

4.5 Advertisement

Are RWFs actively advertising their water? How do customers find out about these stores? Is there a difference across the different income-level areas?

Online Presence

There is a clear difference in not only how the three RWFs advertised, but also how the customers found out about their perspective store. In terms of advertising, RWF H, by far, was the most active in advertising their water as seen by their online presence, events, and partnerships with other organizations or companies. For RWF H, not only does its Yelp page have 25 reviews, but also its biggest presence online is its own website. Beyond O2 Premium Alkaline Water's website not only tells the readers about its product, but it also has six YouTube promotional videos, celebrity endorsed testimonials, links to where you can buy an at home water filtration system for approximately \$1000.

The website also shows the store hosting a "Go Where the Water Flows" video contest to win a "World Class, State of the Art, Beyond O2 Water filtration system" valued at \$550. They link an example video that stars a young woman dressed in a bikini, looking out over the ocean, who all of the sudden gets *premium alkaline water* poured on her by a young shirtless man who enters the video later. When the water gets poured on the woman, the video is put into slow motion and zooms into her chest and then lower thigh. The video ends with the quote "Go Where the Water Flows!" Meanwhile, there is no one narrating the film, only slow, music in the background. The website also promotes their annual "Customer Appreciation" Party only for those 21 and older, where the same young woman from the video is featured on the poster. The testimonials on the website boast how the water has helped them lose weight and various other phrases that describe how they feel as if they have more energy. All of the testimonials mention some health benefit as a result of

drinking this specialized water. Their website can be described as luxury and over the top for drinking water.

There was a clear direct correlation between income level and extent of advertisement for each of the RWFs: an increase in income reveals an increase in advertisement. For RWF L, a quick Google search, also reveals, almost no media advertisement, only a Yelp page. Yelp, while recognizes the store, shows only one picture, one review for the store, and does not list the hours the store is open (which is common for almost all stores on Yelp). For RWF M, there was a slight increase in advertisement. RWF M has a stronger online presence, as evident on Yelp.com. Yelp shows three pictures of the store (two more than LA Pure Water) and four reviews (three more than LA Pure Water). Unlike LA Pure Water, the hours of the store can also be found on Yelp: Water Gourmet No. 11 is open from 8:30 am- 7:30 pm Monday through Saturday and 9:00 am to 6:00 pm on Sundays. Additionally, Water Gourmet advertises that it delivers water. The reviews for Water Gourmet applaud this store for its business hours, being open everyday, its fast service, and friendly workers. The only complaint is that there is “competitive parking.” Both LA Pure Water and Water Gourmet have 5 stars on Yelp.

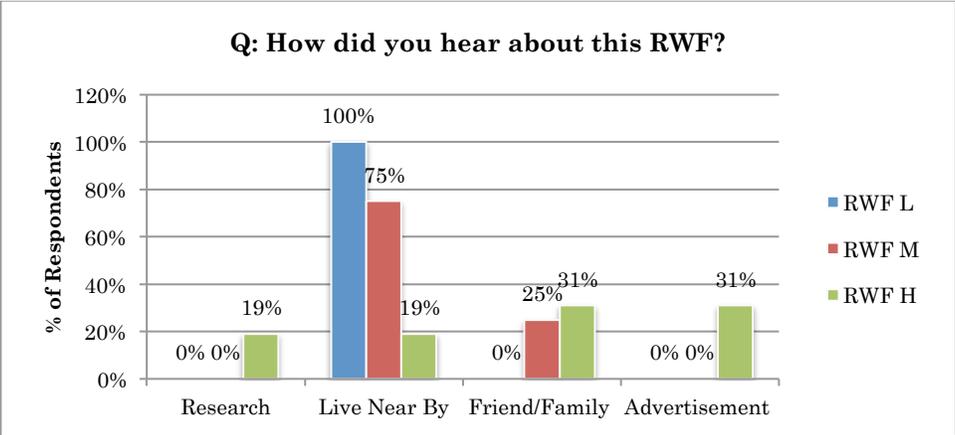
Survey Results: How do customers find out about RWFs?

For the purposes of this project, while the survey question to the customers was open ended (How did you find out about this RWF?), based on their responses I created four categories that were able to encompass all of the responses: Friend/Family, Research, Live Near By, and Advertisement. The friend/family category includes all customers who responded saying they heard about the RWF through word of mouth from either a friend or family member. The ‘research’ category includes all customers who found out about the RWF by researching online about the health benefits of alkaline water, and the ‘live near

by' category includes all the customers who found out about the RWF because they live in the area and either saw it driving or walking by.

The survey respondents were reflective of the trend found in advertisement for the RWFs. As mentioned above, RWF L essentially exhibited zero advertisement, which is also shown in Figure 14, where 100% of RWF L customers found out about the store because they lived near by. Also shown in Figure 14 is that for RWF M, while the majority of customers found out about the store through by living near by (75%), about 25% of the customers found out about the store through word of mouth through either their friends or family. Lastly, for RWF H, we can see that the customers found out about the RWFs in all four ways, almost evenly. The majority though found out through either word of mouth or through some sort of advertisement. Significantly, RWF H was the only RWF where customers found out about the store through researching about alkaline water.

Figure 14: How Customers Heard About their RWF



4.6 Bought (RWF) Water Usage

One hundred percent of the customers surveyed across all three RWFs stated that they used their bought water for at least drinking, which was to be expected. However, interestingly there was a clear correlation between income level and using the bought water

for cooking. Customers from RWF L had the highest percentage for using the water for cooking, followed by RWF M and then RWF H. If you look at Table 3, you can see that for each of the RWF locations, of the respondents who stated they use their bought water for cooking, the majority are immigrants. Additionally, as you increase in income level, the percentage of respondents who use this water for cooking who are also immigrants decreases. What is astounding about the aforementioned statistics regarding cooking is that most water that is used for cooking gets boiled, purifying the water in itself, making buying pure water seem counterintuitive. Not only does this data show that there is an education gap regarding the uses of tap water between immigrants and non-immigrants, but it also calls into question how safe our tap water is. Perhaps, the main reason why individuals are using bought water for cooking is because it appears to be that unsafe to use.

The other statistics that stand out from Figure 15 are the individuals that use the bought water for cleaning (13% of the respondents for both RWF L and M). From the “other” category seen in Figure 15, one respondent from RWF L stated that they use the bought water to water their plants, another stated they use the water to clean their clothes. One individual from RWF M stated they use the water to provide water for their dog to drink. The fact that people could be buying water because they find their tap water so contaminated to the point where they cannot use the water to wash their clothes is absurd. This again gives an example of why water utilities and city officials should be looking into why people are buying water and what they are using it for.

Figure 15: How Customers use RWF Water

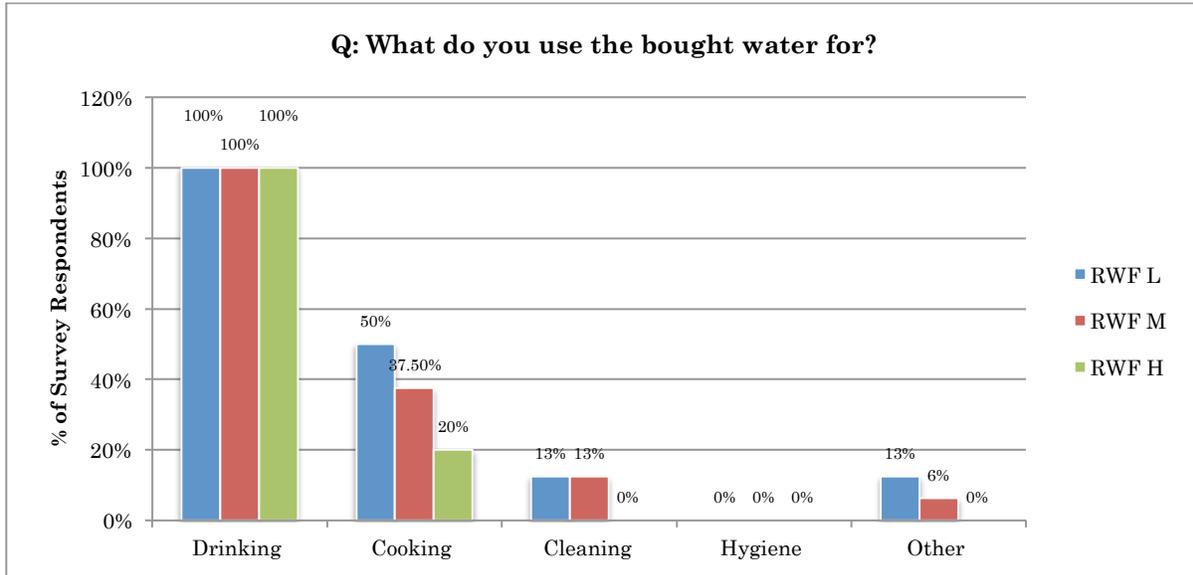


Table 3: Whether Bought Water is Used for Cooking by Immigrant Status

	RWF L	RWF M	RWF H
Use Bought Water for Cooking?	Total	Total	Total
No	50.00%	62.50%	80.00%
Immigrant	18.75%	37.50%	13.33%
Born in USA	31.25%	25.00%	66.67%
Yes	50.00%	37.50%	20.00%
Immigrant	43.75%	25.00%	13.33%
Born in USA	6.25%	12.50%	6.67%
Grand Total	100.00%	100.00%	100.00%

4.7 Tap Water Quality

Do customers believe their tap water is safe to drink?

There was a clear consensus as to whether or not customers thought their tap water was safe across all three RWF locations: the majority of customers for each RWF thought their tap water was *not* safe to drink. The lowest percentage of customers who thought their water was not safe to drink was 56% for RWF M, the next highest percentage was 60% for RWF M, and the highest was 87.5% for RWF L. At first glance, these percentages seem

shockingly high. However, we would expect these percentages to be high given the target population that was surveyed: people who were buying water.

One of the hypotheses was that unsafe tap water was a housing issue. In that, the majority of those who thought their tap water was unsafe to drink were renting their residence. Specifically, the reasoning behind this hypothesis was that perhaps landlords are not making the necessary changes to update their piping. As revealed in Table 4, both renters and owners stated they thought their tap water was unsafe. At first glance, this data leans towards eliminating the initial belief that unsafe tap water was a housing “renters” issue. However, there is a slight correlation between those who stated their tap was unsafe to drink and the percentage of those customers who rent. As seen in Table 4 with the highlighted values in yellow, as you increase in income level, there’s a continuous decrease in percentage of renters who think their tap water is unsafe to drink. This hints at the possibility that tap water may be disproportionately unsafe to drink in rental residences in low-income communities

Figure 16: Percent of Customers who think their Tap Water is Safe to Drink

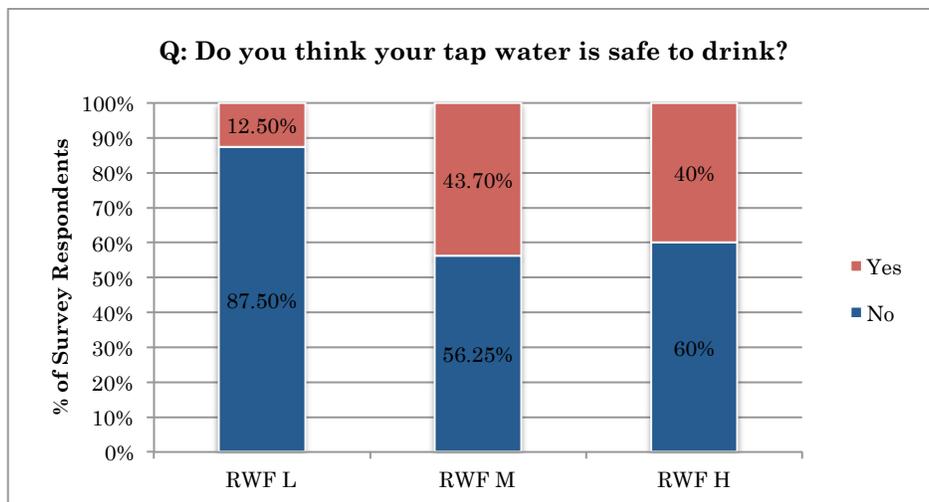


Table 4: Whether Customers Think Their Tap Water is Safe to Drink by Renter Status

Q: Is your tap water safe to drink? Divided into Housing Situation: Rent or Own	RWF L	RWF M	RWF H
	Total	Total	Total
No	87.50%	56.25%	40.00%
Rent	50.00%	31.25%	20.00%
Own	37.50%	25.00%	20.00%
Yes	12.50%	43.75%	60.00%
Rent	12.50%	25.00%	20.00%
Own	0%	18.75%	40.00%
Grand Total	100.00%	100.00%	100.00%

4.8 Why do Customers Buy Water?

100% of all the customers surveyed across the three RWF locations stated they have access to tap water where they reside, eliminating the perceived notion that perhaps some people were buying water because they did not have access to water where they lived. This leads to the next question, if individuals have access to tap water at home, why are they buying water that is on average a 7300% price increase from their tap water.

On each survey, customers were asked: “Why do you buy water?” To analyze the data, I put the survey responses to this question into five different categories that were able to encompass all of the responses (Table 5). The most significant correlations or data points are highlighted in blue (Table 5). First, for RWF L, the majority of the responses fell into the categories ‘need’ (31.25%) and ‘unsafe tap water’ (37.50%). The responses that fell under the category ‘need’ included phrases such as “I need to stay hydrated,” “Everyone needs to drink water,” to “I need to buy it for my family to drink.” In fact, for the RWF L customers, when asked ‘Why do you buy water at water stores,’ a majority of the respondents acted surprised or confused as if the answer to the question was so obvious. As shown in Table 5, it is interesting to see that 46.67% of the respondents for RWF H stated they bought the

water for health reasons. Responses for this category described their choice in buying water as the healthier alternative and explained some sort of benefit alkaline has for the body, which is expected given that is the main advertisement message RWF H sends out to the public. Here, the answers lean towards having the privilege of having the luxury of choosing the healthier option, a strong contrast to RWF L where the customers “needed” the water to drink.

Lastly, at least 25% of the respondents for each RWF stated they buy water due to the organoleptic (relating to sense organs) properties of their tap water. For this category, descriptive phrases include the following: ‘it smells, you can feel it,’ ‘the water is yellow and dirty,’ and ‘it’s cloudy, you have to run the water for 15 seconds before it turns clear.’ One individual mentioned that she has been living near construction for the past 8 years and is worried that the construction site has been affecting the quality of her tap water. What is interesting about this specific category is that it was present for all three-income levels at almost the same level (37.5% for RWF L and M and 26.67% for RWF H. While it was the least for RWF H, no correlations can be made in regards to income level because the survey sample was relatively low for each RWF that the percent difference between 37.5% and 26.67% account for one individual response.

Table 5: Survey Question: Why do you Buy Water?

Count of Participant	RWF L	RWF M	RWF H
Row Labels	Total	Total	Total
Preference	18.75%	31.25	26.67%
Need	31.25%	0%	0%
Uncertainty	12.50%	31.25	0%
Health	0%	0%	46.67%
Negative Organoleptic Adjectives Regarding Unsafe Tap Water	37.50%	37.50	26.67%
Grand Total	100.00%	100%	100%

4.9 An Interview with a RWF Business Owner from a Low-Income Area

As mentioned in the literature review, RWFs are a huge mystery on all fronts: the customer side, the business logistics, water filtration and regulation etc., and the business owner side is no exception. A lot of essential information about RWFs can be obtained from interviewing RWF business owners, yet I was only able to interview one business owner (see methods section for data collection limitations). I interviewed the business owner of a RWF in the low-income area range as defined in my methods section. For the purposes of this paper, a pseudonym will be used for the business owner: Carmela. Additionally, a list of the interview questions is provided in Appendix B.

Carmela's RWF opened in October 2015, thus at the time of the interview her store had only been open for 2 months. This could explain why I was able to interview her because she was available at her store, whereas none of the other business owners were present at their stores when I attempted to interview them. As mentioned earlier in regards to advertisement, we found that RWF L had little to no advertisement, thus we would expect the same for this RWF since it is located in a low-income community. When I asked

Carmela if she advertised, she responded saying that she wants to, but doesn't know how. Broadly, we can assume that RWF business owners located in low-income communities do not advertise because perhaps they do not have access to resources that would teach them how to. When I asked Carmela what type of customers she serves, she immediately responded with "Latinos." This is interesting to compare to our demographic customer results for RWF L. While the majority of the RWF L customers were Latino, there was still a percentage that was white, which Carmela did not mention at all.

When I asked Carmela if she knew what her customers used the water for, she looked at be in disbelief and said laughingly, "Drinking obviously!" I prompted her further asking if she knew customers used it for any other purposes. She paused to think about the answer and said cooking, coffee, and in some cases house activities.

Carmela entered this industry because in her words "water is indispensable... everyone needs it, so it was a great business opportunity for me." It was interesting that she referred to *RWF* water, specifically, as being indispensable, showing her perspective is that its common practice and necessary that everyone in the community buys water to drink. She chose to open a store at that location because she grew up in the area and believed it was a great place to start a business, especially since it was near home.

Carmela sells water for 30 cents/gallon, a little more than RWF L, which sells water for 25 cents/gallon. She said that her store goes through 250 gallons of water every three days, which averages to approximately 80 gallons per day.

When I began asking Carmela questions about where she gets her water from and how (or if) she filters her water, she suddenly became closed off, by giving me very short, vague answers. She said that she buys water from another company that delivers water to her store. It is interesting to think about why Carmela did not want to disclose more details about where she gets her water. Again, it calls into question why are RWFs such a mystery.

Additionally, when I asked her whether or not her store filters her water, she gave a similar closed answer by just saying yes. She wouldn't answer what type of filter, which is somewhat concerning.

Initially, before beginning this project, I thought that perhaps higher-income business owners were taking advantage of individuals in low-income communities knowing their perceptions of tap water. However, Carmela is actually from the area and an immigrant herself. However, given such a small sample size, no conclusions can be made to generalize RWF business owners in low-income communities.

4.10 Summary of Key Findings

Demographics

- ◆ The only demographic variable that saw a percent increase across all three RWF locations was percent foreign born

Frequency to RWFs and Price of Water

- ◆ Customers are paying 5,000-10,500% price increase
- ◆ Low-Income are buying the most water per visit and are visiting RWFs the most

Quality of Tap Water/Why Buy Water?

- ◆ All surveyed customers had access to tap water
- ◆ More than 50% of surveyed customers from all RWF locations find their Tap Water Unsafe to Drink

- ◆ At least 20% of surveyed customers across all three RWF locations used descriptive negatively associated adjectives to describe their tap water (chunky, murky, yellow etc.)
- ◆ A percentage of both renters and non-renters think their tap water is not safe to drink
- ◆ Overall RWF L customers felt they “needed” to buy water whereas a larger percentage of RWF H customers bought it for preference or health reasons

Advertisement

- ◆ RWF H advertised the most and RWF L advertised the least amount
- ◆ All of RWF L’s customers found out about the store because they lived near by

Usage of Bought Water

- ◆ 100% of surveyed customers use their bought water for drinking
- ◆ Direct correlation between income level and usage of bought water for cooking (highest percentage for RWF L customers)

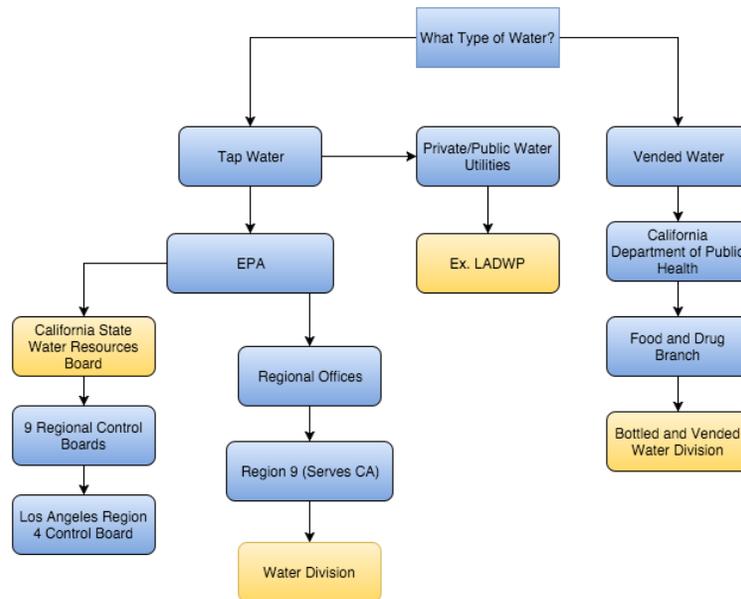
4.11 Regulation of Vended Water and Tap Water

As mentioned earlier, I decided to interview key stakeholders in this industry to get a better understanding of who is accountable for the regulation of tap water and RWFs themselves. Thus, through researching online, I found the following stakeholders:

- Jane Reich, Chief, Food Safety Inspection Unit at the California Department of Health
- Frances Spivy-Weber, Vice-President, State Water Control Resources Board
- Albert Gastelum, Director, Water Quality Division, Los Angeles Department of Water and Power
- John Kemmerer, Associate Director, Water Division, U.S. EPA Region 9

To better understand the importance of the aforementioned individuals a quick summary of the key entities involved in the regulation of drinking water is necessary. There are two main governmental agencies involved in overseeing drinking water: one for bottled or vended water and one for tap water. The California Department of Public Health, specifically the Food and Drug Branch, is responsible for monitoring bottled and vended drinking water, while the Environmental Protection Agency (more specifically, the California State Water Resources Board) is responsible for regulating tap water. The California State Water Resources Board is divided into nine Regional Water Quality Control Boards (Regional Boards) and Region 4 is dedicated to Los Angeles County. Figure 17 shows an organizational chart of the aforementioned stakeholders. As mentioned earlier in the literature review through the various examples of unsafe tap water incidents, we know that there are flaws in the tap water regulation system and with little information about RWFs we can imagine the same problems probably apply to RWF water regulation. This section attempts to examine, through interviews with stakeholders and a brief analysis of regulation protocols, where exactly the system is failing for both the regulation of tap water and RWF water (vended water).

Figure 17: Organization Chart of Who is Responsible for the Regulation of Vended and Tap Water



4.11.1 Regulating Vended Water

California Health and Safety Code (H&SC) Section 111120 requires all retail water facility owners to obtain a RWF license from the California Department of Public Health, Food and Drug Branch (FDB) (“Inspection Procedures and Operating Requirements” 2016). The license in itself creates a strong foundation for RWF regulation as it allows FDB the opportunity to set standards for all RWFs through the license application process. FDB states that it performs a pre-licensing inspection of each facility to ensure it is ready to operate. Once a RWF obtains a license, the FDB conducts “periodic on-site inspections to assess compliance with applicable state and federal laws and regulations” (“Inspection Procedures and Operating Requirements” 2016) However, FDB does not publicly indicate what “periodic” entails only that the inspection includes: “a review of your equipment maintenance and sanitation records; an on-site inspection of your equipment, labeling,

processing, and sanitation operations” (“Inspection Procedures and Operating Requirements” 2016). While having surprise inspections has benefits in of itself, in that, owners can not plan for the inspection, if there is no guide as to how many inspections there are, the inspections can easily fall through the crack. In fact, the table provided in Appendix D shows tangible evidence of this exact system failure (“Bottled and Vended Water Program Report” 2016). Appendix D shows the number of RWF licenses and number of inspections per county and for *every* county where there are RWF licenses issued, there are significantly fewer inspections recorded than licenses. Meaning, not every RWF received a “periodic” inspection. FDB needs to set consist inspection standards that apply to all RWFs so that facilities are not forgotten, posing greater risks to people buying water at these stores.

Another aspect of FDB’s regulations that is concerning is RWFs that get their water from a municipal or public water system are exempt from the source water-testing requirement. Instead, they are only required to provide source water quality information (“Inspection Procedures and Operating Requirements” 2016). Yet, as revealed in this paper’s literature review, we know that there are flaws in regulating public water systems as well. Thus, providing source water quality information does not guarantee that the water is actually safe.

In fact, the January 2016 *Bottled and Vended Water* Report published by the FDB provides additional evidence that their regulations are weak. For example, Table X shows the type of tests RWFs need to conduct on their water in order to maintain their license. For both VOCs and lead, these tests are only required for *new* RWF operators or if RWFs change their water treatment process. Yet, lead levels can change over time with the deterioration of pipes. Meaning, a water sample could have low levels of lead one year, but a couple of years later, the lead levels could rise due to the further aging of pipes. Yet

according to FDB’s regulations, a RWF getting water from said source does not have to test its water again. FDB should implement yearly checks for water for the type of analyses listed in Table 2.

Table 6: RWF Testing Requirements

<i>Type of Analysis</i>	<i>Testing Requirement</i>
Bacteriological, Coliform organisms	Must be conducted every 6 months
Volatile Organic Chemicals (VOCs), including TTHM’s	Must be conducted by new RWF operators and as required by FDB*
Lead	Must be conducted by new RWF operators and as required by FDB*
	<i>* If you change your water treatment process, or replace any water treatment or major equipment, you will be required by FDB to retest your product water for VOC’s and Lead prior the renewal of your RWF license</i>

Source: Bottled and Vended Water Report, January 2016, California Department of Public Health, Food and Drug Branch

On a more positive note, all testing is required to be done by a lab certified by the California Environmental Laboratory Accreditation Program (ELAP) or the EPA, which is good in terms maintaining some sort of authenticity and consistency of lab tests across all RWFs. The most concerning part of FDB’s regulations was revealed in the ‘major violations’ section of the *Bottled and Vended Water Report*. The following table (Table X) was provided in the report, and it shows all the major violations from either bottled or vended water licenses during the year 2015 (“Bottled and Vended Water Program Report” 2016). First, the report does not detail which locations had the violations, which the public has a right to know whether or not the place they buy water from has had a history of violations or not. Additionally, the chart of major violations does not separate bottled water vendors from retail water facilities making it impossible to understand where the majority of the violations are taking place. At the end of the table, the report states that the respective firm

corrected all of the violations and therefore *no fines were issued* (“Bottled and Vended Water Program Report” 2016). Again, over 400 violates were cited and zero fines were given. This calls to question the purpose of regulation systems if no consequences for breaking rules exist. Additionally, it brings to surface a larger concern regarding how the FDB values the importance of our health when it comes to drinking water. Does the FDB consider safe drinking water a basic human right? How important does the FDB think regulation standards are? Does FDB realize there are possible flaws within their regulation system? These questions are great starting points for a future study on this topic.

Table 7: Vended and RWF Major Violations During 2015

Code	Number
H&S 111075 (b) Prior to bottling or vending water, the water shall be subjected to filtration and effective germicidal treatment by ozone, ultraviolet, carbon dioxide, or an equivalent disinfection process approved by the department.	36
H&S 111075 (d) Ollas or other water-holding dispensers, both refrigerated and nonrefrigerated, water-vending machines, and water dispensers in retail water facilities, shall be examined for cleanliness each time they are serviced by the distributor, bottler, retail water facility, or water-vending machine operator. When necessary, these dispensers shall be sanitized according to the methods described in Part 129 of Title 21 of the Code of Federal Regulations.	55
<p>H&S 111115(b)</p> <ol style="list-style-type: none"> 1. The department shall require that water-vending machines be cleaned, serviced, and sanitized in accordance with the manufacturer’s specifications, but at least once every 31 days. 2. Inspection records shall be kept for every visit made by either the operator or the maintenance personnel pursuant to this subdivision. These records shall show the date and time of the visit, any tests performed, any maintenance performed, and the signature or electronic signature of the operator or maintenance personnel. The records shall be kept by the owner of the water-vending machine for a minimum of two years and shall be made available to the department upon request. 	22 2
H&S 111120(a) No person shall operate a water-bottling plant, a private water source, or be a bottled water distributor in this state except pursuant to a license issued by the department. If a person has a valid water-bottling plant license issued by the department, additional license fees for a private water source operator, a retail water facility, a water hauler, or a bottled water distributor based and operating at the same address, shall not be required.	16

H&S 111120 (b) No person shall own or operate a water-vending machine or a retail water facility or be a water hauler, except pursuant to a license issued by the department or to a permit issued by a local health department.	32
H&S 111145 (b) Each product dispensed by a water-vending machine or a retail water facility shall be sampled and analyzed for coliform bacteria at least once every six months. The analysis shall be submitted to the department indicating whether the water is pure and wholesome.	70
H&S 111150 (a) All sources of bottled water, vended water, and water dispensed by a retail water facility shall be monitored annually for the presence of volatile organic compounds of potential public health concern, as specified by the United States Environmental Protection Agency in Tables 2 and 14 contained in Volume 50 of the Federal Register on pages 46904, 46923, and 46924 on November 13, 1985, or as reasonably specified by the department as a condition of licensure.	16

Interview Jane Reich, Chief, Food Safety Inspection Unit at the California Department of Health

Jane Reich is the Chief of the Food Safety Inspection Unit at the CDPH, who is responsible for all of the RWF license applications. She was kind enough to send me a list of all the current RWF licenses issued in California. After looking through the list of RWFs and doing more research I looked into what the RWF license application consists of. One detail that the application requires is it asks owners to state how their water will be treated. To which, the following check boxes are provided: carbon filtration, reverse osmosis, deionization, ultra violet, distillation, membrane filtration, ozonation, and other (“Retail Water Facility License Application” 2016). Given the information was required for the application, I assumed Reich would have access to the responses to that question and would be able to provide those responses to me. However, she responded saying it was not possible, with no other explanation (Reich, email corres., February 16, 2016). The ambiguity of her response raises a red flag that perhaps CDPH is hiding something in regards to the water provided by RWFs. For what reason does Reich or CDPH have to withhold information regarding the regulation of water that people buy on a weekly basis? When I asked Reich if she could provide a list of RWF licenses by year (an attempt to

understand the history of RWF licenses), she again stated that it was not possible, but this time explained that the program they use does not have the ability to “go back and look at previous licenses” (Reich, email corres., February 16, 2016). Again, the lack of information and cooperation is slightly concerning. Finally, when I asked Reich if she would be available for an interview, while she initially stated yes, after sending her the IRB consent form, she quickly changed her mind stating “it would have to be reviewed by her management and legal counsel,” and therefore would not be possible to interview. This signals another concern given the rest of the stakeholders I reached out to had no reservations in interviewing with me.

Reich, however, was able to answer some questions over email (after requesting she needed to see the questions beforehand). See Appendix E for the list of the questions. From the questions I asked, the most useful information Reich revealed was that CDPH does not monitor or have a record of how much water each RWF sells. This is a bit worrisome because the state or city should have information about how much a public good such as water (especially when it is considered a basic human right) is being sold through vendors. Additionally, when I asked Reich what she thought the significance of having over 500 RWFs in LA County was, she responded saying, “CDPH does not have information regarding the significance of the number of machines in Los Angeles County. Los Angeles does have a large population, so perhaps there is a correlation” (Reich, email corres., February 16, 2016). Reich’s seemingly unconcerned response is ironically alarming. It seems as though Reich or the department have not given second thought to why there are so many RWFs in LA County. Perhaps they have not taken the time to map the locations and realize the disproportional amount located in LA County. I also asked Reich why she believes there has been a huge increase in RWFs over the years, to which she responded,

We would not characterize it as a big increase in the number of Retail Water Facilities – ownership turnover appears to be a primary reason new applications are submitted. Each new owner needs to submit his/her own application and obtain his/her own license. So, if a Retail Water Facility changed ownership three times, that would show up as three new applications (when it is really the same facility (Reich, email corres., February 16, 2016).

While her explanation may account for some of the increase, in the 1990s there were only around 200 RWF licenses throughout all of California and now there are over 1000. Thus, it does not make sense to fully explain the increase through ownership turnover when there are 800 more RWF licenses to account for from the original 200.

Lastly, the most shocking part of the interview over email was when I asked Reich if she believed there was a correlation between people buying water at RWFs and their perception of LA tap water. Reich said that she's heard anecdotally that some people buy RWF water because they come from areas of the world where public water supplies are not considered to be safe and those perceptions are carried back to where they live in the United States (Reich, email corres., February 16, 2016). However, she also stated: "CDPH is not aware of a specific perception regarding LA tap water" (Reich, email corres., February 16, 2016). It is unfathomable to think that CDPH has not thought (or is choosing not to confess) that the increase in RWFs (aka increase in people buying water) could be related to people not trusting their tap water. While there has of course been an increase in population in Los Angeles County since the 1900s (when there were only 200 RWFs), why isn't the CDPH questioning the surplus amount of RWFs regardless of the population increase? What about the idea there should not be a copious amount of RWFs regardless because people should be able to drink from their tap. The lack of introspective thought about the increase of RWFs from the CDPH calls into question CDPH's motives or how they define their role in promoting public health through drinking water. Again, further

research could specifically look at CDPH and their goals as a government agency when in regards to vending and tap water consumption.

4.11.2 Regulating Tap Water

Key Stakeholder Interviewees:

- Frances Spivy-Weber, Vice-Present, State Water Control Resources Board
- Albert Gastelum, Director, Water Quality Division, Los Angeles Department of Water and Power
- John Kemmerer, Associate Director, Water Division, U.S. EPA Region 9

Though conducting my interviews, I found out that my conversations with Albert Gastelum (from LADWP) and Frances Spivy-Weber (State Water Control Resources Board) were the most prevalent to this research paper. When I interviewed John Kemmerer, it was clear that the Water Division department and his role specifically do not oversee the regulation of tap water, but rather other water projects such as sustainable storm drainage systems.

Spivy-Weber and Gastelum, on the other hand, are two individuals who play a large role in regulating the tap water in Los Angeles. One of the first questions I asked them was if they could explain how it is possible that customers are complaining about their tap water. When I posed this question, I gave some examples of the descriptive negative adjectives some of the surveyed customers used when describing their tap water. Both Spivy-Weber and Gastelum were somewhat surprised, first stating that all of LA's tap water is safe to drink. However, they followed this by saying that it could be possible that people were describing their tap water in that way due to **aging pipes** in their household. Surprisingly, Spivy-Weber stated: "aging piping is not our issue, it's the house owner's problem" (Spivy-Weber, phone interview, February 4, 2016). Albert seemed more concerned revealing that he had been working on ways to alleviate the cost for homeowners to replace

their pipes but said that he gets a lot of push back from his co-workers because it is a “progressive idea” and of not high priority for his co-workers (Gastelum, phone interview, February 5, 2016). Gastelum said that it would take a long time until enough of the right people get on board to pass a bill that would help home owners alleviate the cost of updating their old piping. Additionally, he explained that everyone around him is so busy and that the office has limited “man-power” that it is hard to find free time to work on pushing this progressive idea (Gastelum, phone interview, February 5, 2016).

While aging is certainly one explanation that could explain the questionable safeness of people’s drinking water, another explanation could very well be flaws within LADWP’s water testing procedures. To give some context, it is important to point out that LADWP’s water testing procedures are far too complex to provide an in depth summary of all the regulations for each chemical compound or bacteria they test for in this paper. I will attempt though, to touch the surface on a few of their regulations in order to provide a bit of insight into the possible flaws within LADWP’s water testing policies.

While we learned in the findings section that customers describing their drinking water as unsafe is not limited to renters, due to the small sample size of this project, there is still the possibility that unsafe tap water is a large issue for renters. When I interviewed Albert, I found out that LADWP is not required to test Tier 2 (multi-family residences), which includes apartments. For Community Water System testing (CWS: a water system that provides water to the same people year round), according to EPA’s water regulation policy 141.86, LADWP is required to collect water samples (at point of consumption, i.e. sink) from “Tier one” single-family structures that either contain copper pipes with lead solder installed after 1982 or contain lead pipes and/or are served by a lead service line (“California Code of Regulations” 2016). If a community water system, however, does not have enough tier one sampling sites, only then are they required to test samples from “tier

two sampling sites,” which consists of multiple-family residences (i.e. apartment buildings). According to Gastelum, since LADWP serves a city of over four million individuals, LADWP has enough tier one sampling sites; it never has to test the tier two, multi-family residences.

Additionally, LADWP is only required to test tier one sites at point of consumption every three years (Gastelum, phone interview, February 5, 2016). The State Water Resources Control Board categorizes water entities based on how their water quality reports and based on those results determines how often they need to conduct water sample tests. Therefore, because LADWP has consistently met the standards from the State Water Resources Control Board, they have to test less often, in their case, every three years. While LADWP is not responsible for the pipes the apartment owns, LADWP should still be testing these sites to provide information to the residents living their regarding the safeness of their tap water (Gastelum, phone interview, February 5, 2016).

There has been a history of landlords not providing adequate housing conditions for renters. So the fact that LADWP does not have to test tap water for multi-family residences, indirectly the State Water Resources Control Board could be responsible for making this unsafe tap water issue a renters issue. Landlords should be required to get their tap water tested and pipes replaced at designated time period. The results of the tests should be disseminated to the renters and the landlords should provide filters for their renters if the tap water is in fact contaminated.

Of course, LADWP tests for other contaminants and claims they collect approximately 30,000 water samples every year. These water samples, based on the contaminant, are tested monthly or yearly, and the sampling sites depend again on the water contaminant being targeted. However, when I asked Albert if for a given contaminant they switch the change the testing locations or if they test from the same

places each time, he responded saying for the most part they test at the same locations (Gastelum, phone interview, February 5, 2016). Clearly, there is a flaw in testing in the same locations as you are ignoring other areas that may be consistently receiving unsafe tap water because it is never tested.

When someone contacts LADWP concerned about the safety of their tap water, LADWP will track where their water is coming from. LADWP has divided their water services into five water quality areas that lead to five main water source filtration sites. They will find the filtration site that provides water for the concerned individual, test the water coming out of that source to determine if it is the water coming out of the source that is contaminated or from the person's home. However, they test the water coming out of the source, not right before the meter. Meaning, while the water coming out from the source may be clean, the water still has time between the source and the meter to gather harmful contaminants (Gastelum, phone interview, February 5, 2016). Thus, LADWP should be required to test at the source and between the source and the meter to obtain more specific testing results.

Lead and Copper Rule (LCR)

As mandated by the EPA, the LCR requires that public water agencies test for lead and copper levels at specified locations, source waters, distribution systems and at customer taps. The LCR set Action Levels (AL) for both lead and copper, meaning any water sample above the AL requires actions by the public water agency, which includes: increased monitoring, source water treatment, corrosion control, distribution system changes, and public education. The AL for lead is 15 micrograms per liter or part per billion (ppb) and the AL for copper is 1,300 ppb. The LCR set the AL on a 90th percentile level of customer tap water samples, meaning only 10 percent of taps tests can have levels higher than the AL ("Lead and Drinking Water in LA" 2016).

According to LADWP, it has been in compliance with the LCR since the rule was created in 1991. Since LADWP is so large, it is required to sample a minimum of 100 homes. To prepare for this test, LADWP has to prepare a list of residences whose plumbing fit the criteria for this test: homes with copper pipes installed using lead solder between 1982 and 1986. To do this, LADWP conducted an exhaustive manual search through the Department of Building and Safety permit records. According to the 2015 LCR testing results, three samples were above the AL for lead and one above the AL for copper (“Lead and Drinking Water in LA” 2016).

One critique of this test is that the list of residences that fit the criteria for this test is not made available to the public. In fact, the homes on that list are not notified either unless they were chosen for a testing site. Additionally, why are only 100 homes tested? Shouldn’t all homes that fit the criteria be tested? Lastly, the LCR allows 10 percent of the tests to surpass the AL, when that percent should be zero. Why is it okay to allow some homes surpass the limit?

Interview Findings Continued

When I asked Spivy-Weber and Gastelum if they could explain the prevalence of the increase of RWFs in LA County, they both said that it could be due to immigrants who do not trust their tap water in the country where they originated from and then carry that same ideology to the United States. Yet, during the second half of the interview, when I began asking about any tap water education plans, none of the plans included targeting the immigrants they just talked about (Gastelum, phone interview, February 5, 2016). Both Frances and Albert revealed a clear lack in future plans regarding tap water education (Spivy-Weber, phone interview, February 4, 2016). Their responses regarding tap water education are included below in the recommendations section.

5. RECOMMENDATIONS

One of the major findings that came from the customer surveys was that for each RWF location, a large percentage of the respondents described their tap water as being unsafe. Additionally, many of the respondents stated that they bought water from RFs because they were unsure whether or not their tap water was safe. From the interviews from stakeholders, we found out that the poor tap water quality could be explained through aging pipes and/or lack of consumer education. Thus, the following recommendations follow two major themes: ways to fix our aging infrastructure issue that is causing damage to tap water quality and tap water education.

5.1 Drinking Water Revolving Fund

In a brief internet search of aging pipes in the United States, most if not of the articles revolve around the concern over the significant cost that comes with replacing these pipes. For example, an article posted by *Times Union* in September 2015 is titled “Billions need to fix New York’s aging water pipes” (Klepper 2016). In this article, it states that the EPA estimates that it will cost New York \$384 billion over the next 20 years to fix its aging infrastructure. While the state has attempted to aid the process by giving zero and low-interest loans to help cities and towns pay for the replacement of old pipes that they can’t afford on their own, the money is not enough to cover the whole cost. It becomes seemingly more evident that cities are, for the most part, on their own to cover the full cost. For example, after Syracuse Mayor announced that the city would need \$725 million in new water funding, Governor Andrew Cuomo told the media that the city would have to solve its own problem (Klepper 2016). At first glance, it seems the main issue is that states and cities do not have enough funds to support these huge projects. However, there seems to be a disconnect.

The United States government has a fund called the Drinking Water Revolving Fund (DWRF), which provides below market rate loans for improving public water systems. It was established through the 1996 amendments to the Safe Drinking Water Act (SDWA). The fund runs through a relationship between the EPA and states. Congress decides the funding for the DWSRF every fiscal year, and from that, EPA awards grants to each state based on the most recent Drinking Water Infrastructure Needs Survey and Assessment. Each state is required to match 20% of the federal grant (“How the Drinking Water State Revolving Fund Works,” n.d.). Water systems then begin slowly repaying back their loans with a low interest, and the money goes back into the revolving fund. In 2014, the DWSRF provided more than \$27.9 billion to water systems and over 11,400 assistance agreements for: “improving drinking water treatment, fixing leaky or old pipes (water distribution), improving source of water supply, replacing or constructing finished water storage tanks, and other infrastructure projects needed to protect public health” (“How the Drinking Water State Revolving Fund Works,” n.d.) States can to a certain extent set specific loan terms to repay the loan up to 30 years and interest rates can range from zero percent up to market rate based on the state’s financial needs.

So, where is the disconnect? As mentioned earlier, while it appears in the media that there is not enough money to fund replacing all of the aging infrastructure, a large amount of the fund is actually left *unspent*. As of August 2015, there was \$1.1 billion of unspent money left in the DWRF due to project delays, poor management, and structural obstacles. Additionally, states are using an increased amount of the funds for drinking water services instead of infrastructure. Approximately 1 in 5 dollars is spent on contractor and employee salaries, and while that aspect is necessary, less money is allocated for the actual repair or replacement of pipes (“How the Drinking Water State Revolving Fund Works,” n.d.). While the fund’s system of providing loans instead of grants to states makes the fund sustainable,

it also discourages smaller cities or towns from taking advantage of this fund. For these smaller places, they can't afford to repay the loans without raising water bills to unaffordable prices.

As a general recommendation, the DWRF needs to provide more incentives for states to use the money. By doing this, ideally it would enable DWRF to spend all of its money, and would avoid getting budget cuts by the federal government, which is currently happening. If they encouraged states to use the money and used all of their money, the DWRF would have a stronger argument to ask for more (much needed) money. The DWRF also needs to implement a sliding finance scale that encourages the smaller cities to use the money. For example, this could come in the form of grants instead of loans. Essentially, the most ideal situation would be to give the necessary financial backing through a loan, but give smaller cities more flexibility in the time limit to pay the money back. This way, the fund is still being sustainable, but also being more encouraging to smaller cities. In fact, it would be more beneficial if states were required to use a portion of the DWRF fund to replace aging pipes (this possibility is explained later in this section).

5.2 National Level: Improve Lead Service Line Pipe Databases

In addition to replacing old piping infrastructure, we need to specifically target replacing lead service pipes, which surprisingly are still very abundant across the US despite having been banned since the 1950s. On top of lead service pipes, lead is also present in another not so apparent form. Lead was also used to seal joints between pipes before rubber gaskets became popular. However, as one could imagine, finding a lead line, which approximate around an inch in diameter or less, is much more difficult to find, yet still contribute to the same hazardous health risks associated with lead. While, Los Angeles County specifically has never had lead service lines, aging pipes is applicable to the whole country, and so are lead pipes, both hazardous to people's health (Young 2016).

The extend of the issue and progress in solving the issue varies across cities all over the US: some cities such as Boston, Massachusetts have taken it upon themselves to not only manually find all of the lead pipe service lines, but also digitally map them (“Lead Service Map” 2016). Any Boston resident with internet access can input their address and visually see whether or not their residence is serviced by a lead pipe. I tested the website herself and found that it was extremely user friendly: easy to navigate, use and understand. Other cities, however, especially older ones like Detroit, Michigan still keeps records of those pipes on index cards. The city hopes to eventually digitize and map them; however, stated that they haven’t gotten around to doing so and don’t have the financial capital to do so. Needless to say Detroit has still been able to meet federal guidelines in regards to their water quality, clearly revealing a flaw in the system (Wisley and Spangler 2016). However, meeting federal water quality standards is a temporary fix to a larger problem that could cause bigger water quality issues in the future as the pipes continue to age and not get replaced. Even then, residents should have the right to know whether or not they are getting water from a lead service pipe, so they can take the right precautionary measures.

Oakland County Water Resources is another example where they don’t have information on the location of lead pipes. Oakland County Water Resources operates water services in 14 communities, yet do not know what houses are connected to lead service pipe lines. Experts say that replacing lead lines is seen as the “most thorough means of addressing any potential problems,” and in order to do this, we need to know where they are. To summarize, the federal government needs to mandate that all cities hire engineering firms to identify the lead pipes and lines within each city (Wisley and Spangler 2016). Then, the federal government needs to mandate that the subsequent data be digitized and mapped for public records and public education. Lastly, the government needs

to mandate that the all cities come up with a plan to remove lead lines within 30 years. Cities across the US have already begun replacing lead lines and have been successful in doing so proving that there should be no excuse for not being able to do so. The most recent example, in an article posted February 1, 2016, the Madison Water Utility was the first major utility in the nation to demonstrate that a full replacement of both private and public portions of lead service lines is possible. It replaced the city's 70,000 lead pipes costing an estimated \$511 to \$756 million. Amy Barrilleaux, spokeswoman for the Madison Water Utility stated that their largest obstacle was "getting Madison's lead service replacement program approved by lawmakers and the agencies that oversee," saying that just that process took years. She also stated "It's not surprising that other utilities have been reluctant to go down that path, but we're glad we did" (Schmidt 2016) Thus, having a federal mandate is a solution that would hopefully, if implemented in the right way, not only speed up this process for utilities, but leave no choice for utilities fearing the long journey to replace all of the lead pipes.

5.3 Recommendations Align with Those of AMWA

AMWA is an organization that represents the largest publicly owned drinking water systems in the United States, and it is the nation's only policy-making organization solely for metropolitan drinking water supplies. This organization is made up of a board of 20 individuals who represent all regions of the country. As a board, they represent the best interests of these publicly owned water systems by working with Congress and federal agencies to make sure laws and regulations not only promote public health interests, but are also cost effective (*Association of Metropolitan Water Agencies* 2016). AMWA has come up with a set of recommendations that they continue to push for every day, and I believe they are integral in helping solve the issue of aging infrastructure.

AMWA supports fully funding the Water Infrastructure Finance and Innovation Act (WIFIA), a new federal loan program that allows lower cost financing for major water infrastructure projects over \$20 million. Generally, these projects are too large to receive significant funding from the DWSRF. AMWA also continues to support maintaining the federal tax exemption for interest made from municipal bonds. Tax-exempt municipal bonds allow for lower interest rates for large water system projects. Over the past 10 years the tax-exempt municipal bonds have financed approximately \$258 billion worth of water infrastructure projects (*Association of Metropolitan Water Agencies* 2016).

5.4 Tap Water Education

Both Gastelum and Spivy-Weber alluded to LA's Celebrate Tap Water Day, a day part of a larger educational Water Week in LA, as the only form of tap water education. This is odd given how LADWP emphasizes tap water education numerous times on their website and water quality reports. LA Water Week has only happened once and it debuted for the first time this past May 2015. Representatives from State Water Resources Control Board, LADWP, and EPA were present at the event as the major stakeholders. Interestingly enough though, while both Frances and Albert talked about plans for the next Water Week this coming May, John Kemmerer, Associate Director of the Water Division of US EPA Region 9, had not heard of any plans for the upcoming event. While this could have been because it was too far in advance to contact John about plans for the week, it does hint a possible lack of collaboration and/or communication between these government agencies about tap water education in general. (Gastelum, phone interview, February 5, 2016).

When I asked Spivy-Weber whether or not there were further plans of this educational campaign (in addition to Water Week) her response was that it was annual, in that, the next year when they host Water Week again would be the said future plans to expand this educational campaign (Spivy-Weber, phone interview, February 4, 2016).

Additionally, when asked about the details of the Tap Water Day, she revealed that their plan to reach out to the community would be largely dependent on their partnership with Dodger's Stadium, an extremely specific target population. Since the only plans of tap water education Gatselum and Spivy-Weber referred to was LA Water Week, specifically LA Tap Water Day, I decided to look more closely at the event, specifically its community outreach.

LA Tap Water Day

On May 7, 2015, the City of Los Angeles spearheaded and celebrated its inaugural TAP Water Day as part of a larger, also first of its kind, Water Week. The city partnered with major stakeholders within this sector including: LA Deputy Mayor, LA Chief Sustainability Officer, LADWP Director of Water Quality, Environmental Protection Agency (EPA) California representative, State Water Resources Control Board, LA County Public Health, American Water Works Association (AWWA), and the LA Department of Recreation and parks ("LA Celebrates TAP Water Day to Highlight Benefits of City's Clean Drinking Water" 2015). However, *'Tap Water Day,'* the name in itself, is a bit misleading—as the main purpose of the day was to celebrate the new drinking water stations that would be placed in a variety of locations throughout LA, where city officials hope residents will use these to not only drink out of, but to also refill their reusable water bottles. As part of this day, they handed out free reusable water bottles for residents to use ("LA Celebrates TAP Water Day to Highlight Benefits of City's Clean Drinking Water" 2015). However, the event was held at Balboa Sports Center, on the outskirts from the hub of Los Angeles as seen in Figure 18. Figure 19 also shows that the Sports Complex is located in an income area range of \$104,000-200,001 and surrounded by a majority of higher income areas as well. However, as mentioned earlier in the paper, the majority of the RWFs are located in the income level \$12,000-43,000. If the majority of RWF locations are located in low-income

communities and this outreach event is held in a higher-income area, it calls into question how effective the outreach to the targeted population is.

Figure 18: Map of RWFs in Los Angeles County with Balboa Sports Complex Marked

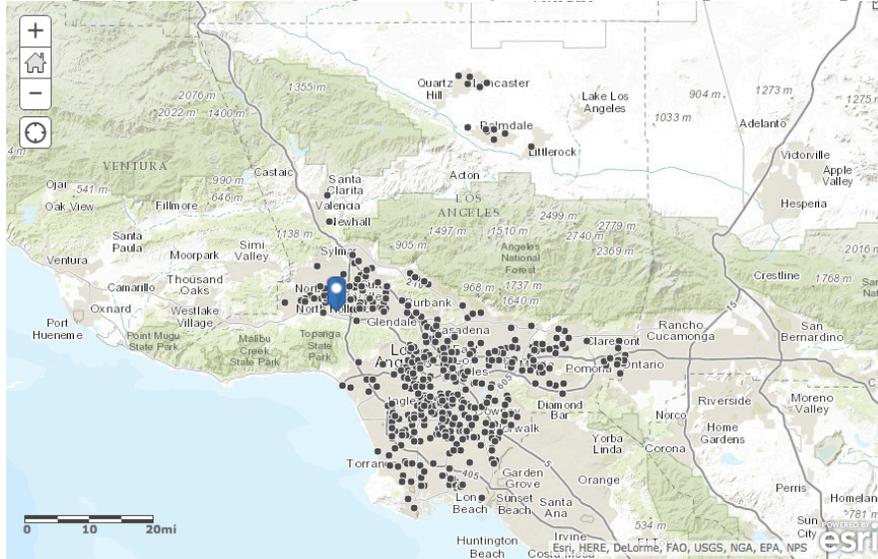
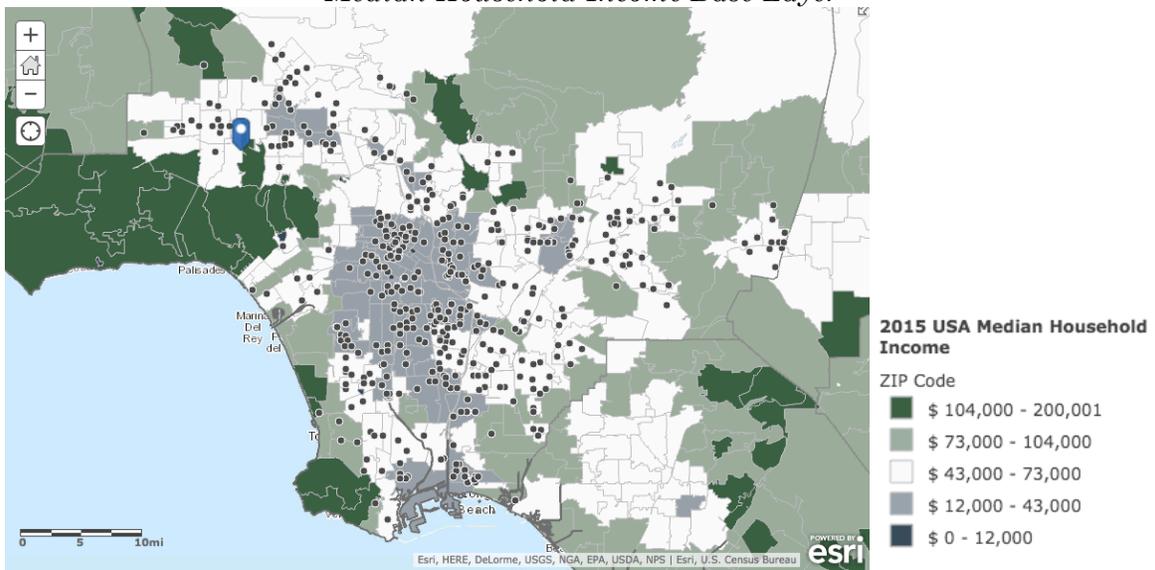


Figure 19: Map of RWFs in Los Angeles County with 2015 USA Median Household Income Base Layer



More concerning though was Spivy-Weber statement that there would be no follow up on the campaign until the following year (Spivy-Weber, phone interview, February 4, 2016). It really shows the lack of priority when it comes to LA tap water education. This is saddening because when I interviewed Gastelum, I learned that customers can get their

water tested for free by LADWP. In fact, LADWP will come to your house, test at point of consumption and at source water. Additionally, he told me that sometimes people's water can come out of their tap water as murky, but that it is still completely safe to drink as it is just a result of chemicals they use to disinfect the water (Gastelum, phone interview, February 5, 2016). Yet, what percentage of LADWP customers knows this?

Tap Water education, as we learned in our findings, should also encompass what it can be used for and how it can be used. Specifically, in the findings section we learned that a disproportionate amount of low-income customers felt the need to buy water to use for cooking, when cooking water actually cleans the water. Therefore, tap water education needs to encompass myths such as these so that people don't feel the need to buy more water than they desire.

There are organizations such as WeTap, based in LA, that is dedicated to helping promote tap water safeness; however, the city, public and private utilities, state, or federal government should be held accountable for educating consumers about tap water. The State Water Resources Control Board should require water suppliers to survey their customers. This survey would ideally be given annually and give insight as to what community members know about their tap water and resources available to them if they have questions. Not only would this create another line of communication between the SWRCB and water suppliers, but it would give the SWRCB evidence regarding the lack of education around tap water that would ideally motivate them to prioritize tap water education more.

Essentially, each city should be required to meet a base tap water education requirement, given how essential it is for everyone to have equal access to drinkable tap water. The data from the survey above would help cities tailor their education strategies, as it could very easily vary across different cities. Each year, the city should have send a

report to the State Water Resources Control Board on their efforts to educate the community about tap water.

5.5 Radical Recommendations

Currently, when it comes to water infrastructure, the only federal requirements are in regards to water quality. Essentially, as long as the water coming out of the pipes meet federal water quality standards, the federal government does not require water systems to replace their pipes, no matter how old they are.

First, in regards to the lead service pipes, the federal government needs to mandate that every city hire an engineer to locate and document all of the lead service pipes and any connecting lead pieces or lines. Then, that information needs to be communicated to the respective community and be easily attainable and available, so that those who are being serviced by a lead service line or pipes that contain lead connecting pieces know not to drink their water and take precautionary steps to filter their water. Second, once all lead service pipes are located, the federal government needs to mandate that those cities set a 20-30 year plan to replace all of those pipes. In terms of aging pipes, the federal government needs to create a law that mandates all pipes need to be replaced after a certain period of time. This law would be in addition to the water quality standards.

This is not so much a radical recommendation as it is a radical goal: the ultimate goal is for all tap water in the US to be completely safe to drink and to have every person in the US not have any doubts about the quality of their tap water. Every person should be fully educated about the components of their tap water and how they can get their water tested if need be. While this statement seems obvious, after conducting this research project, it seems so out of reach because we have so much ground to cover. For example, as mentioned earlier, as of March 2016 (9 months after media news broke about the incident), Gardena residents are still complaining about their tap water, after noticing for years that

their tap water was black. We can't even ensure that all of the tap water in the United States is safe drinking water. Let alone, when we do know that it is unsafe to drink, it takes city and state officials an inexcusable long amount of time to address and most times not fix the actual issue. This needs to change.

6. FUTURE STUDIES

There were obvious limitations as outlined in the methods section to this study, in which future studies could assist in closing those gaps. For one, there is still much needed information to find out regarding the business side of RWFs. Specifically, where the business gets their water, what type of filtration systems do they use, do they actual filter the water, how did they get into this business, how much do they profit from their business, and why do they sell water? Interviewing business owners (being able to speak Spanish and Chinese) and working at any of the RWFs would provide more information that would hopefully answer some of the aforementioned remaining questions.

Additional studies could also include surveying more RWFs strengthen the database of those who are complaining about their water using descriptive language, and then to follow up with those individuals and map where those residences are and to actually test the water at those places. This could uncover points of consumption where the water is detrimental to people's health or it could be that the water looks unappealing, but is in fact safe to drink making the issue more about tap water quality education.

Since, there is clearly an education and communication gap between city and water system officials and the community, it would be helpful to have a study done that looked into why this gap exists and how the gap can be closed. Specifically, this research could survey the community to determine the level of education residents have regarding not only the quality of their tap water, but also how residents can get their water tested. A follow up

to this study would be to use that data to research best practices to educate the community on those topics.

Lastly, it would be beneficial to have a study done solely on the policy aspect of this issue. This could include looking to see if any other countries have federal laws that mandate replacing old pipes. Additionally, looking at how other countries financially support upgrading infrastructure and if they have similar funds like the United States' DWSRF. This would also include looking more in depth at how cities use the DWSRF and how incentive programs could exist that would greater the impact of the fund and community infrastructure needs.

Appendix A:
Customer Survey

1. Ethnicity origin (or race). Please check your ethnicity:
 - White
 - Hispanic or Latinx
 - Black or African American
 - Native American or American Indian
 - Asian or Pacific Islander
 - Other (Please Specify)
2. Please check the statement that best describes your living situation
 - I rent the place where I reside
 - I own the place where I reside
 - Other (Please specify below)
3. How many total people live in your household (including yourself)
 - _____
4. Do you have access to tap water where you reside?
 - Yes
 - If no, please explain
5. If you have access to tap water where you reside, do you use it?
 - Yes
 - No (Please explain why)
6. If you use tap water where you reside, what do you use it for? (Check all that apply)
 - Cooking
 - Cleaning
 - Drinking
 - Hygiene (showering, washing hands, etc.)
 - Other (Please specify)
7. How much did you spend at the water store today?
 - _____
8. How often do you buy water?
 - Never
 - Less than once a month
 - Once a month
 - 2-3 times a month
 - Once a week
 - 2-3 times a week
 - Daily
9. What do you use the bought water for? Please check all that apply
 - Drinking
 - Cooking
 - Cleaning
 - Hygiene (showering, washing hands, etc.)
 - Other (please specify)
10. How did you find out about this water store?
 - (i.e. family, advertisement, friends) _____
11. If you have access to tap water where you live, do you think it is safe to drink?
 - Yes
 - If not, why?
12. Why do you buy water at water stores?
 - _____
13. Where were you born?
 - Please list country _____

Appendix B:
Business Owner Interview Questions

1. What do you sell?
2. How long has this store location been open?
3. How long have you been in this industry?
4. Do you advertise? If so, how and what do you advertise?
5. What type of customers do you serve?
6. Do you know what your customers use your water for?
7. How did you enter this industry?
8. Why did you choose to open a store here?
9. How many customers do you normally get a day/week?
10. What is a typical customer's receipt?
11. How much do you sell water for?
12. Where do you get your water from?
13. How do you treat your water?
14. Do you own other Retail Water Facilities?
15. What ethnicity are you?
16. Where were you born?

Appendix C:
RWF L, M and H vs. Surrounding Area Demographic Data

	ACS	RWF L	% Change
White	12.10%	12.50%	3%
Black/African American	0.40%	0%	-100%
Asian	3.10%	6.25%	102%
Latinx	84.40%	81.25%	-4%
Foreign Born	45.90%	62.50%	36%
Native Born	54.10%	37.50%	-31%
Foreign Born: Eastern Asia	1.50%	7.14%	376%
Foreign Born: Latin America	92.80%	92.86%	0%

	ACS	RWF M	% Change
White	9.60%	13%	30.21%
Black/African American	0%	0%	0.00%
Asian	29.50%	25%	-15.25%
Latinx	39.20%	63%	59.44%
Foreign Born	35.60%	75.00%	110.67%
Native Born	66.40%	37.50%	-43.52%
Foreign Born: Eastern Asia	57.60%	33%	-42.13%
Foreign Born: Latin America	37.70%	67%	76.83%

	ACS	RWF H	% Change
White	71.10%	44%	-38%
Black/African American	9.30%	19%	104%
Asian	6%	25%	317%
Latinx	11%	6%	-45%
Foreign Born	18%	31%	72%
Native Born	82%	69%	-16%
Foreign Born: Eastern Asia	19.90%	60%	202%
Foreign Born: Latin America	39.60%	20%	-49%

Appendix D:
*Number of RWF Licenses and RWF Inspections by County Regulated by
California Department of Public Health*

County	Number of RWF Licenses	Retail Water Inspections	County	Number of RWF Licenses	Retail Water Inspections
Alameda	19	10	Placer	1	
Alpine			Plumas		
Amador			Riverside	64	12
Butte			Sacramento	23	2
Calaveras			San Benito	1	3
Colusa			San Bernardino	63	13
Contra Costa	8	1	San Diego	53	8
Del Norte			San Francisco	5	
El Dorado	1		San Joaquin	12	2
Fresno	19	10	San Luis Obispo	6	
Glenn			San Mateo	5	1
Humboldt	1	1	Santa Barbara	4	
Imperial	5	3	Santa Clara	109	32
Inyo			Santa Cruz	11	3
Kern	11	14	Shasta		
Kings	5	2	Sierra		
Lake			Siskiyou		
Lassen			Solano		
Los Angeles	494	166	Sonoma	9	
Madera			Stanislaus	8	
Marin	3		Sutter	1	
Mariposa			Tehama		
Mendocino	2		Trinity		
Merced	2		Tulare	2	1
Modoc			Tuolumne		
Mono			Ventura	7	4
Monterey	17	7	Yolo	7	1
Napa	2		Yuba	1	
Nevada	1		Out of State		
Orange	161	50	Out of Country		
			Total	1,143	346

Appendix E:
Interview Questions for Jane Reich via Email

1. What department(s) or people oversee Retail Water Facilities in LA/California?
2. Who regulates water quality of Retail Water Facilities?
3. Who oversees the Retail Water Facility application?
4. Where do the majority of Retail Water Facilities get their water from?
5. Are Retail Water Facilities required to filter their water? If so, are they required to filter it in a specific way?
6. Is there a record of how much each Retail Water Facility sells their water for?
7. What is the significance of over 500 Retail Water Facilities in Los Angeles County?
8. Why do you believe there's been a big increase in Retail Water Facilities over the years?
9. Do you believe there's a relationship between the amount of Retail Water Facilities and usage/perception of LA tap water?

Interviewees

1. Jane Reich, Chief, Food Safety Inspection Unit at the California Department of Health
February 4-16, 2016, email correspondence
2. Frances Spivy-Weber, Vice-President, State Water Control Resources Board
February 4, 2016, 4:00 pm, phone interview
3. Albert Gastelum, Director, Water Quality Division, Los Angeles Department of Water and Power
February 5, 2016, 12:00 pm, phone interview
4. John Kemmerer, Associate Director, Water Division, U.S. EPA Region 9
February 18, 2016, 11:00 am, phone interview

Field Observations/Data Collection

1. December 19 and 26 2016, 10am-1pm
Observing customers, data collection, taking notes on store appearance

LA Pure Water
5419 North Figueroa Street
Los Angeles, CA 90042
2. January 2 and 9 2016, 10am-1pm
Observing customers, data collection, taking notes on store appearance

Water Gourmet No. 11
3756 West Avenue 40
Los Angeles, CA 90065
3. January 16 and 23 2016, 10am-1pm
Observing customers, data collection, taking notes on store appearance

Beyond O₂ Premium Alkaline Water
2209 Main St
Santa Monica, CA 90405

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