Final Report

The Water Team:

The Green Living Project
Action Research Team
Environment 185B

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Education for Sustainable Living Program
The Institute of the Environment
On-Campus Residential Life
UCLA Housing and Hospitality

The current drought in California coupled with rapidly growing population and a warming climate are draining water supplies at alarming rates, and beg questions about conservation. The goal for the project, therefore, was to quantify the amount of water individual students use in the Residence Halls each day, as well as to determine when, in the day, students consume the most water. The types of methods we employed were surveying, direct monitoring of shower and toilet use, and a 24-Hour Water Watch, as well as the secondary method of observing flushes per person for both automatic- and manual-flush toilets. Surveying data revealed students' attitudes and behaviors with regards to water, with surprising results pertaining to both student drinking water consumption and students' willingness to change. Additionally, we obtained interesting results from the monitoring data as well, which includes information about the quantity of water used during showers, the temporal distribution of showers, and – perhaps our most interesting point – the differences in water usage between students who used different monitoring methods, and what these implications might have for future student water use. Finally, the 24-Hour Water Watch and flush observation data offer additional insight into how students use water. From our various methods of water use assessment, we measured the considerable impact students place on water resources. From this data, we recommend changes that should be made in the dorms that lessen water expenditure and save UCLA money in the long run. Equally important, we hope to instill a sense of urgency and awareness so that students will make conscious decisions to conserve water.

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Objectives

The Water Team originated with the purpose of looking at water use and behaviors among the 9,398 students currently living in UCLA Residence Halls, a population of buildings commonly referred to as "The Hill." Because of Los Angeles' naturally scarce water resources, the way in which residents use water and the attitudes and values they reflect is the subject of great interest. Moreover, in the context of UCLA, it is in the University's best interest to promote water-saving strategies for both economic and environmental gains. Therefore, our primary goal was to evaluate these behaviors and perceptions while bearing in mind the implications they have for future water use on the UCLA campus. More quantitatively, we aimed to identify a specific measure of water per person used on the Hill, in order to most accurately address water conservation in the longer term. We began with three objectives: to determine an actual quantity of water consumed per person per day, to compare halls (communal-style bathroom) to plazas (private bathrooms) in terms of water use, and to quantitatively confirm whether automatic-flush toilets (located in Sproul Hall) or manual-flush toilets (located everywhere else) use more water per person. However, we were to discover that there were perhaps more interesting questions at hand. The question of comparing halls to plazas seemed somewhat beyond our scope, and not of particular value. We also became aware of the fact that solar thermal heating systems are employed on all buildings, meaning that water used later in the day is actually more energy efficient. Therefore, we became interested in the distribution of showers throughout the day as our third objective, rather than differences between room types.

Significance of Study

Along with the rest of the world, the U.S. is facing a water crisis on a national scale. Aquifers in many parts of the nation are being depleted at faster rates than they can be naturally replenished. This over-pumping of groundwater is due to agricultural, domestic, and industrial uses. As this continues, the water table levels will decrease, and then – among a myriad of other associated problems – Americans will face a huge problem due to lack of fresh drinking water. The days when freshwater will be incredibly expensive are becoming a real possibility.

Already in the U.S. certain populations are feeling the effects of scarce water. In the semi-arid Southwest that includes Los Angeles, droughts and even extended droughts are nothing new, but warming climate trends can intensify water problems[8]. Unfortunately, residents living at home or students in universities might not even realize that they are in the middle of a water crisis, especially when it seems that water comes abundantly out of their faucets. The agriculture sector, on the other hand, has finally started to feel the pressure of the limited availability of water. It comes as no surprise, since it is the largest group of water consumers in the West, using about 80%, according to the National Research Council[2].

Water transfers to Los Angeles

Los Angeles receives its water from a couple of sources. One source is the State Water Project (SWP), a complex system that consists of 22 dams and reservoirs in Northern California, a pumping plant in the Sacramento Bay-Delta region, and a 444-mile-long aqueduct that brings water from the Delta to southern California. The SWP supplies water to farms in the San Joaquin Valley, as well as to Los Angeles, Riverside, San Bernardino and others[7].

Another major source of water for the Los Angeles region is the Colorado River, which also feeds seven states in the Colorado River Basin. 25 million people and 1 million acres of

farmland utilize this water, making it "the West's most important water source."[2] The two reservoirs that feed into the Colorado River Basin are being depleted rapidly due to rising population in these states, coupled with the drought that the West is facing[8]. They are now filled at less than half their capacities.

Lastly, groundwater usually makes up 30% of California's annual water supply, but during times of drought, it can reach up to 60%. This water is drawn from aquifers, permeable layers of rocks, gravel, and clay[7].

Los Angeles water solutions

Due to the urgency of the drought, Los Angeles is taking steps to alleviate stress on our water sources. The Los Angeles Department of Water and Power (DWP) and the Metropolitan Water District (MWD) are currently collaborating to help the city save water. Over 13,000 Falcon Waterfree urinals have been installed throughout the city. The water saved from these urinals alone would fill 489 tanker trucks, and the retrofit is projected to save $10,000 a year in operating costs[13].

For homeowners, a massive amount of water is wasted in maintaining lawns. For those who still want to keep their lawns or gardens, there are a variety of ways to maintain them while also lowering water usage. For instance, instead of using plant species that are foreign to the landscape and guzzle up water, native species are usually more water efficient in their natural habitats. These drought-tolerant plants need no more water than the natural rainfall in the region to survive[5]. Additionally, lawn owners can water their lawns at night, which is more efficient because less evaporation occurs at that time.

Prior research

Though the water situation in Los Angeles is becoming dire, we are not the only ones concerned about water use and conservation. The Corporation of Water in Perth, Western Australia, conducted a study on water usage similar to ours from 1998-2000, called the Domestic Water Use Study (DWUS). The study focused on domestic water usage patterns and trends among single residential homes and multi-residential homes[6]. The objectives of DWUS were to collect data on household water usage, identify water use patterns and trends, and develop a demand forecasting model and a water use efficiency program at a later stage.

Early planning of the study included background research, contacting other agencies and consultants that have done similar work, statistical analyses of data (surveying) to determine the major variables affecting domestic water usage, engaging with stakeholders to ensure that their needs were captured, determining the data to be collected and the method of collection, and conducting trials of meters used for the study. A phased approach was used for DWUS, and they started with a pilot group of 120 households and a main group of 600 households, where they all completed three questionnaire surveys regarding demographics, appliance ownership, and attitudes toward water usage. Variables accounted for in homes included bath and shower, tap, toilet, and washing machine. They used "smart" meters and data loggers to record water usage patterns, and the average occupancy rates were 3.35 persons for single residential households and 2.19 persons for multi-residential households.

The estimated average annual total usages by the single residential and multi-residential households were 460kL/house and 280kL/house, respectively. The daily average in-house usage for single residential homes was 523 L/house/day and 365 L/house/day for multi-residential homes. The breakdown of usage for each variable is presented in Table 1.

	Single Residential		Multi-Residential	
Appliance	L/house/day	L/person/day	L/house/day	L/person/day
Bath and Shower	171	51	121	55
Wash. Machine	139	42	94	43
Toilet	112	33	62	28
Tap	83	24	77	35
Other	18	5	11	5
Total in-house	523	155	365	166

Table 1.

Shower type (low/normal/high flow), washing machine type, and different toilet type (half/full volumes per flush) were taken into account for the studies. The overall summary of findings concludes that the domestic sector accounted for about 70% of Perth's total water demand. The rate of water usage was about the same throughout the year, but households with higher income used more water during the summer. Compared to a similar study done in 1981 and 1982 for single residential homes, total average water usage per single residential household increased by 55% and in-house water usage increased by about 50 L/house/day.

Since then, the State Government of Western Australia released a State Water Strategy in 2003 to improve water use efficiency throughout Western Australia. They are asking for full community support to conserve and change their water use patterns. For instance, the public has been offered attractive financial rebates to install water efficient showerheads, washing machines, rainwater tanks and garden bores. But ultimately, success will depend on peoples' attitudes towards sustainability and the government will need to educate and promote responsible water use behavior in order to create effective change.

Methods

In order to achieve our research purposes, we employed four different tactical strategies, which consisted of large-scale surveying, monitoring individual rooms, performing a 24-hour "Water Watch" to determine hourly water flows, and observing flushes per person in bathrooms with both auto and manual flush toilets. These methodologies are described extensively in the following segments.

Surveying

We came up with a working survey during our first official meeting, and began administering this survey in a door-to-door fashion beginning that same week. However, it came to our attention after approximately one week of surveying that our methods were not condoned by the rules of the Hill. The surveying process required getting approval of the survey through a survey committee, which also gave helpful feedback on the form and content. We decided an appropriate method of surveying would be to stand in the lobbies of buildings and outside of dining halls.

We determined that with a total population of students on the Hill of 9,398, a sample size of 1,000 surveys would be representative of such a population, including a reasonable confidence interval of ±2.93%. We decided that we would like these 1,000 surveys to proportionally reflect the number of students living in each of the three types of housing available: hall, plaza, or suite. We determined that in order to accurately represent these populations, we would need 332 surveys from the halls, 584 surveys from the plazas, and 84 surveys from the suites. In reality, however, it was difficult to obtain exact proportions of students in the three types of housing, and our final survey counts actually consisted of 400 surveys from the halls, 471 surveys from the

plazas, and 72 surveys from the suites, for a total sample size of 942 surveys, which constitutes almost exactly 10% of all students living on the Hill.

Then, it was a matter of obtaining consent from individual buildings, which we divided up among the Water, Waste, and Energy ART projects. Our buildings consisted of Hedrick Hall, Rieber Vista, Hitch, and Sunset Canyon. We obtained consent from the Hedrick Hall Student Association during the Winter Quarter, and we administered our survey by having students fill them out directly on laptops, using the website SurveyMonkey. To achieve this convenience sample, we positioned a table in a walkway in the building and near the Hedrick dining hall with a bank of 3-5 computers, and then asked students to stop at their convenience to fill out our survey (please refer to **Appendix A** for a map of survey collection locations). We offered them candy or cookies as a motivator.

For the Spring Quarter, we received permission to conduct our survey with laptops at Covel. We stationed ourselves immediately outside of the Covel dining hall in the common area that contains the lockers, and we employed a similar setup to that of Hedrick surveying, with a table and a bank of computers for collecting surveys. We did not use any food incentives this time. We spent a total of 30 hours surveying in the two locations: 15 hours in Hedrick and 15 in Covel. Please refer to **Appendix D** for a hardcopy form of the final survey.

Monitoring

Like surveying, monitoring in the Residence Halls requires permission from individual buildings, as well as consent from participating rooms. Rob Kadota, ORL Assistant Director, obtained this permission for us from the Resident Directors of each building. Specifically our team was given permission to monitor students living in De Neve, Hitch, Rieber Vista, Rieber Terrace and Sunset Village. Consent for individual rooms was obtained through the collection of

an informed consent form (see **Appendix C)** In order to find participants for our initial pilot, which took place during Winter quarter, we simply spoke with students that we knew or knocked on doors randomly, without any set protocol. This was appropriate for the pilot project of nine rooms, since our aim was to perfect our monitoring setup and evaluate the best logistical practices.

When we started our very first pilot room in Hitch, we had not yet received our *Eco ShowerDrop* monitors (diagram in **Appendix B**), so we gave the participants a stopwatch with which to time their own showers. We also provided them with a sheet of paper and a pen near the shower that had space for marking the time of day the shower started as well as the amount of time the shower lasted. In the bathrooms, we posted a sheet of paper on which the participants were instructed to make a check mark for each toilet flush (both shower and toilet data collection forms can be found in **Appendix C**).

For the next eight rooms we piloted, the setup was exactly the same, except that we used the *Eco ShowerDrops* instead of stopwatches, which must be calibrated. However, these devices then record the number of liters used per shower, rather than just the time. We also calibrated the original shower using the same methods, which allowed us to convert the data to liters as well. The calibration method consisted of using a one-liter bag provided with the *Eco Showerdrop*, and then setting the monitor to record one liter for that time period. At the end of the week, the contact for each of the nine pilot rooms came to perform a checkout interview with all subjects present. This interview consisted of asking the volunteers how it went, if they had any suggestions for us, and if there was anything we should know about their data.

For our true data monitoring, which started at the beginning of the Spring Quarter, we employed tactics to randomize our sample of rooms monitored. We had received approval to

monitor in De Neve, Hedrick Summit, Rieber Vista and Rieber Terrace, each of which we received the odd floors to monitor (the Green Living Project: Energy Team received the even floors). Therefore, all of our data monitoring took place on the 1st and 3rd floors of the De Neve buildings Acacia, Birch, Cedar, Dogwood, Evergreen, and the 3rd floor of Fir, as well as the 1st, 3rd, 5th, 7th, and 9th floors of Hedrick Summit and Rieber Vista, and the 3rd, 5th, 7th, and 9th floors of Rieber Terrace (see **Appendix A**). To randomize our sampling even further, we knocked on every 3rd door within our assigned floors to ask for participants. In order to legitimize our requests, the Resident Assistants accompanied us on our rounds of the respective floors to find volunteers.

Based on responses and experiences from the pilot monitoring, we made some changes in methodology for the Spring Quarter. First, participants were asked to identify their shower data through either initials or some other symbol (numbers, signs, etc) so that we could sort the data by individual. Also, we collected data sheets in large envelopes, to ensure privacy. The subjects were also given a small sheet of instructions on how to properly use (and troubleshoot) their *Eco Showerdrop*, as well as the name and phone number of their assigned contact person. Finally, all data was de-identified from the volunteers, and their identities have been kept anonymous in order to guarantee confidentiality.

However, additional changes needed to be enacted mid-quarter, when it was found that the *Eco ShowerDrops* did not hold up well when exposed directly to water, and several of them stopped working. Because we did not have enough monitors to proceed with our schedule, we decided to purchase additional stopwatches to supplement our remaining cache of *Eco ShowerDrops* (see **Appendix B**). By the end of the quarter, approximately half of our rooms had

been monitored using stopwatches, the other half using *Eco ShowerDrops*. This did seem to affect our data in a very interesting and unforeseen way, which is detailed later in the paper.

Observing flushes

In order to determine whether automatic- or manual-flush toilets use more water, we spent equivalent amounts of time in each type of bathroom and counted the number of people who entered the toilet area and the number of ensuing flushes. We accounted for fluctuations by time of day by corresponding half hours in Sproul Hall (automatic) bathrooms and bathrooms in Hedrick Hall and Dykstra Hall (manual flush). Alternating floors in Sproul were assigned to the same floors in either Hedrick or Dykstra Halls, with odd numbered floors corresponding to those in Hedrick (i.e. Sproul 3 North and Hedrick 3 North), and even numbered floors corresponding to those in Dykstra (i.e. Sproul 2 North and Dykstra 2). The same half hour in consecutive days was recorded for the corresponding floors (i.e. 7:30-8:00am). All seven floors in Sproul were measured for data from their female bathrooms on both the North and South floors.

24-hour Water Watch

As per the suggestion of one of our stakeholders, Robert Gilbert, we decided to take on the task of examining water usage on a building-wide scale. In order to determine peak flow and low flow hours for entire buildings, we conducted 24 hours of hourly inspections of building water meters. The chosen residential buildings were Cedar, Dogwood, and Evergreen of De Neve, due to the fact that these three are stand-alone buildings, whose water data is not skewed by the presence of dining halls or large lobby areas. We started the 24-hour water watch on Thursday May 7th at midnight and ended on Friday May 8th at midnight, giving us a total of 25 measurements. Measurements were taken from the Cedar building monitor on the hour, at Dogwood three minutes after the hour, and at Evergreen six minutes after.

Data

Survey data of interest

Our survey consisted of 18 questions that probed various students' behaviors and attitudes towards water use in the Residence Halls. The entire survey can be found in **Appendix D**. The responses we received enabled us to put together an accurate picture of what average student water use looks like, the results of which are recorded later in this section. However, there were two pieces of data that stood out when viewing the survey results, and these key findings are detailed here. One of the areas that often gets neglected when considering water use is that of drinking water. We had two questions that delved into students' habits pertaining to the water they consume, and the results were somewhat surprising. When asked how often students got drinking water from the tap, a full 39% of them responded "never." This is interesting in that it indicates an enormous percentage of students do not drink tap water in any container (**Figure 1**). We assume it is because people expect bottled water to be cleaner than tap water, and the

Figure 1.

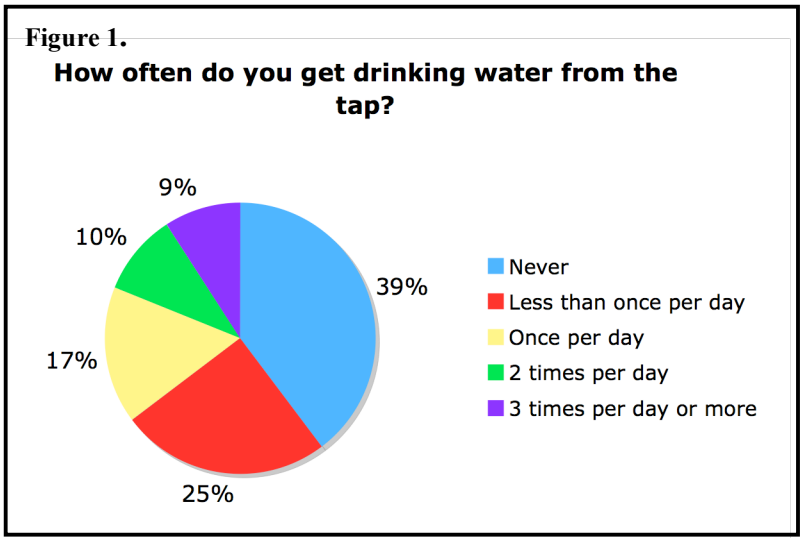
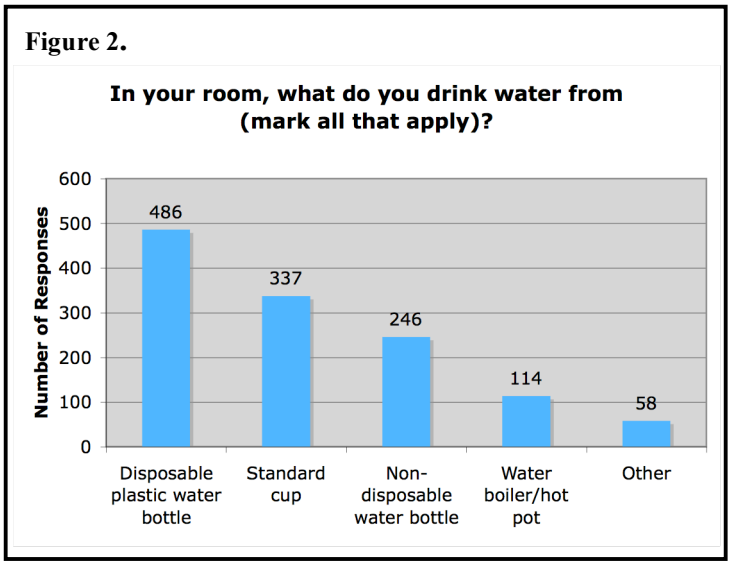


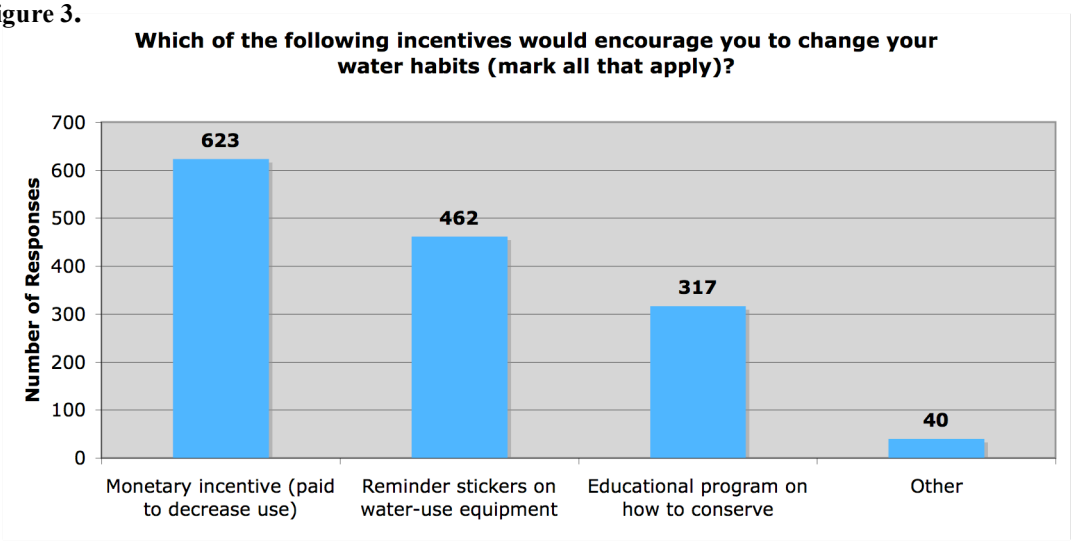
Figure 2.



irony of this is that in the state of California, bottled water is actually less highly regulated than tap water. Additionally, we were curious as to how students generally consume water in their rooms, and we found that more than half the respondents (52.4%) drink water from disposable plastic water bottles (**Figure 2**). Although this does not have direct implications in terms of water consumption, this is alarming with respect to the waste generated by such behaviors. Only 26.5% report using non-disposable water bottles, although many of the "other" responses fall into this category as well.

Another important finding from the surveys regards how students might be convinced to change their current water behaviors. We posed the question "Which of the following incentives would encourage you to change your water habits (mark all that apply)?" we received somewhat surprising results (**Figure 3**). As it turns out, 69.2% of the students we surveyed would changed their habits given some sort of monetary incentive, while 51.3% said that reminder stickers on water use equipment would work as well. Lastly, we found that 35.2% of respondents felt that they would be receptive to the effects of an educational program on how to conserve water. We received additional comments on this question, ranging from "if it was poisonous" to floor-wide or Hill-wide competitions. However, the overwhelming majority of people who added additional comments for this question wanted to have wasted water put into context for them; they wanted to know how much money they were wasting with longer showers, or simply how much water gets wasted each day, so that they might realize the impacts of their actions. These data about students' willingness to change provides essential information on how the Office of Residential Life might take steps to mitigate water usage on the Hill.

Figure 3.



Please refer to **Appendix E** for a complete breakdown of survey responses.

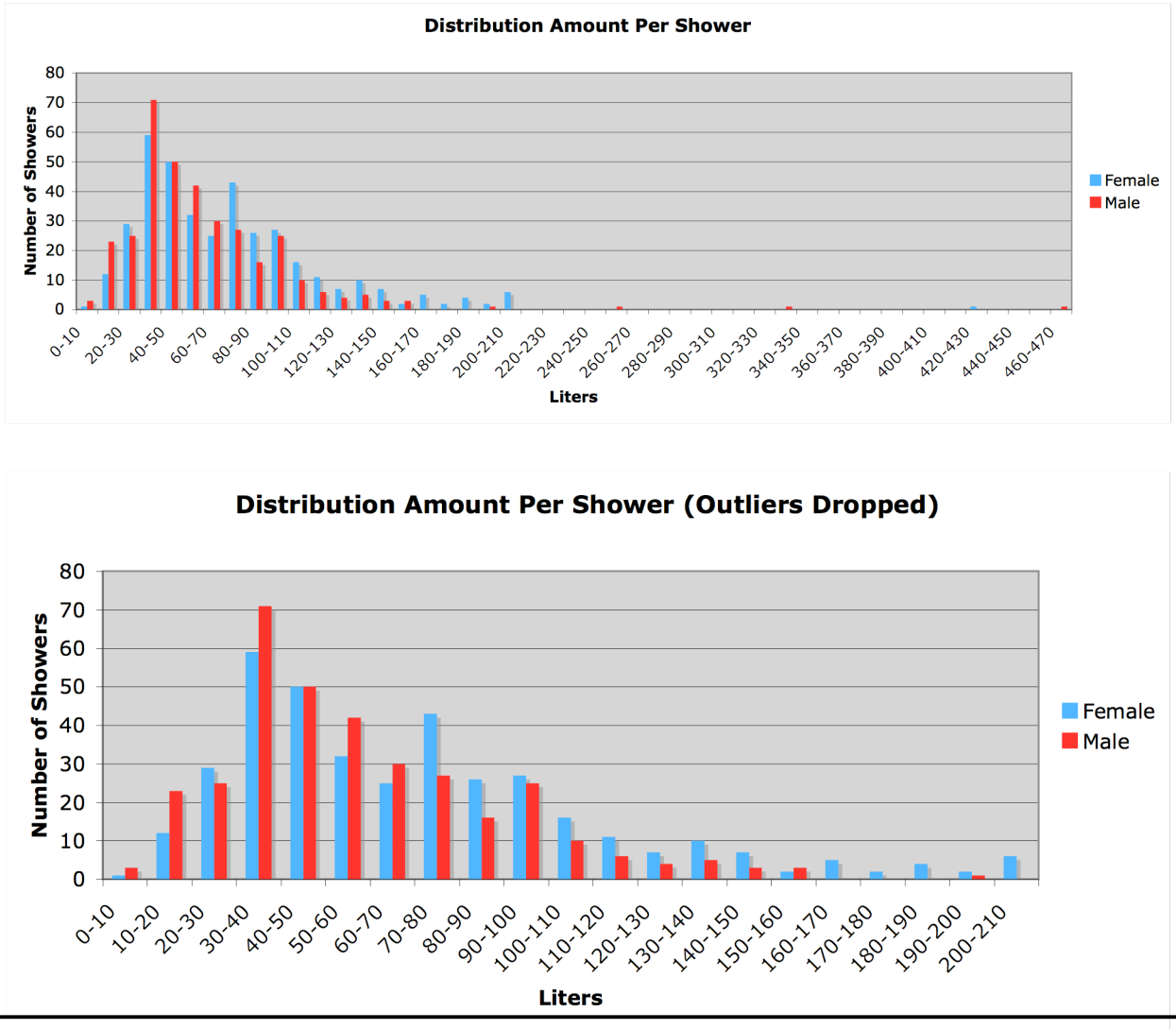
Shower monitor data

Our results shed light on the general water use and behaviors of the student population living on campus. The results from the shower monitoring revealed the times of day when students took showers most often, the difference in the median amount of liters each gender used per shower, and whether there was a difference in the showering habits on weekdays versus the weekend. The results from the toilet tally revealed the average amount of water used per day by on-campus housing residents. 149 participants living in 47 rooms volunteered for shower monitoring and the toilet tally. 84, or 56.4% of these participants were female, and 65, or 43.6% of these participants were male. A total of 734 showers taken by these participants were monitored and 52.6% of these showers were taken by females and 47.4% of these showers were taken by males. Also, 56.5% of the showers were monitored using the *Eco ShowerDrop* and the other 43.5% of the showers were timed using a stopwatch. The distribution graphs we constructed (**Figure 4**) display the distribution of shower lengths by gender.

The results reveal that the median amount of water used per shower by students is 55.4 liters. This median value was achieved from analyzing the amount of water user per shower in

47 rooms containing 149 total occupants. The reason a median value was chosen over an average value to represent the data from all occupants because the distribution showing the amount of water used per shower is skewed to the left and there are a few very high outliers. The median amount of water used per shower by females was 14.0 liters greater than the median amount of water used per shower by males; 64.0 liters for females and 50.0 liters for males.

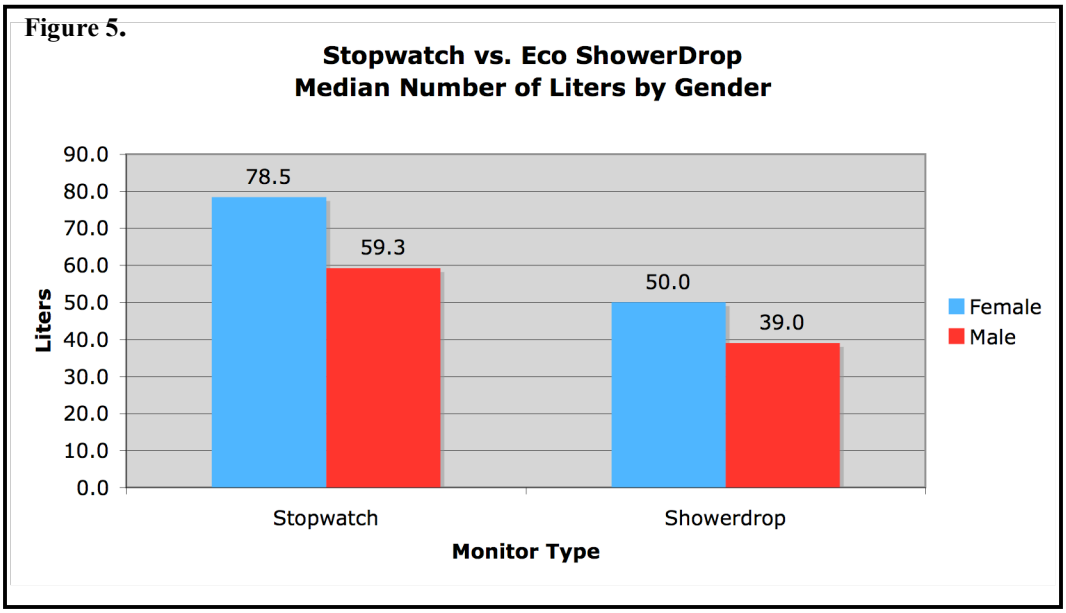
Figure 4.



We also noticed a difference in the median amount of water used per shower by participants using the *Eco ShowerDrop* and the stopwatch to time the shower. The median amount of water used per shower by females using the *Eco ShowerDrop* was 50.0 liters and the

median amount of water used per shower by females using a stopwatch was 78.5 liters. Females using the stopwatch generally used 28.5 more liters of water per shower than females using the *Eco ShowerDrop*. By comparison, the median amount of water used by males using the stopwatch was 20.3 liters greater than the median amount of water used by males timing with the *Eco ShowerDrop* (**Figure 5**).

Figure 5.



These findings are interesting because they show that the *Eco ShowerDrop*, which calculated the amount of water used during the shower, may have been more effective in reducing shower lengths when compared to the standard stopwatch. It is likely that participants using the *Eco ShowerDrop* were more likely to take shorter showers when they could directly observe the amount of water they were using. Although we did not want to change student water behaviors during these observations, the findings show that students are more likely to respond by taking quicker showers when they can observe the amount of water they are using.

Other data of interest were our analyses of shower distributions throughout the day. We explored this on both the micro distribution scale of individual rooms that we monitored, and on

a macro distribution scale from our 24-Hour Water Watch. There are slight nuances between our two analyses; the graph from our monitoring data (**Figure 6**) details the number of showers taken during that hour, whereas the 24-Hour Water Watch data (**Figure 7**) evokes the amount of water used by the building throughout the hour. However, the graphs are extremely similar, which suggests that the number of showers taken per hour is a good indicator of quantity, as there seems to be no particular period during which students take much longer showers than in another.

Figure 6.

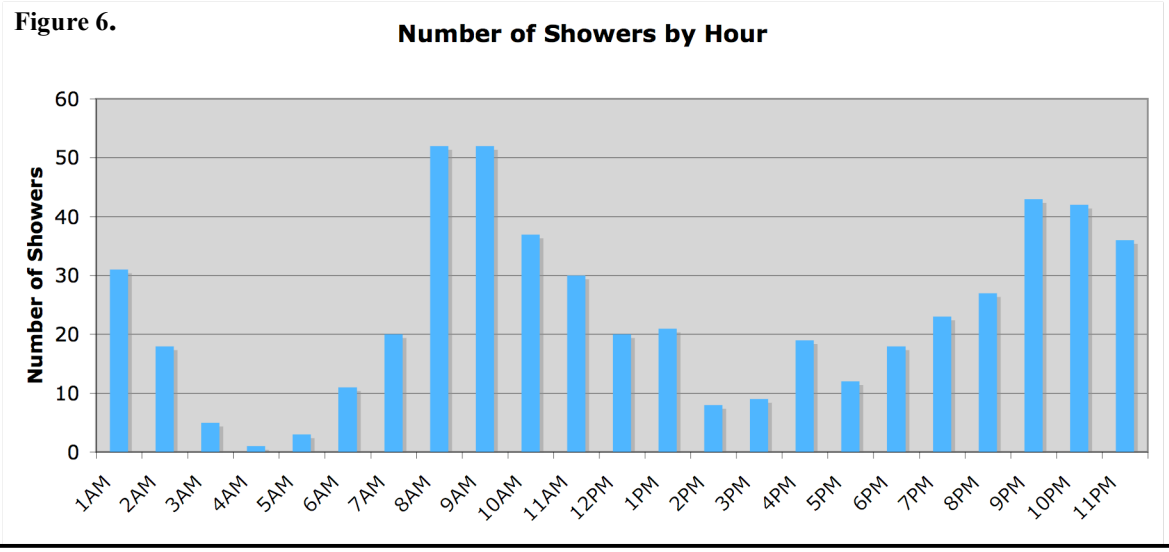
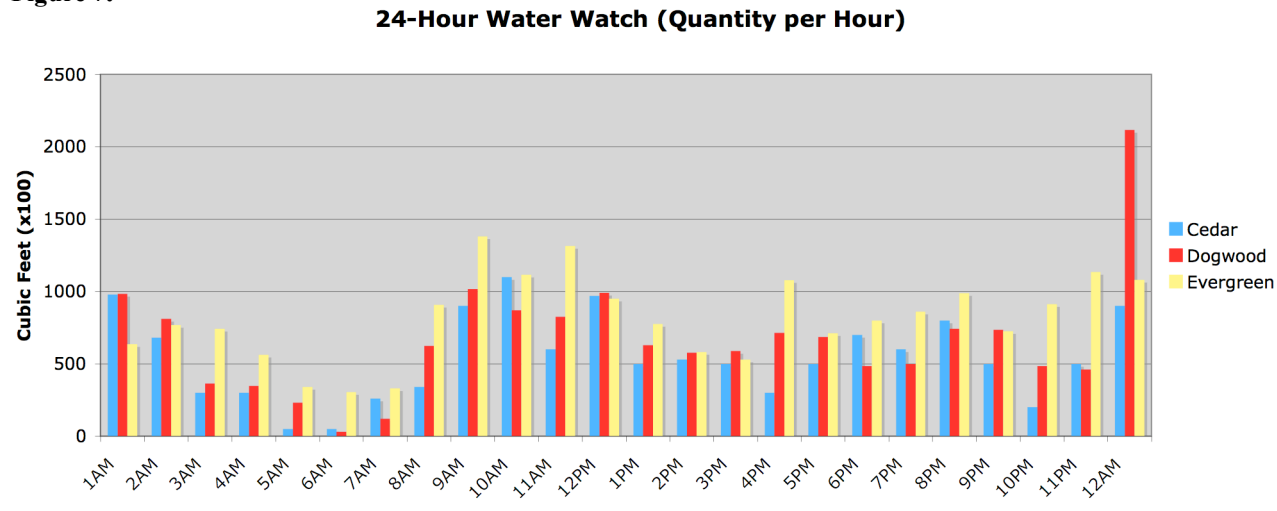


Figure 7.



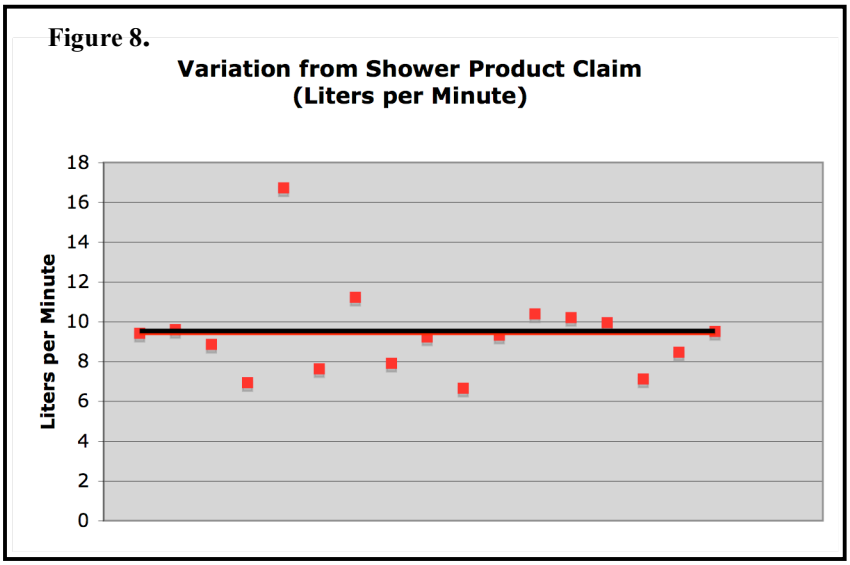
The data also revealed that the peak times students take showers in the dorms are generally between 9am and 12pm and between 10pm and 12am. The hours when the most amount of water was used in the De Neve Cedar, Dogwood, and Evergreen from the 24-hour water watch was also between 9am and 12pm, but the amount of water use between 10pm and 12am was not significantly greater than any of the other hour during the 24-hour study. The hours when students take the most showers are likely because they are either in the morning before classes begin and in the late evening before students likely go to bed. It was interesting that the distribution showing the total amount of water used in the three buildings was not bimodal like the distribution showing the hours when participants took the most showers. When both graphs are analyzed together, it can be seen that most water is used in the morning after 8am up until 12pm. This does not just highlight a greater amount of water use in the morning, but is also shows that much more energy is used for water heating. Since a large number of showers occur in the morning, and assuming that the majority use hot water, the building requires more energy consumption from external sources. The building's solar panels cannot provide sufficient energy for water heating in the morning since these showers are occurring right after sunrise. Therefore, more energy must be attained from external sources, which leads to rising energy costs for UCLA Housing Services. Showering later in the afternoon and the evening would require less energy from external sources since much more electricity can be supplied from the buildings' solar panels.

Another analysis we performed was in seeking to identify a difference in the lengths of showers on weekends compared to weekdays. We did not really look into whether students on average took more showers during the weekends because more students leave campus and are not occupying their rooms during that time, but rather we sought to determine whether or not

people took significantly longer or shorter showers on the weekends. Our results did not reveal any significant difference in the length of showers on weekends in comparison to the length of showers throughout the week.

Finally, we had noticed anecdotally in using the stopwatches that there seemed to be a wide range of times that defined a liter. We collected this data in the rooms with stopwatches so that we might later convert their data from minutes to liters, and so we decided to investigate what appeared to be some type of disparity. We plotted the various liters per minute we collected from stopwatch data on a graph, and then added a black line at the manufacturer's claim quantity (**Figure 8**). In actuality, there was very little difference between the average of the rooms we monitored and the manufacturer's claim; we determined and average of 9.36 liters per minute to their 9.5 liters per minute. Even including what seems to be an extreme outlier, the average for the showers we monitored remains slightly lower than that of the manufacturer, although they are so similar that on this graph the lines coincide, and one can only barely see the red average line plotted on the graph. This data is perhaps interesting only as a quality control check for the shower companies.

Figure 8.



Toilet Monitor Data

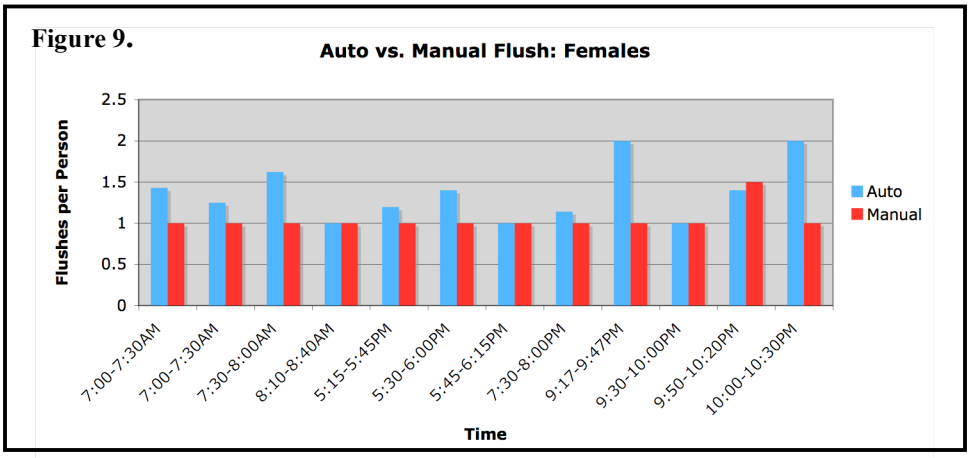
The data from the "Toilet Tally" collected during our monitoring revealed that the average student flushed the toilet 3.6 times a day and thus 35.4 liters of water were used on average per

student per day from toilet flushing alone.

Flush observation data

We determined by observing flushes that the automatic-flush toilets in the female bathrooms in Sproul Residence Hall flush more per person than the manual-flush toilets found in the female bathrooms in Hedrick and Dykstra Residence Halls (**Figure 9**). Flushes were tallied in each bathroom for 30-minute periods. The team tallied 20 separate 30-minute periods and 10 of these involved tallies in the Sproul bathrooms and the other 10 included tallies from both Hedrick and Dykstra bathrooms. The ratio of flushes per person within each 30-minute period was calculated by dividing the number of flushes by the number of people entering the stalls. Then the ratios found from the restrooms containing automatic- flush toilets were compared to the ratios found from the restrooms that contained manual-flush toilets. Figure 1 was set up to compare the ratios of flushes per person of the manual toilet facilities and the automatic toilet facilities during the same time periods. During only one time period, between 9:50 and 10:20, the ratio of flushes per person was higher with manual toilets than this ratio for the automatic toilets. Only two of the time periods, 8:10-8:40 and 9:30-10:00, showed no difference in the ratios. The other 7 time periods did display that the ratio was greater for automatic toilets than manual toilets.

Figure 9.



The average of the 10 ratios from the restrooms containing automatic-flush toilets was calculated as 1.425 flushes per person. The average of the 10 ratios from the restrooms containing manual-flush toilets was calculated as 1.050 flushes per person. Overall, when the two means are compared, they show that the automatic toilets statistically flush more often than the manual toilets ($p=0.015$). This value is low enough to determine that the data is statistically significant. Overall, the statistical surveys indicate that the automatic toilets flush more per person than the manual toilets.

Estimate of average water use per student per day

From the data we received through both monitoring and surveying, we were able to construct a water use profile of the average student living on the Hill (**Figure 10**). Each of the numbers was computed a bit differently; the shower and toilet numbers, respectively, came directly from our monitoring data. For the other numbers, we had data on students' laundry, sink, and tap water use from our surveys. To illustrate the method used, we will detail the laundry process. Most of the students surveyed indicated that they do their laundry twice per month, and do two loads each time. However, there were other responses as well. In order to incorporate all of the responses, we created a weighted measurement of all the answers received, then multiplied this average number of loads per month with the amount of water used per load. We then divided this value by 30 days, to get the amount of water used by the average students per day of the month. For the sink data, we explored usage in five different categories; washing hands after flushing the toilet, washing the face, shaving the face, brushing teeth, and washing dishes. Our survey gave us data

Figure 10.

Average student water use per day profile

Shower:	55.4 liters
Toilet:	35.4 liters
Laundry:	14.1 liters
Sink:	11.8 liters
Drinking:	0.7 liters
Total:	**117.4 liters** ~31 gallons

on each of these behaviors, and we used a weighted analysis, similar to that used for laundry, to create these numbers. Drinking water was a similar analysis. From these data, we see that the average student uses 117.4 liters, or approximately 31 gallons of water every day in their Residence Hall rooms alone. This number does not take into account water consumed during meals in the dining halls, dishwashing in the dining halls, showers taken at the gym or in other peoples' rooms, or any other various behaviors that occur throughout a typical students' day. What we are able to draw from this data is that students use an enormous amount of water with their everyday activities, and that showering has a large effect on total water used, since it accounts for nearly 50% of student water use. This provides students with a huge potential to decrease their use, and even minor limitations would have an enormous effect. For instance, if each student on the Hill shortened their average showers by one minute, it would save 1.6 million liters of water in a single school year.

Key Findings

Of our numerous findings, which detail the attitudes and behaviors of students living in the On-Campus Residence Halls, perhaps the most important data is in regards to students' willingness to change. While we found from our monitoring that the average student shower is 55.4 liters and happens once every day, the overwhelming majority of students we monitored were surprised and interested to learn how much water they were actually using. In our exit surveys of the rooms, the most common comment we encountered was that students with *Eco ShowerDrops* felt more conscious of their water use while being monitored. Augmenting this, many of the write-in survey responses included an awareness of water usage; "I should probably use less," and "I find myself to be water-conscious" were among some of the replies.

Additionally, 69.2% of students surveyed would be willing to change their water use if given some sort of monetary incentive, while 51.3% responded that they would change if provided with reminder stickers on water use equipment. An additional 35.2% suggested that they might be convinced to conserve if they attended an educational program with tips and advice on how to minimize their water impact. All these data seem to imply that students are conscious of the water shortage in Los Angeles, and are ready and willing to change their behaviors with a bit of guidance.

Another important finding of our research is that most of the showering and water use in buildings occurs in the morning, which is unfortunately when water is being heated by electricity, not by solar thermal. This means that showers earlier in the day are less sustainable in terms of water usage than those that occur later.

Finally, we encountered an approximate 35% decrease in shower amount when student showers were outfitted with an *Eco ShowerDrop.* For females, the mere presence of a monitor that they noticed while in the shower brought down their median shower times from 78.5 liters to 50 liters, and for males this change was from 59.3 liters to 39 liters. This is crucial information, as it implies that students' water use may be significantly affected by the presence of a shower monitor.

Recommendations

The data our team has collected on student use habits on the Hill allows us to make cost-benefit projections for a variety of water products. These products could be used in building retrofits or in the new dormitories scheduled over the next few years. Specifically, the water team has assembled data on toilets, showerheads, and faucets, comparing the least-cost models

we could find with the most sustainable models. The following cost-benefit analysis will lay bare the time frame upon which a more expensive but more sustainable product will repay itself over a cheaper but less efficient model.

Examining toilets, we found a variety of cheap models. The cheapest is known as the LWCC Cheap Toilet, available online[3]. At a price of $78.30 (though dependent on the exchange rate with the British pound sterling), it undercuts the competition by around twenty dollars. The toilet uses 6 liters (1.6 gallons) per flush, about 9.79 liters (1 gallon) less than the toilets UCLA currently uses on the Hill. Over a time period of 34 weeks (one school year), given a rate of 3.6 flushes per day per student, a total of 5,141 liters of water will be used. This water will cost $8.41 to the school at current rates (estimated at $4.60 per 2,838 liters [750 gallons]). By comparison, we found lower-flow toilets from Toto that use less water per flush. These Toto CT705EL toilets use just 4.85 liters (1.28 gallons) of water per flush – 20% less water than the standard[11]. The cheapest models cost $133.56, about 71% more than the cheapest models around. Over the same time period of 34 weeks, given a rate of 3.6 flushes per day per student, a total of 4,155 liters of water will be used. The appropriate cost comparison is $6.73 dollars. Given these figures, the Toto 4.85 liter model will ultimately save money over the LWCC 6 liter model over a time period of 33 school years. Over the 9.84-liter models used currently, however, the 4.85-liter models have a payback time of just 8 school years. We recommend that Housing use this information to guide their purchasing. In addition, we suggest that Housing confer with the campus division of Facilities to determine the success of their two-cup urinals installed in the Public Affairs building. By far the lowest-flow urinal models around, the water team similarly recommends the installation of these products in upcoming or newly renovated buildings. Lastly,

we suggest that Housing look into installing aerators (even as easy as a filled water bottle in a toilet) for their water-saving capabilities.

Our research on showerheads yielded slightly longer timetables for payback over the life of a model, but nonetheless promising results. The most inexpensive showerhead model available, to our knowledge, is the Tempest Watersaving Showerhead[10]. Priced at a scant $5.95 each, selling 12 for the price of 9, there may be no cheaper alternative. These showerheads use 7.57 liters (2 gallons) of water each minute, also the standard for UCLA's showerheads. Given a 7.57 liters per minute flow, a time period of 34 weeks (one school year), a rate of 1 shower per day lasting 12 minutes, a total amount of 21,620 liters (5,712 gallons) of water will be used. This water will cost the school $35.03 per student per year. By comparison, the lowest-flow showerheads around retail for $37.99 each[12]. Known as the Ultra-Low-Flow showerhead, these models use just 1.89 liters (0.5 gallons) per minute, but cost over five times as much as the cheapest models. They use an innovative system of maintaining flow, whereby just a few of the showerhead spigots spray water at any given time, but a mechanism rotates the spray around so quickly that the user does not feel a difference in pressure. Putting this information into our equation, we find that the Ultra-Low-Flow showerhead uses just $8.76 of water each school year on average per student. Therefore, the Ultra-Low-Flow 1.89 liter model will ultimately save money over the Tempest Watersaving 7.57 liter model over a time period of 2 school years, and we recommend Housing implement this information accordingly.

The same may even be said of faucets. Though our estimates our a bit rougher, we find that students use 12.5 liters of water from the sink each day. Over the course of a school year, this translates to $4.86 in water use. The school currently uses 8.33-liters per minute faucets, while the lowest flow models around use just 5.68-liters per minute. Given that these lowest-flow

models use just 68% of the water used by the UCLA standard, we find that they save the school $1.55, costing just $3.31 in water per student per school year. The cheapest models online for these 5.68-liter models cost just $2.39, meaning they can recoup the cost within three school years – another worthy investment[9,11].

While the showerhead and faucet data points very clearly to the conclusion that lowest-flow showerheads will prove a timely investment for Housing, our results for toilets appear more lackluster. However, we stress that as the price of water increases (which it will almost certainly do, given California's drought conditions), the payback time for lower-flow toilet models will be reached much more quickly. We also recommend that Housing investigate dual-flush toilet models – those with two flush buttons, one for liquid waste and one for solid waste – because of their more unique ability to save water costs over time. As well, should UCLA make deals with a particular company or contractor for the purchase of large numbers of toilets, any savings they receive will translate into a lesser payback time for the products themselves. On a more positive note, we found that UCLA uses the most efficient washing machines we could find, which is certainly a compliment to UCLA sustainability.

Conclusion

The last two quarters have yielded important data for use by ORL, Housing and Hospitality Services, Facilities, and other departments working on the Hill. The water team's collective efforts in obtaining surveys, toilet use data, shower use data, toilet type data, water meter data, and information on "best practices" leads us to a few key recommendations for potential policy changes. Our initial data collection, determining number of flushes with automatic versus manual flush toilets, showed that automatic toilets flush 1.3 times for every

manual toilet. When we brought this fact to the attention of Robert Gilbert, Sustainability Coordinator for Housing and Hospitality Services, he replied that the automatic toilets saved more time and labor costs than their manual counterparts. While we have no data on the labor costs of each type, we recommend a second look at the costs associated with both, to see if the benefits of automatic toilets really do outweigh the extra water they consume.

Our preceding cost-benefit analysis showed that particular product choices would go far in saving UCLA water over the long term. Toilet product changes produced less of an impressive effect – 4.85-liter models would yield savings to the school over an 8-year period compared with the 9.79-liter models currently in use. However, this result was due to the current price of water, which will almost certainly increase over the life of these toilets as the drought conditions in the state worsen and prices rise correspondingly. We also recommended use of ultra-low-flow urinals (like those currently used in the Public Affairs building on campus) and dual-flush toilet models, if costs should prove adequate. Our showerhead results, on the other hand, were uncompromising. Compared with the already low-flow models in use – the cheapest of which are available at less than six dollars – the lowest-flow products on the market had payback times of just two years given current student averages. Using a bare 1.89 liters per minute, these models use just a quarter of the water that UCLA's current showerheads do, and we recommend that they be used in all future dormitories – and in any building renovations – because of their immediate cost-saving effects. Lastly, sink faucet replacements, from current 8.33-liter models to 5.68-liter models, would recoup their costs within three years.

Our survey data shows that students are receptive to changing their water use habits in response to potential programs. A plurality of students surveyed – over 50 percent – agreed that informational stickers on water-use equipment would encourage them to be more sustainable.

These results parallel those derived from the Energy Team's survey. Given the low up-front costs of stickers with environmental messages, a Hill-wide program of putting stickers on water products could easily be accomplished during the summer months. Their benefits would certainly outweigh the costs of purchasing them, given our survey response data. They would also help students to be more mindful of water issues in general, perhaps leading to sustainable behavioral changes elsewhere in their daily habits. This effect could be supplemented by more intense educational programming with regard to sustainability. Over a third of students recommended stronger educational programming as an aide to improving water use habits. Perhaps another dorm competition, centered exclusively on water use, could be performed next year. The key, according to our survey results, is to "institutionalize" the concept of sustainability among students – much easier said than done, of course.

Perhaps the most surprising result occurred by accident: our *Eco ShowerDrops*, the original timers we used for students' showers, frequently broke. We replaced them with generic stopwatches, which hung outside of the shower. By comparing our liters-per-student data for students using *Eco ShowerDrops* versus students who used stopwatches, we realized that students with *Eco ShowerDrops* consumed 35% less water. As we reported, this change could be due to a number of factors, including seeing the liter totals or the beeping associated with the *Eco ShowerDrops*. No matter the cause, however, a 35% percent reduction is substantial. We recommend that Housing investigate means to put timers or liter counters in their showers to achieve a measure of this benefit. We realize, however, that our assumption is vague – perhaps independent research by Housing or a future Action Research Team will be able to more thoroughly elaborate these results.

References

1. Boxall, Bettina and Ashley Powers. (2007, December 14) The Nation - Colorado River Water Deal is Reached - The Interior Secretary Calls It An 'agreement to share adversity.' LATimes. <http://articles.latimes.com/2007/dec/14/nation/na-colorado14>

2. "California's Water Crisis." Aquafornia: The California Water News Blog. 31 Dec. 2007. <http://aquafornia.com/californias-water-crisis>

3. Cheap Toilet. "LWCC Cheap Toilet Seat." Bathroom Trade. 3 March 2009. <http://www.bathroomtrade.co.uk/products/lwcc-cheap-toilet-set-896-220.html>

4. Dewey, Ken. (2009, January 31). Lake Mead Elevation at Hoover Dam Continues to Fall: January 31, 2009 Report. <http://www.nebraskaweatherphotos.org/Lake-Mead-2009.html>

5. Green Landscaping: Greenacres. (2009, May 21). U.S. Environmental Protection Agency. <http://www.epa.gov/greenacres/>

6. Loh, Michael and Peter Coghlan. "Domestic Water Use Study: In Perth, Western Australia." Water Corporation. (March 2003): 1-32. <http://www.energyrating.gov.au/library/pubs/wa-wateruse.pdf>

7. "Los Angeles Watersources." (n.d.). Where Does MY Water Come From? Water Education Foundation. <http://www.watereducation.org/watersources/community.asp?rid=9&cid=562>

8. O'Driscoll, Patrick. "Report warns water crisis looming in… Southwest." USA Today. 22 Feb 2007. http://www.usatoday.com/weather/climate/2007-02-21-southwest-droughts_x.htm>

9. "Sink Faucet Aerator .5 GPM." Green Feet. 4 March 2009. <http://www.greenfeet.com/itemdesc.asp?kw=Sink-Faucet-Aerator-5-GPM-&ic=2005-00325-0000&eq=>

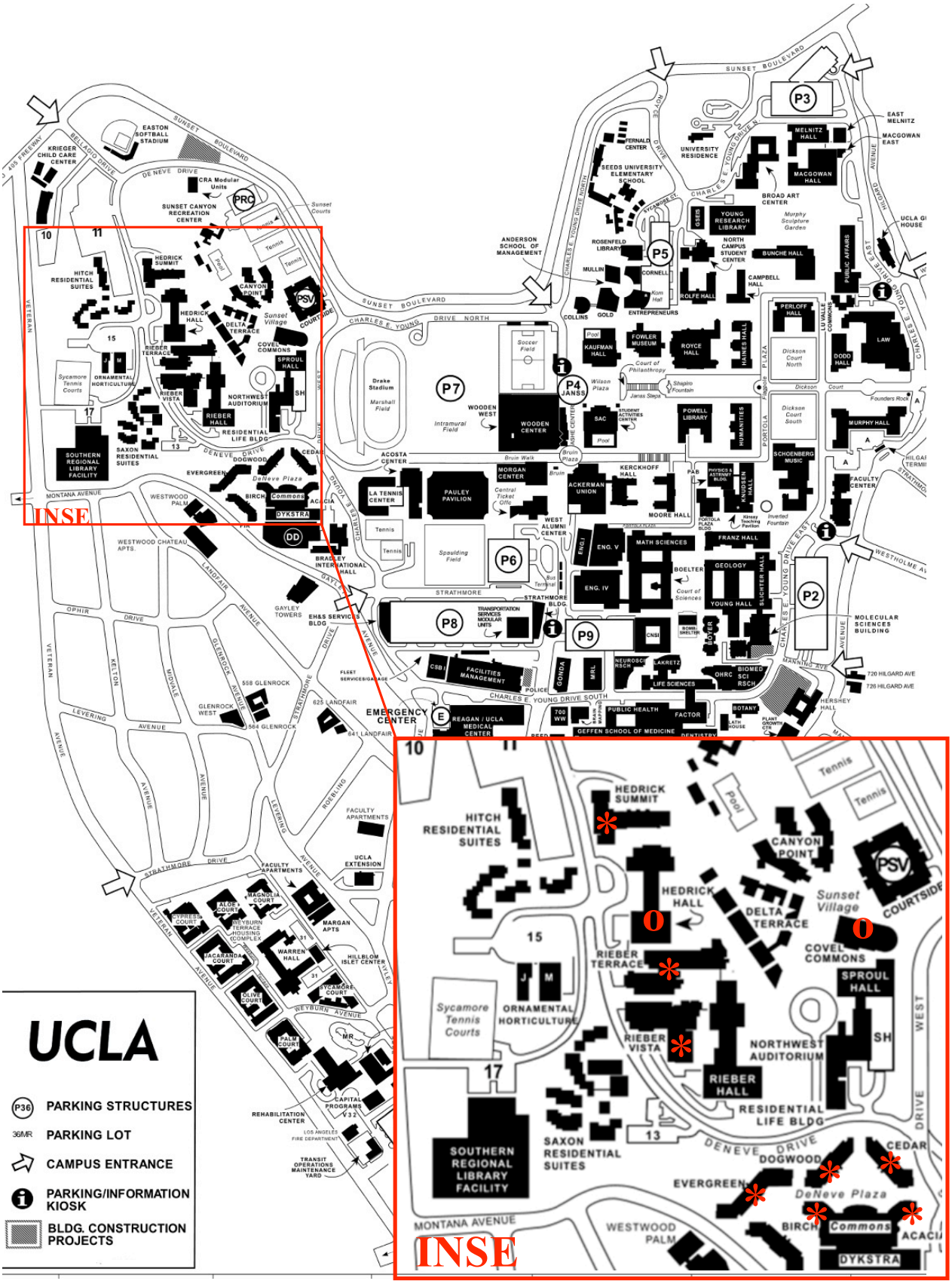
10. "Tempest Watersaving Showerhead." ShowerStore.com. 3 March 2009. <http://www.showerstore.com/products/product-details.php?item=10019>

11. "Toto CT705EL One-Piece Elongated Toilet." Faucet Direct. 3 March 2009. <http://www.faucetdirect.com/index.cfm/page/product:display/productId/CT705EL/manufacturer/Toto>

12. "Ultra Low Flow 0.5 GPM Shower Head." Showerhead Store. 4 March 2009. <http://www.showerheadstore.com/0-5gpm-showerhead.html>

13. WattPlaza. (2008, November 10). Water Conservation Reaches New Heights with Falcon Waterfree Urinals in Los Angeles High-rise. Falcon Waterfree Technologies. <www.falconwaterfree.com/press/docs/pr111008-WattPlaza.pdf>

Appendix A. Location of Surveying (O) and Monitoring (*)



Appendix B. Diagrams of *Eco ShowerDrop* **(a)** and Stopwatch **(b)**

(a)

(b)

Appendix C. Various Data Forms: Toilet Tally Data Collection Form **(a)**; Shower Data Collection Form **(b)**; Informed Consent Form **(c)**

(a)

Toilet Tally: please make a check mark on this page each time you flush the toilet. If you flush twice in one sitting, please record each flush.

(b)

Showers: Please record the date and time of day that your shower started. Also, please record the number of liters used during your shower, as indicated by your *Eco ShowerDrop*. Additionally, please indicate who took the shower by using an identifying mark (numbers, letters, simple pictures). This mark must remain unchanged throughout the duration of the week.

Date, Time	*# Liters*	*ID*	*Date, Time*	*# Liters*	*ID*	*Date, Time*	*# Liters*	*ID*

(c)

ESLP Action Research Team
Water Use Study Consent Form
Spring 2009

Contact: Hayley Moller (415) 233-1140 hemoller@ucla.edu

Scope of study:

This study is designed to gather information about student water use in the on-campus residence halls. Our objective is to acquire an average of student water consumption based on monitoring of showers and toilets, as well as informational surveys, in order to promote sustainability in the daily lives of residents. It will include very little involvement on the part of the subjects. We will monitor both shower and toilet use in the following manners:

-Shower:

Subjects will be expected to record the length of each shower based on time and volume readings of an *Eco-Shower Drop* or a stopwatch, which will be installed by the members of this team. These recordings will be picked up at the end of the weeklong monitoring period.

-Toilet:

Subjects will be expected to record each flush of their toilet on a "Toilet Tally," located in the bathroom near the toilet. One tally mark will correspond to one toilet flush. These recordings will be picked up on a weekly basis, during a visit to collect shower information.

Disclaimer:

By signing below, the participants voluntarily agree to the monitoring procedures described above, with the understanding that the participants' names and any other identifying information will remain completely anonymous and confidential. Participants also agree to accurately and consistently report their water use data in the manner described above, as well as maintain and return the *Eco-Shower Drop* meters or stopwatches in good condition. Finally, the participants may choose to opt out of the program at any time.

I agree to these terms:

Please Print Name	*Signature*	*Date*
Please Print Name	*Signature*	*Date*
Please Print Name	*Signature*	*Date*
Please Print Name	*Signature*	*Date*
Please Print Name	*Signature*	*Date*
Please Print Name	*Signature*	*Date*

Appendix D. Survey Questions

Water Survey

This is a survey to determine the water use behaviors of students living on campus. Please read each question carefully, and select the best answer for you. Your results in this survey will remain completely anonymous. This survey is performed through the ESLP program. For any questions or comments, please email hemoller@ucla.edu

Basic Information

1. What is your gender?

- ☐ Male
- ☐ Female

2. What year are you in school?

- ☐ 1st
- ☐ 2nd
- ☐ 3rd
- ☐ 4th
- ☐ 5th or more

3. What building do you live in?

- ☐ Canyon Point
- ☐ Courtside
- ☐ De Neve
- ☐ Delta Terrace
- ☐ Dykstra
- ☐ Hedrick Hall
- ☐ Hedrick Summit
- ☐ Hitch
- ☐ Rieber Terrace
- ☐ Rieber Vista
- ☐ Saxon
- ☐ Sproul

Shower

4. How often do you shower in your room or the communal bathroom on your floor?

- ☐ More than once per day
- ☐ Once per day
- ☐ Every 2 days
- ☐ 2-3 times per week
- ☐ Once per week or less

5. How long is your average shower?

- ☐ Less than 5 minutes
- ☐ 5-10 minutes
- ☐ 10-15 minutes
- ☐ 15-20 minutes
- ☐ 20 minutes or more

6. If you have the water flow control dial (only in plazas), where do you set it when you shower?

- ☐ Minimum water flow (right)
- ☐ Medium water flow (middle)
- ☐ Maximum water flow (left)
- ☐ I don't know
- ☐ I do not have a flow control dial

Laundry

7. How often do you do your laundry in the building?

- ☐ More than once per week
- ☐ Once per week
- ☐ 3 times per month
- ☐ 2 times per month
- ☐ Once per month
- ☐ Less than once per month

8. On an average laundry day, how many loads do you put in the washing machine?

☐ 1 ☐ 2 ☐ 3 ☐ 4 or more

9. What setting do you usually use for the washing machine?

- ☐ Whites
- ☐ Perm. Press
- ☐ Colors
- ☐ Woolens
- ☐ Bright Colors
- ☐ Knits & Delicates

10. How often do you use the "extended cycle" option?

☐ Always ☐ Sometimes ☐ Never

Sink

11. How often do you wash dishes in your room (how many meals do you eat with dishes in your room)?

- ☐ Never
- ☐ Once per week
- ☐ 2-6 times per week
- ☐ Once per day
- ☐ More than once per day

12. How often do you leave the water running during the following activities?

	Always	Sometimes	Never/NA
Brushing Teeth:	☐	☐	☐
Washing Face:	☐	☐	☐
Shaving Face:	☐	☐	☐

13. How often do you get drinking water from the tap?

- ☐ Never
- ☐ Less than once per day
- ☐ Once per day
- ☐ 2 times per day
- ☐ 3 times per day or more

14. In your room, what do you drink water from (mark all that apply)?

- ☐ Standard cup
- ☐ Disposable plastic water bottle
- ☐ Non-disposable water bottle
- ☐ Water boiler/hot-pot
- ☐ Other (please specify container):

Toilet

15. How often do you wash your hands after using the bathroom?

☐ Always ☐ Sometimes ☐ Never

16. How often do you flush the toilet after using it?

☐ Always ☐ Sometimes ☐ Never

Behavior

17. Which of the following incentives would encourage you to change your water habits (mark all that apply)?

- ☐ Educational program on how to conserve
- ☐ Monetary incentive (paid to decrease use)
- ☐ Reminder stickers on water-use equipment
- ☐ Other (please specify):

18. Please provide any additional comments.

Appendix E. Survey Responses by Count and by Percent

1. What is your gender?

Answer Options	Response Frequency	Response Count
Male	41.1%	387
Female	59.0%	556
answered question		942
skipped question		0

2. What year are you in school?

Answer Options	Response Frequency	Response Count
1st	55.0%	518
2nd	29.2%	275
3rd	13.7%	129
4th	1.7%	16
5th or more	0.5%	5
answered question		941
skipped question		1

3. What building do you live in?

Answer Options	Response Frequency	Response Count
Canyon Point	7.8%	73
Courtside	4.4%	41
De Neve	10.8%	101
Delta Terrace	5.4%	51
Dykstra	3.3%	31
Hedrick Hall	28.3%	265
Hedrick Summit	11.2%	105
Hitch	5.8%	54
Rieber Terrace	6.9%	65
Rieber Vista	3.7%	35
Saxon	1.9%	18
Sproul	11.1%	104
answered question		936
skipped question		6

4. How often do you shower in your room or the communal bathroom on your floor?

Answer Options	Response Frequency	Response Count
More than once per day	10.8%	101
Once per day	76.0%	712
Every 2 days	12.0%	112
2-3 times per week	2.3%	22
Once per week or less	0.5%	5
answered question		937
skipped question		5

5. How long is your average shower?

Answer Options	Response Frequency	Response Count
Less than 5 minutes	4.6%	43
5-10 minutes	32.6%	306
10-15 minutes	34.8%	326
15-20 minutes	19.3%	181
20 minutes or more	10.7%	100
answered question		938
skipped question		4

6. If you have the water flow control dial (only in plazas), where do you set it when you shower?

Answer Options	Response Frequency	Response Count
Minimum water flow (right)	4.3%	39
Medium water flow (middle)	21.5%	197
Maximum water flow (left)	20.9%	191
I don't know	16.2%	148
I do not have a flow control dial	39.6%	362
answered question		915
skipped question		27

7. How often do you do your laundry in the building?

Answer Options	Response Frequency	Response Count
More than once per week	0.4%	4
Once per week	25.3%	236
3 times per month	13.4%	125
2 times per month	32.9%	307
Once per month	12.9%	120
Less than once per month	16.4%	153
answered question		933
skipped question		9

8. On an average laundry day, how many loads do you put in the washing machine?

Answer Options	Response Frequency	Response Count
1	36.6%	333
2	50.6%	461
3	10.2%	93
4 or more	3.8%	35
answered question		911
skipped question		31

11. How often do you wash dishes in your room (how many meals do you eat with dishes in your room)?

Answer Options	Response Frequency	Response Count
Never	64.7%	599
Once per week	25.2%	233
2-6 times per week	8.2%	76
Once per day	2.9%	27
More than once per day	0.9%	8
answered question		926
skipped question		16

12. How often do you leave the water running during the following activities?

Answer Options	Always	Sometimes	Never/NA	Response Count
Brushing Teeth:	165	256	516	934
Washing Face:	284	313	332	926
Shaving Face:	100	107	704	904
answered question				935
skipped question				7

13. How often do you get drinking water from the tap?

Answer Options	Response Frequency	Response Count
Never	40.5%	377
Less than once per day	25.3%	236
Once per day	16.8%	157
2 times per day	9.8%	91
3 times per day or more	9.4%	88
answered question		932
skipped question		10

14. In your room, what do you drink water from (mark all that apply)?

Answer Options	Response Frequency	Response Count
Standard cup	36.4%	337
Disposable plastic water bottle	52.4%	486
Non-disposable water bottle	26.5%	246
Water boiler/hot-pot	12.3%	114
Other (please specify container):	6.3%	58
answered question		927
skipped question		15

Other (please specify container):
thermal
Brita
I refill soble bottles, since they don't sweat arsenic
brita water filter
water fountain
coffee pot

Water filter
My Hands
brita water filter
Mug
Brita
i don't drink water in my room
brita filter
cup
nalgene
Reusable Water Bottle
Britta filter
brita water filter
plastic water bottle
brita water filter
brita
Brita water filter
dining hall stuff
Brita Filter
Brita Water purifier
Brita water purifier
brita pitcher
brita
brita pitcher
hands
Pitcher
i just drink out of the gallon jug like a real man
Britta!
thermos bottle
brita pitcher
brita
mug
Brita
filter water brought from home
filter water brought from home
thermos
thermos
roundevu cup
brita
brita
Mug
Water Purifier
water purifier
2 gallon dispenser
brita
water filter
straight out of a gallon jug
bcaf cup
water bottle store bought

15. How often do you wash your hands after using the bathroom?

Answer Options	Response Frequency	Response Count
Always	93.5%	871
Sometimes	6.2%	58

answered question	932
skipped question	10

16. How often do you flush the toilet after using it?

Answer Options	Response Frequency	Response Count
Always	94.7%	882
Sometimes	4.7%	44
Never	0.6%	6

answered question	931
skipped question	11

17. Which of the following incentives would encourage you to change your water habits (mark all that apply)?

Answer Options	Response Frequency	Response Count
Educational program on how to conserve	35.2%	317
Monetary incentive (paid to decrease use)	69.2%	623
Reminder stickers on water-use equipment	51.3%	462
Other (please specify):	4.4%	40

answered question	900
skipped question	42

Other (please specify):

Nothing to be honest although I should use non-disposable water bottle.
Nothing.
The thing is an educational program wouldn't really work because I wouldn't go, but reminders such as a poster by the elevator or by the Bruin cafe (one that are like hey you could shut off the water while you shampoo your hair and it would save _ gallons of water. Then I would probably be like hey I'm gonna shut off the water. Good luck you're doing a great thing.
mo money
If the water was poisonous
In plazas/suites set an average. People who go over pay more and people who are under for water usage get money back! Maybe a little of the money is used to fund educational programs about conservation.
Stickers are a big plus!!!
Maybe it could be incorporated into a floor competition, or a school to school competition.
prizes for who saves the most water :D
Nothing
Not Much
Random facts about how much water is wasted a day posted in the stalls or by the sinks would help because it would let me know the amount of water being wasted when i'm leaving the sink on.
food and beverage
When we're out of water. But I think I'm pretty good at saving water.
NOTHING - IM THIRSTY
RA specifically encouraging residents
free swipes!!
candy
None
Just the environment we try to be water and electric concsientious in our room

ENvironmental awareness Water Conservation
Making it known how much water is wasted
Reminder stickers on EVERYTHING.
special cause ex: money saved used for...
nothing
give me a million bucks and you got a deal!!!
real facts about how the environment is in major trouble if we don't start to conserve water
small scope studies are unhelpful. mass studies have proven that water usage, much like recycling, is ineffective at the distruction of the world. Be nihilistic. :)
not really anything- its water- the source of life!
having people come talk about it probably. make it important at UCLA.
nothing
nothing
Gift Certificates, UCLA Prizes (mugs, cups, etc)
nothing
peer pressure
Posters

18. Which of the following incentives would encourage you to change your water habits (mark all that apply)?

Answer Options	Response Count
	52
answered question	52
skipped question	890

Response Text
I use the water below average, i was trained to do so by my parents, we are very big on saving water.
cool survey!!!
I <3 water...
Educational programing never gets any attendance.
this was a nice and short survey
I am all for the program to reduce water.
I love water. Give me more?
We need to save more waterrrr! myself included.
great survey, i love conserving water
N/A
Should people cut down on washing hands and flushing toilets?
I think this is really great!!!! Good luck!
save water
Thanks for doing this project!!
I love water conservation!! lul
Showers and sinks are leaky!
I like my water habits and doubt I will change anytime soon.
i feel we should all conserve more of our water, and be more cognizant of how often and how much water we use. we should be much more water efficient. this survey was a great reminder of what we as a society overlook too often.
WATER TASTES GOOD
Hedrick Summit won the All-Hall Save Energy Competition in February!
:-)
its cool that youre doing this! good luck!
thank you!
GO GREEN YEAYUH!
we need low flo shower heads and water saving toilets on campus and in the dorms!!! Thanks for doing this. Go ESLP!
let us use the water fountains in sproul again!!!
Thanks!
What.

Thanks!
What.
Great thanks!
NA
This was a cool way to bring change.
=P
who doesn't flush the toliet?
thanks
love
I tend to use more water in dorm since i don't pay for it.
:)
nice and quick survey
cool stuff