

3.1 Irrigation Audits

A response to the Paul Robbins review

Summary:

- Weather and other factors were taken into account through the use of average residential water usage as a baseline.
- There are more than enough heavy water users in AWU's served area.
- The review has a number of factual errors. E.g. the reviewer seems to disregard the fact that the AWU estimate was concentrated on peak savings only and did not look at the off-season usage. This is because the AWU's study was done in light of the 2007 Water Conservation Task Force report, which concentrated on peak usage (which drives treatment capacity requirements).
- Savings estimates were good for the samples used. The reviewer, on the other hand, used numbers from a relatively wet year (2010). However, savings may and will change in the future; hence, follow-up studies are needed and will be conducted.
- The reviewer is correct in calling for audits of heavy water users first and foremost.

Detailed Response

3.1.1 The footnote 11 is incorrect. The AWU study estimated only peak savings. Possible savings occurring from October through April were NOT estimated; rather, it was surmised that audits occurring during off-season may have some effect on irrigation patterns during the peak season. Thus, an audit done during October through April was found to save 300 gallons per day in peak use.

Paragraph 3.1.1 states that the data was not adjusted for rainfall and other factors and did not use any comparisons with non-participants. This assertion is flawed. Here is what the AWU study says:

It is important to note that overall per capita residential consumption of water was lower in June 2008 (103.74 gpcd) than in August 2008 (124.29 gpcd). Thus, decreases in water consumption of the audited customers cannot be attributed to general factors such as weather; instead, they can be attributed to the audited customers' willingness to reduce water use and irrigation audits.

Overall residential usage was higher in August than in June. This usage serves as a baseline (control group) for comparisons as well as implicitly takes into account weather, economic, and other factors. Average residential consumption numbers are not flukes but consequences of daily decisions by hundreds of thousand of customers taking all kinds of factors into account. Since August overall usage was higher than that in June, the savings estimate is conservative.

The review also states that "It is not entirely clear from the narrative in this study what the savings results from this analysis referred to, summer peak, winter peak, or average year-round peak." There is only one peak and it almost always occurs sometime during July through September.

3.1.2 In this paragraph the reviewer states:

Just as curious, the AWU savings study estimates that program participants had extremely high water use. In first set of data discussed above, the average customer was estimated to consume 40,000 gallons per summer month. According to an AWU bill frequency analysis in August 2010 (below), such high consumption represented only 1% of all AWU residential customers in that month. As such, there is an extremely limited universe of customers that can really achieve the estimated savings in this study, assuming they are even valid.

There are several problems with this criticism.

- a) 40 thousand gallons per month was the average usage; hence, many participants used less than 40 thousand gallons per month.
- b) AWU usually audits around 1000 residential customers per year. According to the reviewer's residential frequency analysis, there were 2,380 customers using over 40,000 gallons a month in August 2010.

- c) 2010 was a relatively wet year with average water usage much lower than in 2008 or 2009. The principal sample was customers audited in July 2008.

Finally, 40,000 gallons per month was the actual average use of customers audited in July 2008, not an arbitrary number. Many customers request an irrigation audit after receiving a high water bill, so the high average use in June among the sample group is unlikely to be an aberration.

3.1.3 In this paragraph the reviewer states that that the average usage of program participants was 30,000 gallons in July 2010, not 40,000 and even less during other months of 2010. But, while this may be true, it is also irrelevant for the following reasons:

- Water usage varies from year to year and 2010 was a low usage year.
- Water usage during off-season months is irrelevant because the AWU study estimated peak savings, not average ones. Hence, in 2010, it is usage in peak months, such as July and August, which is relevant for savings potential.

That said, it is good to emphasize audits of heavy water users because they represent higher savings potential.

In the same paragraph, the reviewer states that a master's thesis discovered savings of 100 gallons per day. It is not clear if this number represents peak or average savings and we would need access to this thesis to verify its numbers.

3.1.3.1 This paragraph states that AWU ignores savings during the off-season. However, the AWU study did not estimate those in the first place. Rather, it estimated whether audits conducted during the off-season had an effect on peak usage.

3.1.4 Currently, AWU does not decline irrigation audit requests from customers using less than 25,000 gallons a month. But the reviewer is correct that heavy water users represent higher potential savings.

3.1.5 The reviewer states the following:

The annual savings estimates are also compromised by the longevity of the savings. AWU only assumes the savings from a landscape audit lasts for 3 years. Yet its monthly report format implies that the savings are cumulative and permanent.

The monthly report implies nothing of the sort. Lifetime savings of an irrigation audits are stated at 219,000 gallons. It is easy to ascertain that this number is the result of 200 times 365 times 3, i.e. average savings *times* days in a year *times* three years. The number 200 is average daily savings obtained by spreading peak season savings of 500 per day over the full year. In short, the reviewer is mistaken.

Yes, irrigation audit savings are not permanent since they involve a behavior modification and behavior changes over time. But that is the very nature of these types of conservation activities.