Water Consumption Analysis – Gage Low Rise

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Assignment 1

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The Gage Lowrise is a 4 storey building part of Walter Gage residence at UBC. It is composed by studio and one bedroom suites. Gage Lowrise is located north of the UBC bus loop and two blocks away from the Recreation Centre and the Student Union Building. This building hasn't had any renovation work regarding water retrofitting. The current document presents an analysis of water consumption in this building between August 2010 and September 2014. The data analyzed were collected monthly, towards the middle of each month, by UBC's Energy and Water Services.

Data Analysis

Data adjustments: From 2010 to 2013 there was an absence of data for readings on the month of June. To fix this data gap, water consumption for June and July was estimated calculating consumption between May and July and dividing this value by two. The same calculation was performed to address a data inconsistency on October 2012.

Results: As can be seen in Figure 1, the data almost follows a normal distribution, although there is a concentration of data towards the left side of the graphic. As can be seen in Figure 2, the monthly water consumption in Gage Lowrise presents a high variability. In the analyzed period, the lowest consumption was 170m3 on March 2014 and the highest consumption corresponded to 795m3 on August 2014. This large variation in the monthly water consumption is reflected on a standard deviation of 121m3. While the mean or average monthly consumption was 330.8 m3 and the median consumption was 317.5m3 these values don't provide much information because individual consumption levels deviated greatly from the mean.

As can be observed in Figure 2 water consumption seems to have a seasonal variation through the year. In both figures it is possible to observe that consumption levels are lower during colder months and higher during warmer months. Consistently, the peak consumption each year happens in August and the lowest consumption tends to be in January. As can be seen in Table 1 the average consumption on the summer was always higher in comparison to the winter period. After conducting an independent samples t-test it was found a significant difference in water consumption during winter (M= 250 SD=) and summer (M=403 SD=) t=2.4 p=000. This results confirm that there is a higher water consumption on summer months in comparison to winter months.

Table 1. *Seasonal Water Consumption in Gage Lowrise Building.*

Winter* Consumption (m3)		Summer** Consumption (m3)	
Oct-Apr 11 Winter	1465	Summer Apr-Oct 11	2215
Winter Oct-Apr 12	1490	Summer Apr-Oct 12	2188
Winter Oct-Apr 13	1608	Summer Apr-Oct 13	2515
Winter Oct-Apr 14	1608	Summer Apr-Sep 14	2400

*Water consumption between October 15th and April 15th. **Water Consumption between April 15th and October 15th

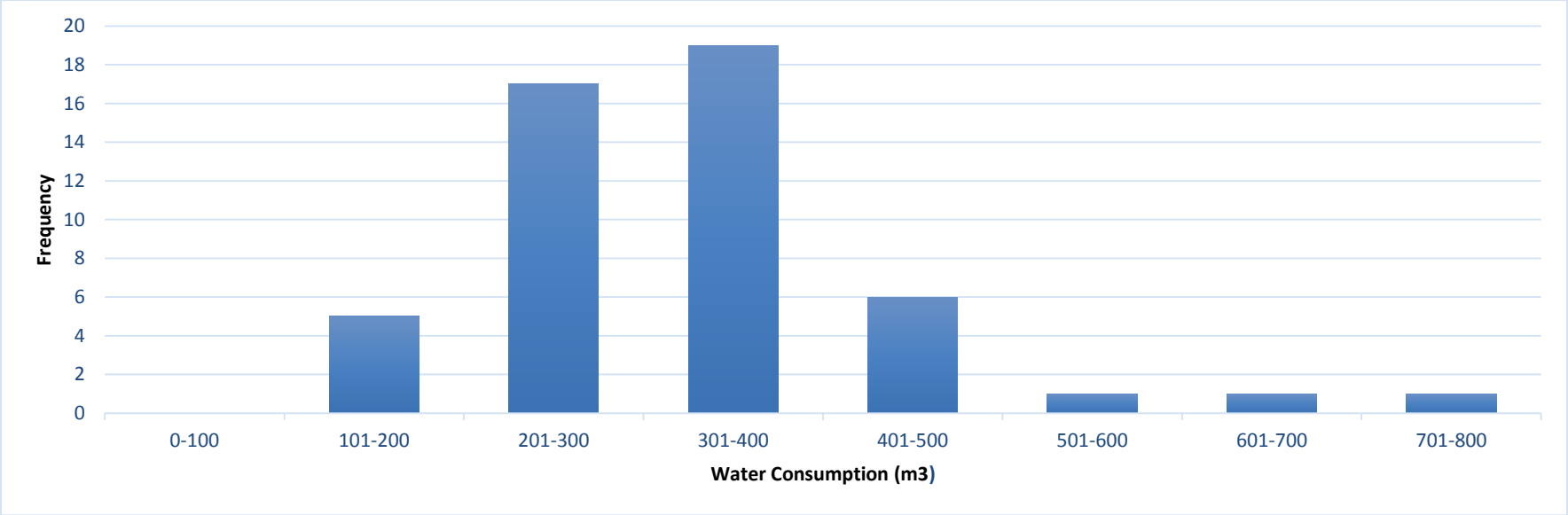

Figure 1. Histogram, Water Consumption Distribution in Gage Lowrise Building

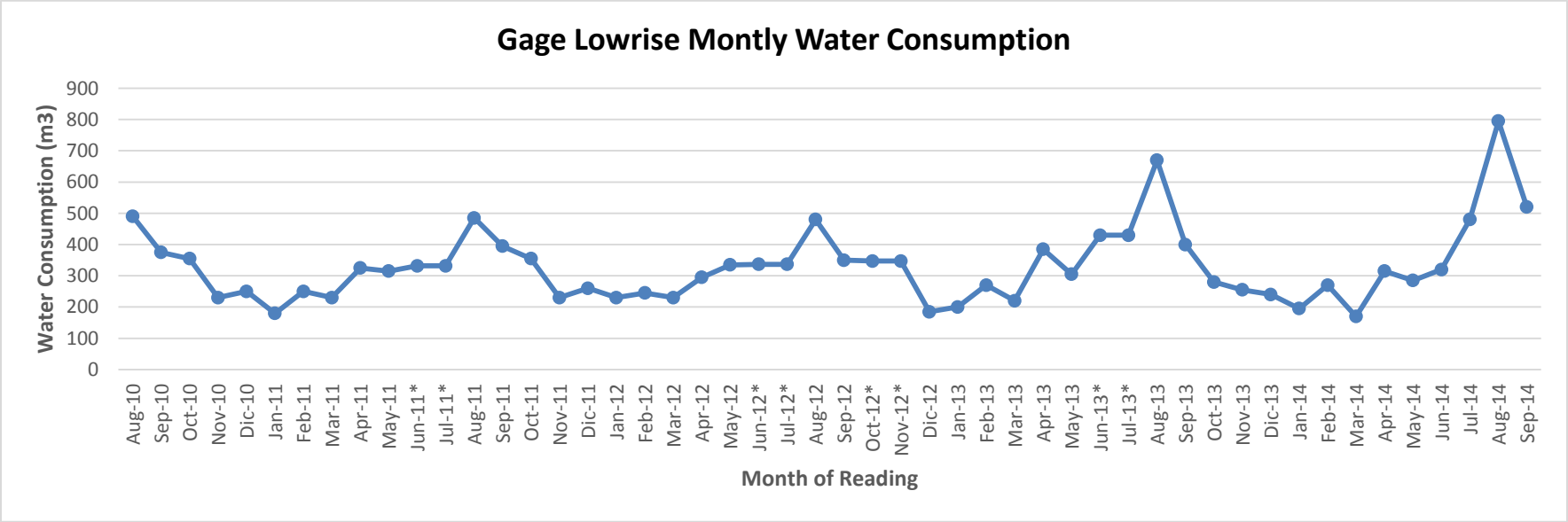

Figure 2. Plot of monthly water consumption from August 2010 to September 2014 in Gage Lowrise building

* Due to data gaps, consumption on these months was estimated using bimonthly readings and calculating average consumption.

Conclusions and recommendations: The analysis showed that water consumption in Gage Lowrise is higher during the summer months, particularly between mid-July and mid-August. The main recommendation of this report is the increase of conservation campaigns during this period of the year. Further research could be performed to identify causes of water consumption increase during the summer. This could inform additional strategies to reduce water consumption during summer.