

Assignment 1 (Thunderbird A)

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I chose to analyze Thunderbird residence A building. I collected all the data that was available for this building. The monthly frequency readings were from June 2010 to September 2014, the quarterly frequency readings were from December 1997 to September 2014. I was more interested in analyzing a residence building to see if any water consumption patterns correspond with UBC's academic schedule. First, I calculated the difference in water consumption from the previous month, or quarterly month (which included a combination of the high and low water reads). Second, I gave the oldest month, or quarterly month, the value '0' and gave the next months, or quarterly months, value the difference. Going forward, I added every next months, or quarterly months, difference to the previous. I used this method because plotting the actual value of water consumption would involve unnecessarily high numbers and this would be the easiest way to view and interpret water increases or decreases. For some months, the low or high meter reads were missing and so to avoid any misinterpretation I omitted the entire month, instead of only including a high or low read.

In the monthly distribution (Figure 1) there is a spike increase from May to August 2011 that is not visible in the quarterly data (Figure 2). Because the quarterly data tracked the difference between May and September 2011 the August increase was unrecorded, as there was a decrease in September.

The quarterly data shows more of a pattern, as it dates back to 1997. Over all, there is a general increase in water consumption. Around every four years there is a sudden decrease, then water consumption starts to steadily climb again. In the monthly data the sudden drop that seems to happen around every 4 years, occurs from August to September 2011. The reason the drop does not seem as substantial in figure 1 is because the accumulation of the monthly increases previous to June 2010 is not plotted.

My assumption was that there would be a decrease in the months of May to September, because of the summer break, every year. However the decrease does not happen every year, it happens roughly every four years and it seems to switch between semester months. This pattern is present in figure 2. The first decrease happens between September to December 2000. The second decrease happens between June to September 2004. The Third decrease happens between March to May 2008. The fourth decrease happens between May to September 2011. Because the quarterly data does not have the

months between May and September there could be a decrease that is unrecorded, similar to what occurred in figure 1 during May to September 2011. There is recorded data for the month of June from 1998 to 2005, but there is no decrease for that summer month.

I unfortunately did not have enough time to substantially explore the possible variables that could account for this steady increase in water consumption, or the dramatic decrease that is occurring every four years. However, if I were able to continue working on this study, I would contact the building manager to ask about vacancy rates, if the building is continuously being used during the summer semester, and if there were more beds added at any point. I would like to contact UBC maintenance and ask about any history of leakage for the building and what the frequency was. I would also like to contact those installing or reading the water meters to ask if there is a technical drawback that may occur.

I am not sure what would account for this continuous increase in water consumption, but I would first look at other resident buildings with similar square footage and number of residents, to see if the same pattern is occurring. As well, I could only assume that if water consumption is steadily increasing that the resident's utility bills are also increasing. To make sure that the residents are actually the cause for the consumption increase I would want to look at their utility bills along with the water readings.

Statistical summary of quarterly water consumption differences

Variance: 6635078857

Standard Deviation: 81456

Mean: 173581.194

Median: 188922

Statistical summary of monthly water consumption differences

Variance: 1040182522

Standard Deviation: 32251.860

Mean: 4784

Median: 3006

Monthly Water Consumption

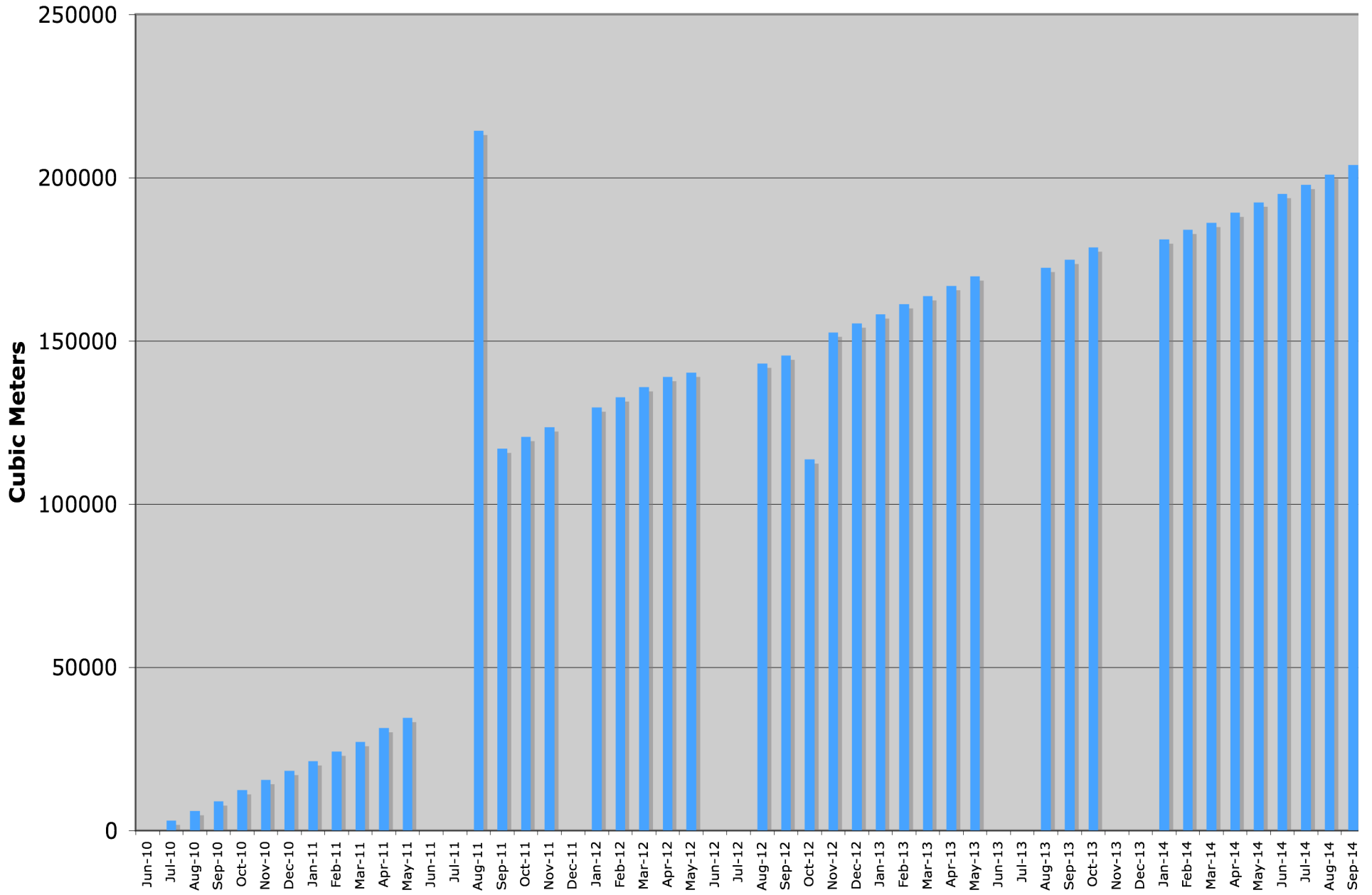


Figure 1

Quarterly Water Consumption

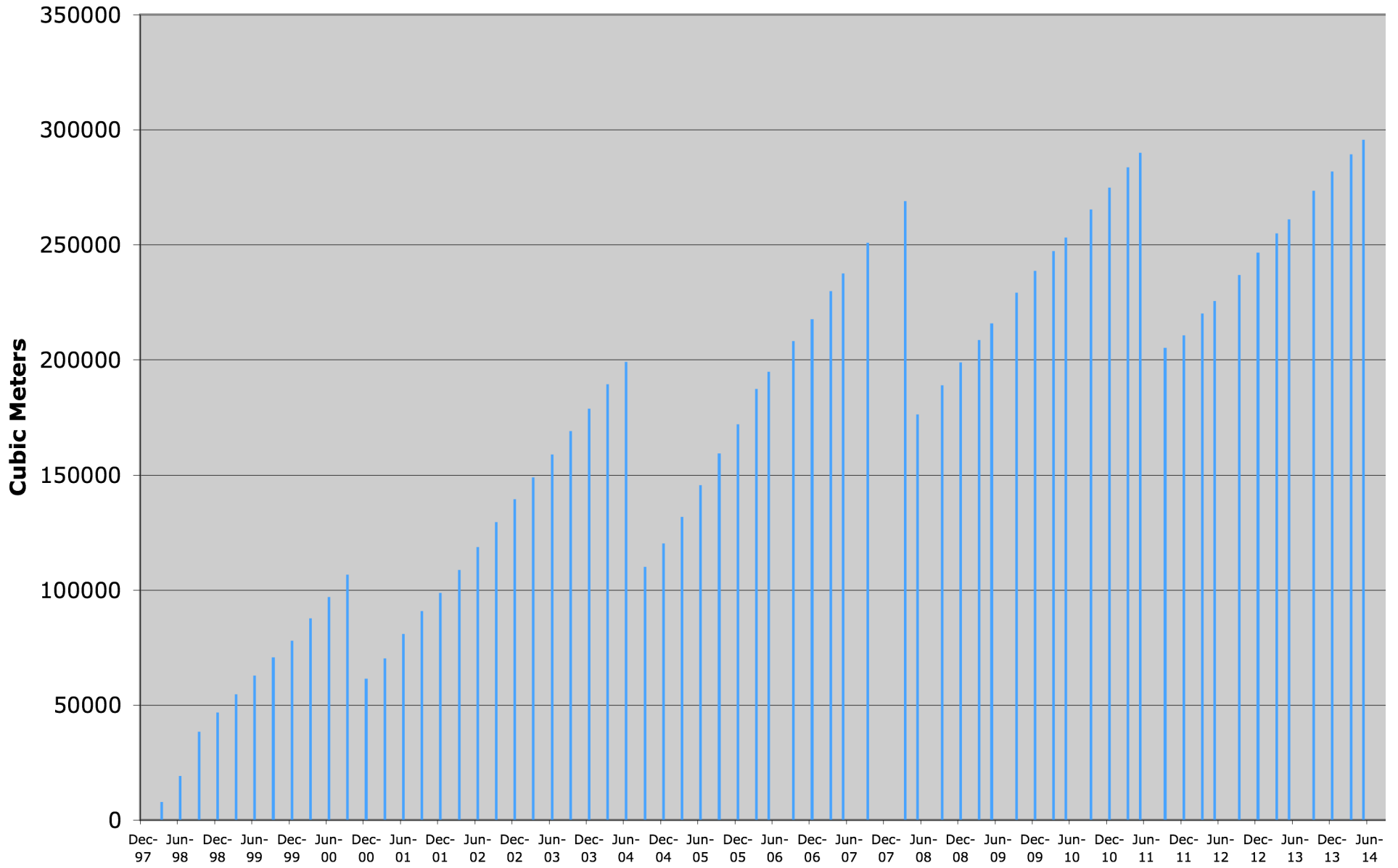


Figure 2