *Holling Consulting*, Jan. 2013, p.21 par.2, <http://www.reachingresults.com/wp/wp-content/uploads/2013/05/Littering-from-a-Behavioural-Science-Perspective.pdf>. Accessed on 13 Feb. 2017.

101) Waghorn-Lees, Claire et al. "Litter Reduction from a Behavioural Science Perspective". *Holling Consulting*, Jan. 2013, p.41, <http://www.reachingresults.com/wp/wp-content/uploads/2013/05/Littering-from-a-Behavioural-Science-Perspective.pdf>. Accessed on 13 Feb. 2017.

102) "Don't Trash Arizona Litter Evaluation Survey". *Mariscopa Association of Governments*, September 2015, p.1 par.1-5, <http://dontrashaz.com/wp-content/uploads/2015-MAG-Litter-Survey-Report-FINAL.pdf>. Accessed on 13 Feb. 2017.

103) "Don't Trash Arizona Litter Evaluation Survey". *Mariscopa Association of Governments*, September 2015, p.6 par.8, <http://dontrashaz.com/wp-content/uploads/2015-MAG-Litter-Survey-Report-FINAL.pdf>. Accessed on 13 Feb. 2017.

104) "The Hubbub on Anti-Litter Campaigns: New Website Showcases Best Practices". *Sustainable Brands*, Sustainable Life Media Inc., 2007-17, par.1-3, [http://www.sustainablebrands.com/news\\_and\\_views/behavior\\_change/sustainable\\_brands/hubbub\\_anti-litter\\_campaigns\\_new\\_website\\_showcases](http://www.sustainablebrands.com/news_and_views/behavior_change/sustainable_brands/hubbub_anti-litter_campaigns_new_website_showcases). Accessed on 13 Feb. 2017.

105) "Litter Reduction at Multi-Family Dwellings: A Guide for Effective Outreach". *Clean Water Program*, 4 May 2015, p.2, <http://www.nuglu.com/images/uploads/MFD-Litter-Reduction-Manual-FINAL.pdf>. Accessed on 13 Feb. 2017.

106) "Don't Mess with Texas Litter Prevention Research Executive Summary". *Texas Department of Transportation*, 2009, p.1 par.1-5, [http://www.dontmesswithtexas.org/docs/DMWT\\_2009\\_Litter\\_Prev\\_Exec\\_Summary.pdf](http://www.dontmesswithtexas.org/docs/DMWT_2009_Litter_Prev_Exec_Summary.pdf). Accessed on 13 Feb. 2017.

107) "Litter and it Will Hurt". *Washington State Department of Ecology*,



---

30 June 2001, p.20 par.2, <https://fortress.wa.gov/ecy/publications/documents/0107043.pdf>. Accessed on 13 Feb. 2017.

108) "Litter and it Will Hurt". *Washington State Department of Ecology*, 30 June 2001, p.6 par.4, <https://fortress.wa.gov/ecy/publications/documents/0107043.pdf>. Accessed on 13 Feb. 2017.

109) *Suraya Foundation*, Case Study 2 - Anti-littering campaign, <http://www.surayafoundation.com/case-studies.html>. Accessed on 13 Feb. 2017.

110) Waghorn-Lees, Claire et al. "Litter Reduction from a Behavioural Science Perspective". *Holling Consulting*, Jan. 2013, p.12 par.3, <http://www.reachingresults.com/wp/wp-content/uploads/2013/05/Littering-from-a-Behavioural-Science-Perspective.pdf>. Accessed on 13 Feb. 2017.