A study of the use of electronic road signs during 2008 in the Australian Capital Territory

"Are road users seeing the message and is it changing their behaviours of water use?"

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May 2009

A thesis submitted in partial fulfilment of the requirements for the degree of Master of Science Communication of the Australian National University

Declaration

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma at any university; and that to the best of my knowledge and belief does not contain any material previously published or written by another person except when due reference is made in the text. The empirical work described within was not carried out with any other person.

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Acknowledgements

I wish to thank my supervisor, Director of the Centre for the Public Awareness of Science at the Australian National University, Associate Professor Susan M. Stocklmayer for her support and guidance as I developed this thesis. Her coaching was subtle and encouragingly persuasive as she help transform a 'business report' into something readable.

I also enjoyed the interface in assessing the results obtained from the survey with the Deputy Director of CPAS, Dr. Rod Lamberts. His guidance was very much to the point.
Thank you, Rod.

The CPAS Masters' course, of which I was a member during 2008, is competitive. My course colleagues are all innovative and hard-working providing a strong on-going challenge. They will all succeed in their chosen careers which I shall watch with interest.

With so much activity and companionship studying at the Centre for the Public Awareness of Science has been a privilege.

My wife, Audrey, has provided life support during our marriage. No less support has been provided through this adventure, although there have been times I have looked for direct help!

Abstract

The study has been to determine whether electronic (variable message) signs installed by the Actew Corporation and the ACT Government have been effective in communicating the on-going water situation to ACT residents.

It is believed that this use of these signs to communicate an affirmative message is unique to the ACT.

The signs display, on a daily basis, yesterday's water usage in megalitres, the seasonal daily target use and dam (storage) levels. The signs have been installed on five major access roads since December 2007. At that time when dam levels were very low (around 30% capacity), and further restrictions in the domestic use of water were being considered.

A survey was conducted through a hard-copy and/or online questionnaire in a closed-user group of ACT residents.

The signs have been seen by ACT residents within the survey population by 99% of all respondents. 65% say it is a relevant daily reminder and a similar number say the knowledge has prompted them to think differently about their own use of water. 77% of ACT residents have changed their water use habits as a result of the continuing publicity.

The survey has also provided for an analysis of the use of water in and around the home including changes in water use habits and possible barriers to further changes.

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Chapter One : Introduction / background to the study.

In early December 2007 the Australian Capital Territory (ACT) Government and Actew Corporation, (who supply water to the ACT), installed variable message signs on five major exit roads from Canberra City to advise road users of the ACT of their use of water and to record dam storage capacity on a daily basis. An example of the sign is shown in Figure 1.

Figure 1 : Press release photograph from *The Canberra Times* of 7 December 2007 announcing the installation of the signs. Within the text MLA Ms. Karen MacDonald encouraged Canberrans "not to become complacent with their water use as we have learnt how quickly conditions can change".

Providing a daily road-side update of water use is a tactic within the continuing communications strategy of both organizations to reduce any extravagant use of potable (drinking) water and it is targeted towards residents. The decision to install the signs was made at the time when additional restrictions were being considered and water storage dams in the Territory had, during 2007, reached their lowest levels ever. The signs have been retained on a semi-permanent basis as the belief is that they are effective. This study questions and tests that belief.

This use of variable message signs to transmit affirmative messages is believed to be unique. Until this time the use of such signs had been limited to advisory and / or warning signs to road users. This study examines the impact of the new medium as a science communication device.
The sequence of three messages on the signs is shown in Figure 2.

Figure 2 : Photographs of an electronic sign showing its three messages in sequence : Yesterday's water use, the daily target (for the season of the year) and yesterday's dam levels. (The photographs were taken on Barry Drive, Canberra on 28 February 2008).

An Australian problem

Australia is the driest continent in the world and has periodically suffered from drought conditions. Some areas of the country have been known to go without rain for a period of years. Huge tracts of the country in all the States are 'drought declared' and the Government is subsidising farmers and other land users to enable them to continue 'on the land'. At the same time, in an effort to sustain the Murray-Darling River System, Government is buying back water (extraction) licenses from irrigators to keep water in the natural water courses.

The problem in Australia is being compounded by the effects of climate change. The November 2007 General Election that saw the election of the Rudd Labor Government has resulted in an increased awareness of climate change. Indeed one of the new Government's first acts was to sign the *Kyoto*

Agreement on the reduction of greenhouse gases as a focus of the effects of climate change upon how we shall live in the future.

Water for the Future is the Commonwealth's long-term plan to secure water supply because "Climate change is causing water shortages that pose a serious threat to our economy and way of life". [Australian Government, Department of the Environment, Water, Heritage and the Arts' web-site]. "The Government is committed to investing $12.9billion over ten years through its *Water for the Future* initiative" to address four key priorities which are listed in Table 1 below and described in some detail in Appendix 7 of this study :

***Water for the Future* Action Plan**	
Item	Priority
1	Taking action on climate change
2	Using water wisely
3	Securing water supplies
4	Supporting healthy rivers

Table 1 : The Australian Government *Water for the Future* priorities

This study concentrates upon item 3, above, *the securing of water supplies* in the short and medium-term. This necessarily includes '*using water wisely*' as a means of maintaining supplies mainly in an urban setting. It does not mean that item 4, '*supporting healthy rivers*', is ignored. In the ACT, residents are conscious of the implications of maintaining a healthy river system. The Murray-Darling Commission has its headquarters in Canberra and the media keep residents well advised of the prevailing condition of the system, from a local as well as an Australian perspective.

An Australian Capital Territory (ACT) problem

The lack of water has resulted in the application of 'water restrictions' in many areas of the country including the ACT. These restrictions are a short-term policy to reduce the amount of drinkable (potable) water used for non-

critical purposes. "The ACT, like the rest of Australia, is currently in the grip of a severe drought". [The ACT Government web-site].

The ACT Government's *Think water, act water* policy statement was issued in April 2004. The Chief Minister, (Jon Stanhope, MLA) writes in his forward :

> The absolute necessity of effective water resource management in the ACT has never been clearer than it is now. We can no longer treat water the way many of us have in the past. Even before the drought and the bushfires, the Government was looking to the future for water, through the development of The Canberra Plan, which provides a long-term strategic vision for the ACT.

A scheme of temporary restrictions on the use of potable (drinking quality) water from the Actew Corporation was approved under the *Utilities (Water Conservation) Regulation 2006.* This sets out a "target annual reduction relative to water conservation measures" in four stages, with increasing savings targets as shown in Table 2 below, to sustain the provision of potable water to residents, (and other users).

Restriction level	Water saving target
Stage One	10%
Stage Two	25%
Stage Three	35%
Stage four	55%

Table 2 : Water conservation annual target reductions

An initial voluntary water restriction system was in place from 15 November 2002 in the ACT. Mandatory and permanent water regulations have been in effect in the ACT since this time, as shown in Table 3 :

Restriction level	Date enforced
Stage One	16 December 2002
Stage Two	1 November 2006
Stage Three	16 December 2006

Table 3 : Water restriction stages and dates of enforcement

The ACT collects its water in four catchment areas and stores its water behind four dams. The dam water storage levels are recorded daily on the Actew Corporation web-site. Examples and comparisons of historical levels of dam water at the end of November 2008 are shown in Figures 3, 4 and 5. Dam, (water storage potential), levels reached an all-time low, 30.8% of capacity, in June 2007 and it looked as if water restrictions to Stage Four might be required to maintain safety supply levels to sustain the community need for water.

The following three graphs show dam water storage levels.

i) The four dams that comprise the total storage capacity of the ACT are shown in Figure 3, comparing capacity with actual water levels at the end of November 2008.

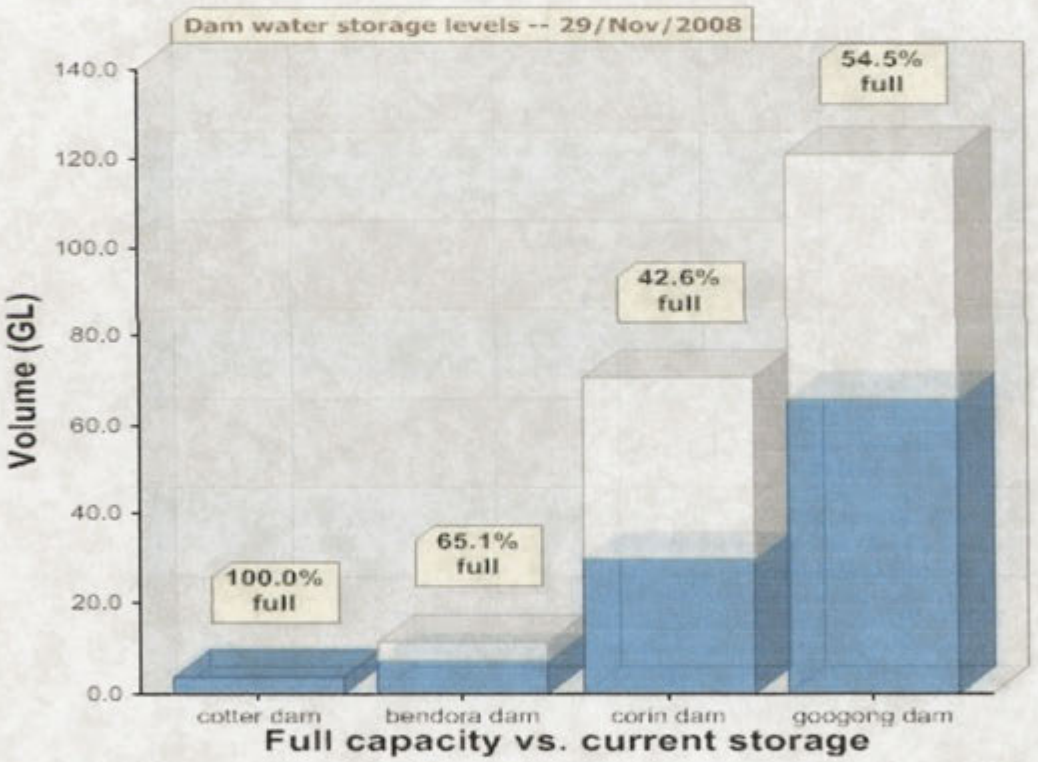


Figure 3 : Dam water storage levels
Copied from the Actew Corporation web-site on 30 November 2008

ii) The combined storage levels, compared to 100% full are described below in Figure 4.

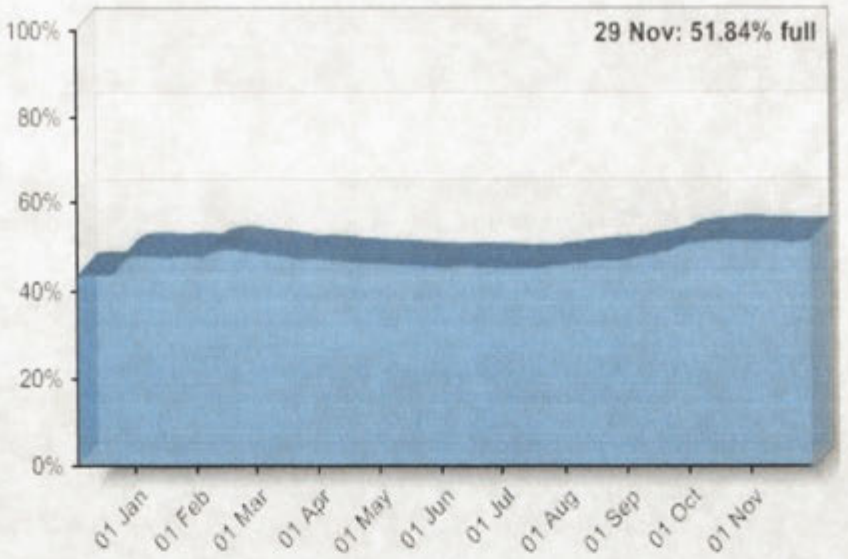


Figure 4 : Combined dam storage levels over 12 months
Copied from the Actew Corporation web-site on 30 November 2008

iii) The third graph in the series shows the combined dam water storage levels over the past five years. The low point in June 2007, (30% of total capacity), prompted Actew Corporation, as the agent of the ACT Government, to consider moving to Water Restriction Stage Four. Installation of the road signs was a step in prompting ACT residents to be more frugal in their water use and delay implementation of Stage Four Restrictions. This graph is shown in Figure 5.

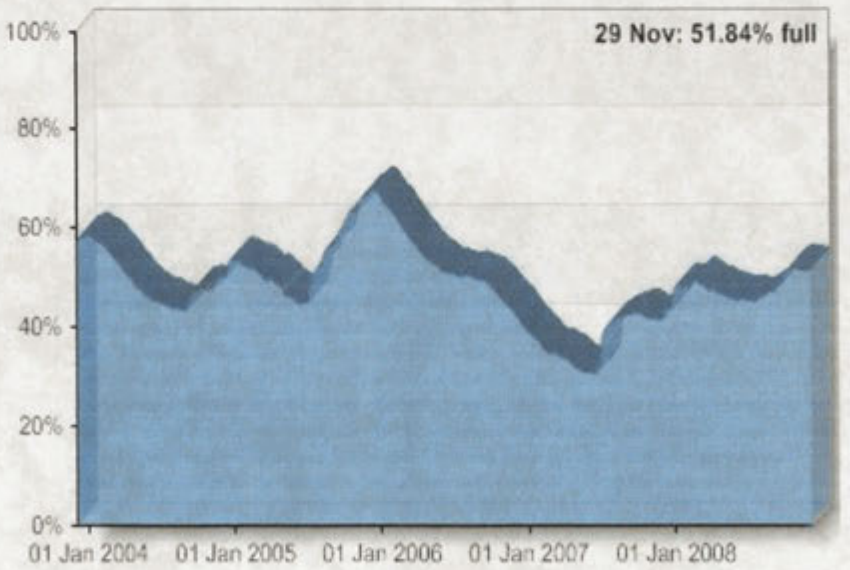


Figure 5 : Combined Storage Levels over 5 Years
Copied from the Actew Corporation web-site on 30 November 2008

A complete schedule of what the four stages of restrictions in water use mean is included in Appendix 1. Two examples of the differences between Stage Three and Stage Four for the domestic user are shown in précis below. (Table 4).

	Stage 3	Stage 4
Target annual reduction	35%	55%
	Restrictions	Restrictions
Private gardens and lawns	No sprinkler or other irrigation system, other than a dripper system may be used. Watering of lawns not permitted. A hand-held hose fitted with a trigger nozzle, a bucket or a watering can may be used to water plants between 7.00am and 10.00am and between 7.00pm and 10.00pm on alternate days as per the 'odds and evens' system. At all times gardens may only be watered without causing pooling or run-off.	External watering of lawns and plants only permitted using non-potable water.
Vehicles	No washing of any vehicle except at a commercial car wash that recycles water and holds an exemption allowing the use of potable water. Boat motors may be flushed or rinsed after use	No vehicle washing. Boat motors may be flushed or rinsed after use

Table 4 : Precis of the differences to the household of Stage Three and Four Restrictions

Holding back the need to move to Stage Four Water Restrictions

As the dam storage levels approached the 30% level a new, more rigorous public awareness campaign was conceived to prevent the need to proceed to Stage Four Restrictions. Actew Corporation announced : "Like most of

Australia, the ACT has experienced drought conditions over the past six years and inflows into our catchments have been down by 63% from the long-term average, and almost 90% less in 2006". (Actew publication *Preparing for Stage 4 Water Restrictions* copied from the Internet on 4 April 2007).

At the suggestion of the Chief Minister, Jon Stanhope, MLA, Actew Corporation and the ACT Government trialed the use of variable (electronic) message signs to provide a daily prompt to road users to conserve water. In December 2007 five variable message signs were sited on major exit roads from the City of Canberra in the ACT. The signs confirm that the prevailing Water Restriction is at Stage Three.

In deciding the target for reduction in water consumption to be achieved and which Stage of temporary restrictions should, therefore, be in force, Actew Corporation may have regard to the several factors that are shown in Table 5. The source of this data is the ACT Government Think water, act water policy document published on the ACT Government website (4 April 2008).

The factors to be considered in assessing water use restriction stages
1. Dam storage levels 2. The time of the year and likely future consumption of water 3. Daily consumption levels in the immediately preceding period 4. Daily consumption levels in corresponding periods in previous years 5. Currently available weather forecasts and other meteorological advice 6. The desirability of reducing water usage on an ongoing basis 7. The desirability of avoiding excessive reliance on only one of the ACT's water catchments 8. The possibility that, if restrictions do not sufficiently reduce current water consumption, water available for later supply maybe of a quality that may cause damage to property 9. Any other relevant consideration

Table 5 : The factors that have to be taken into account by Actew Corporation in determining any change to water restrictions.

Anecdotal evidence.

In investigating whether the public were taking note of these signs, I was initially informed by personal anecdotal evidence.

Anecdotally the electronic road signs seemed to have the attention of the general public. They and the daily messages they convey appeared to have become part of the prevailing ACT psyche. Casual conversations about the signs generated comments such as :

"*I picked up my parents from the airport after their holiday. My Mother, when we passed a sign immediately enthused 'Great, I see Canberra has had some rain'. I was not previously aware that that she had even seen the signs*". [A fellow student].

"*I always sit the side of the bus where I can see the signs*". [An acquaintance].

"*I am not sure the wording is appropriate. I believe the word 'target' is too challenging. I wonder if, when the observer notes the fact that the target has not been met he / she is encouraged to become profligate in the use of water in the garden to make sure we meet the target. We have talked it over but the word 'aim' has almost the same meaning as target*".
[An elected Member of the Legislative Assembly, who also advised that the use of the signs was never a political issue in the Assembly. It was a decision of Actew Corporation, with the (financial) support of the ACT Government, Department of Territory and Municipal Services].

"*Have you noticed that the even-numbered houses seem to use a lot less water than the odd-numbered houses*". [A colleague].

"*The signs would be much more effective if the wording was in upper and lower case. Travelling at any speed past the signs word recognition is easier with lower case*". [A retired public-servant].

The signs were also used to make a political comment in an article in *The Australian* of 18/19 October 2008, page 3, Election Day in the ACT :

> "... after the cyclist, the next ideological obstacle in the way of my commute is the huge electric road sign informing me and my fellow Canberrans how full our dams are today, what our target should be and how much in percentage terms we are over or under the desired target of water and utilities Big Brother ACTEW ...And people are fed up, specifically with Stanhope. They are weary of the ideological bent of his Government, of the exhortations on electronic billboards and expensively produced television propaganda".

[Commentator Angela Shanahan. Her article was entitled '*It's curtains for common sense in Nohoperstan*'].

Purpose of the Study.

Variable message signs have not been used previously in the ACT to express an affirmative message. The purpose of this study was to determine whether the signs have done the job intended for them, in reminding road users of the water conservation message prompting them to take further action to save water in and around the home and where they can. The study deliberately sought opinions, though 'open' questions to respondents, on the broader issues related to water use and conservation, such as whether we can determine how well the road user understands of all the issues and what more we, as residents might do or what the ACT Government might have to do. How have the signs been accepted? Do the residents of the ACT see the signs as an encroachment upon their freedom of choice?

The study, therefore, looks at behavioural change through this initiative at the community level. Generically this has become recognised as community-based social marketing, and an addition to a solely information-based campaign.

The research question for this study is :

Are road users seeing the message and is it changing their behaviours of water use?

Before embarking upon the study I consulted with both the ACT Government and Actew Corporation to determine that they had not, or were not planning, to ask the research question for themselves. One outcome was that Actew Corporation provided research results from surveys conducted as a follow-up to their continuing advertising campaigns. Their March 2008 results are described in Chapter Two. Marlene Stolt, of Actew Corporation, requested that specific two water conservation options, (those of the gardeners' change to drought resident plants and the use of drip irrigation), be included in my study to complement their research findings. She was keen that the study investigate which water use habits have changed, as a result of exposure to the messages conveyed through the road signs. Actew Corporation anticipated that my research would confirm and justify results from their own, on-going telephone surveys. The comparative results are analysed in Chapter Five. Meetings with the ACT Government, the Departments of the Chief Minister and of Territory and Municipal Services were less fruitful but both Departments did ask to be kept informed of the results of the study.

Overview of Method.

A questionnaire was chosen as the preferred methodology to involve a general sample of ACT residents. A hardcopy questionnaire on two sides of a single page was used for a pilot survey to determine the appropriateness of the questions.

The main survey was conducted via an on-line survey using the ANU Apollo facility. Hardcopy questionnaires were also available if the respondent was not able, or wanting, to use the on-line facility. Content analysis using key-

words and phrase-matching techniques were used to code answers into manageable categories to evaluate the responses to the open-questions.

Subsequent to closing the survey Actew Corporation was again consulted and a new set of their own telephone survey results was received. The Actew November 2008 results attempt to determine the 'usefulness' of the information shown on the electronic road signs and asks whether ACT residents want Actew to continue to provide the daily updates. These additional results test the validity of this study and are described in Chapter Five.

Significance of the Study.

As recorded in previous Actew Corporation (telephone) survey results ACT residents are aware of the need for water conservation. This study tests the validity of the Actew Corporation findings and examines different aspects of behavioural change. Actew Corporation and the ACT Government will receive copies of the study results.

The study explores the different habits that have been changed to conserve water. This has wider significance for water conservation policies elsewhere.

Limitations of the Study.

Initially the ACT Government and Actew Corporation contracted to use the five electronic signs for the 'Summer' period December 2007 – February 2008. These two sponsors believed the signs were having a positive effect on usage and the scheme was extended for a further three months. Further extensions have seen the signs in place during all of 2008.

At first, therefore, it appeared that this research into the effectiveness of the electronic signs would be a 'case study' of a limited time phenomenon and focusing upon the shock-effect of the signs. The extended installation of the

signs has changed the study. The focus became a close look at the effectiveness of the signs as a component of the on-going awareness programme conducted by Actew Corporation who are pursuing the total water conservation programme through television advertising, specific publications and notices, mail-drops, poster advertising and the placing of editorials and advertising in *The Canberra Times* and local newspapers.

Overview of the Thesis.

The current ACT Government has followed a policy of water awareness through its programme *Think water, act water*, published in three volumes in April 2004. The rationale for the programme is analysed as a part of this study. Studying the history of water in the ACT and water use shows that the availability of water was a concern for the Federation planners prior to their choosing Canberra as the National Capital in 1913.

As described in Chapter Two the available but limited literature review covers a wide range of disciplines. Challenges to the research question in the literature are discussed.

In Chapter Three the research methodology chosen for the study is examined.

Chapter Four details the research findings and results from the survey.

Specific conclusions, limitations and recommendations for taking the research further are discussed in Chapter Five.

In the next chapter the relevant literature is reviewed.

Chapter Two : Review of Related Literature

Introduction :

The examination and determination of related literature was conducted on four levels :

- the background to the availability of water in the ACT,
- Government policy, the road signs' sponsors' documentation and the situation leading to their decision to install the signs as a tactic to prevent the need to impose a more severe level of water use restriction. The three main agents for such impositions are :
    - The Commonwealth of Australia
    - The ACT Government
    - Actew Corporation
- Social Marketing theory as a guide to assessing the signs as a medium of science communication, and
- other relevant information such as :
    - consumer behaviour and persuasion
    - the effective design of posters and poster research
    - public events
    - a set of "Living Green" postage stamps issued by Australia Post during August 2008.

1. The background to the water shortages current in the ACT

The possibility of water shortages in Canberra was evident to observers during the selection phase of the Federal Capital and before the actual announcement of Canberra as the preferred site in 1913.

The six independent Colonies of Great Britain in Australia decided to amalgamate into one Federation which came into being in 1901. There was always a rivalry between Melbourne and Sydney that necessitated an independent site for the federal city. The Constitution of 1901 stipulated

that the capital be "not less than 100 miles from Sydney". By 1907 there was strong support for a site in the Yass-Queanbeyan area. In 1908 The New South Wales Parliament selected Yass-Canberra at its choice. The next step was to define a site. The instruction to the NSW District Surveyor Charles Scrivenor was to find a site meeting the criteria :

> "The Federal Capital should be a beautiful city, occupying a commanding position, with extensive views and embracing distinctive features that will lend themselves to a design worthy of the object, not only for the present but for all time."

The history that has afforded the most background is Roger Pegrum's The Bush Capital: *How Australia chose Canberra as its Federal City*, (1983). Additional insight was gleaned through discussions with David Headon, currently the Advisor to the *Centenary of Canberra* project. He told me that the politicking that took place to decide the new Federal Capital was intense. Dr. Headon has devoted one of his history segments on the ABC's '*Stateline*' programme to the contest between Canberra and Dalgety. Two quotations from Pegrum : "Canberra – much of which was originally beyond the boundaries of permitted settlement" and "Modern city speedily grafted on to a rural district", set the scene for the competition between Victoria and New South Wales.

The Bulletin of the day was an interested commentator and editorially favoured locating the federal city in the Dalgety area of Victoria. During the six year selection period of 1907 and 1913 prior to the Canberra announcement being made public it carried many of the conflicting opinions. Many comments reflected a fear that the Yass–Queanbeyan area was too dry to sustain the new federal capital. A cartoon from *The Bulletin* in 1912 is shown as Figure 6.

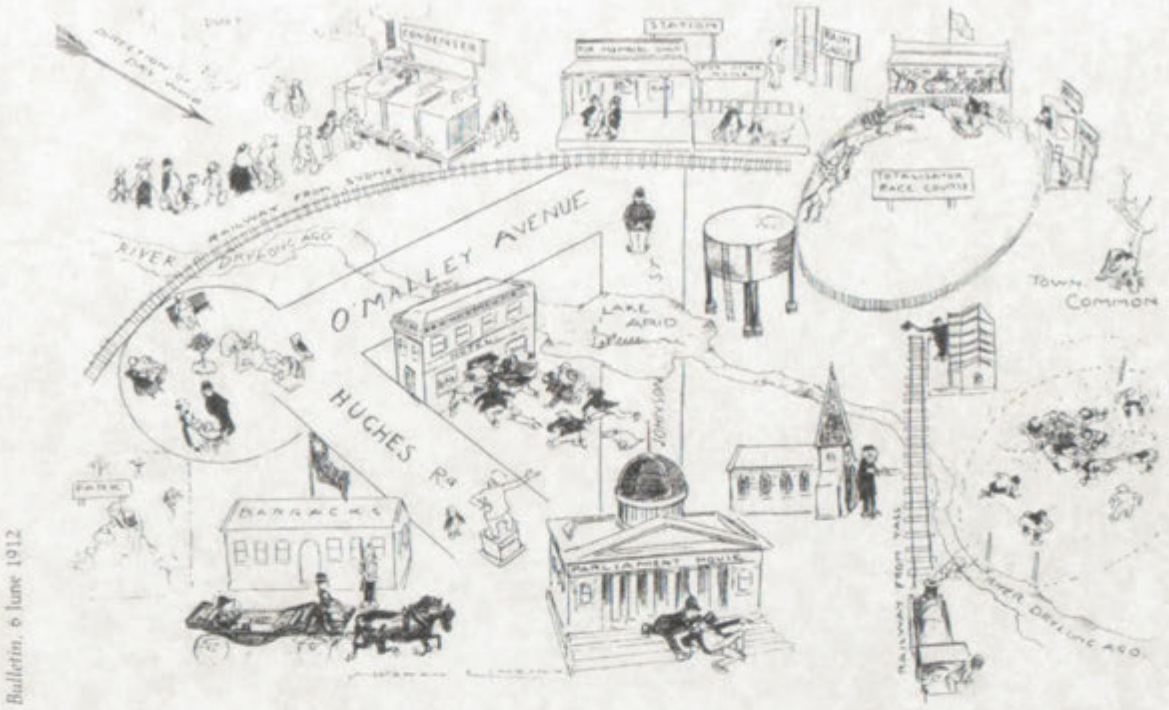


Figure 6 : Cartoon by commentator Norman Lindsay published in *The Bulletin* on 6 June 1912.

Mr. Lindsay's design for the Federal Capital includes geographic features labeled River Drylong Ago, Lake Arid with climatic notes, direction of dry wind and dust. It is also interesting to notice residents queuing for water with their buckets at a water condenser. Prophetic indeed. The railway has not developed to the extent envisaged. Two of the politicians recognisable in this cartoon have suburbs named after them rather than street names. Those politicians are King O'Malley and Billy Hughes.

Looking chronologically from the inception of the Federation to the choice of Canberra it is obvious that the future water supply was a real concern and the counter-arguments of the proponents of the two contender sites were publicly discussed and taken into consideration by the Senate Committee tasked with the choice. In an edition of *The Bulletin* during 1907 John Gale, comparing the merits of the Dalgety and the Yass-Canberra candidatures as the federal city, wrote "We have shown that in every essential factor Canberra stands unrivalled. It possesses (a) water supply for all possible requirements", (Gillespie, 1988, p 242).

The comparison could not be stronger with *The Bulletin* of 6 February 1908 declaring "The Canberra site for the Federal Capital advocated by NSW State Premier (Charles) Wade, lies 16 miles from this trickle of water, (Cotter Creek). And it is to depend on the trickle for its entire water supply".

A later *Bulletin* included a statement on the quality of the water that might be available. "The Cotter River flows through sheep and cattle country, and when, after heavy rain, it swells for a few hours to the size of a baby torrent, it brings down manure, diseased cows and other carrion. It is never quite dry, and never wet enough to be a serious danger to a sober pedestrian". (Gillespie, 1988, p 243).

Sir John Forrest, former acting Prime Minister, in June 1907 stated "Canberra possessed nothing of particular importance in either scenery or great natural features...there are no rising knolls for public edifices...the site is not visible till you get near it, while the view from it is not commanding". "Canberra was also inferior to Dalgety", reported Forrest, (to Prime Minister Arthur Deakin), "on the grounds of water supply and electricity, and in the matter of accessibility it was less attractive", he said, "because it was closer to Sydney than it was to Melbourne" – precisely the reason why the Sydney men wanted Canberra and did not want Dalgety. (Pegrum, 1983, p 131).

NSW Premier Carruthers was disappointed with Forrest's dismissal of Canberra. He was reminded that the advice of the 1901 congress was that an inland federal city should contain a large body of water for both ornament and recreation, and he was assured by State engineers that a dam across the Monongo River could retain an extensive lake on the floor of the valley. Support for Canberra and Carruthers came unexpectedly from John Watson who publicly deserted the Dalgety site selected during his short term as Prime Minister and declared himself in favour of Canberra. (Pegrum, 1983, p 131).

Sydney interests who had clung tenaciously to the idea of a federal territory in the western districts turned their eyes south towards Canberra which was only a few miles further from Sydney and which still had some rivers flowing. (Pegrum, 1983, p 133).

The supporters of the Southern Alps said that Canberra had an unreliable water supply, but the Sydney press published many charming pictures of the Mononglo River near Canberra and said that Dalgety might have a "good lot of water but not a lot of good water". (Pegrum, 1983, p 135).

In relation to this narrative it is crucial that in 1908 – 1909 the New South Wales District Surveyor, Charles Scrivener, was seconded to the Commonwealth and appointed Surveyor for the new capital. The instructions to Scrivener stipulated the site should be chosen with a view to securing picturesqueness, and also with the object of beautification and expansion. In his first report he wrote "The Canberra Valley approaches nearer to what is required than any other I have inspected in the Yass-Canberra district. Water for drinking could be brought by gravitation from the Cotter River, and the flood plain of the Mononglo River could form an ornamental lake in the centre of a city site".

Armed with Scrivener's second report, Deakin wrote in July to Premier Gregory Charles Wade, suggesting that New South Wales agree to surrender the land shown on Scrivener's plan and confirm at the same time that New South Wales would grant the Commonwealth some land at Jervis Bay and the right to use the waters of the Snowy Mountains to generate electricity for the federal territory. So impressed was King O'Malley, the Government Home Secretary, with Scrivener's recommendation that he flamboyantly observed "Moses, thousands of years ago, as he gazed down on the promised land, saw no more (a) panoramic view."

Charles Wade was most unwilling to hand over Queanbeyan and its river but, in exchange for Queanbeyan and all the land to the east of the railway line, offered to throw in the catchments of the Gudgenby, Naas and Paddy's Rivers to the south of the city site and agreed to do nothing to pollute either the Queanbeyan or Mononglo Rivers. Deakin agreed to Wade's offer, which produced a federal territory with an area of about 912 square miles. Wade also offered the rather disappointing area of two square miles at Jervis Bay but, by the time that transfer took place in 1914, New South Wales had increased the federal land there to 28 square miles. New South Wales also agreed to allow the Commonwealth use of the Snowy for electricity. Only the Cotter river, a narrow tributary of the Murrumbidgee, seemed to Scrivener to combine the two benefits of water purity and reasonable proximity to a valley in which a city could be built.

In May he submitted his second report, defining a federal territory of about 1,000 square miles. He included the catchment of the Cotter River in order that a pure water supply might be placed beyond doubt, but recommended also that the territory include the catchments of the Queanbeyan River and the Mononglo River to prevent them from being polluted before flowing through the city site.

Charles Scrivener had recommended the inclusion of the catchments of the Mononglo and Queanbeyan Rivers, but New South Wales offered a larger area to the west of the railway line instead.

The final extent of the federal territory is shown by the heavy line on the sketch map shown below (Figure 7). The small hatched square is the proposed city site on the Mononglo River.

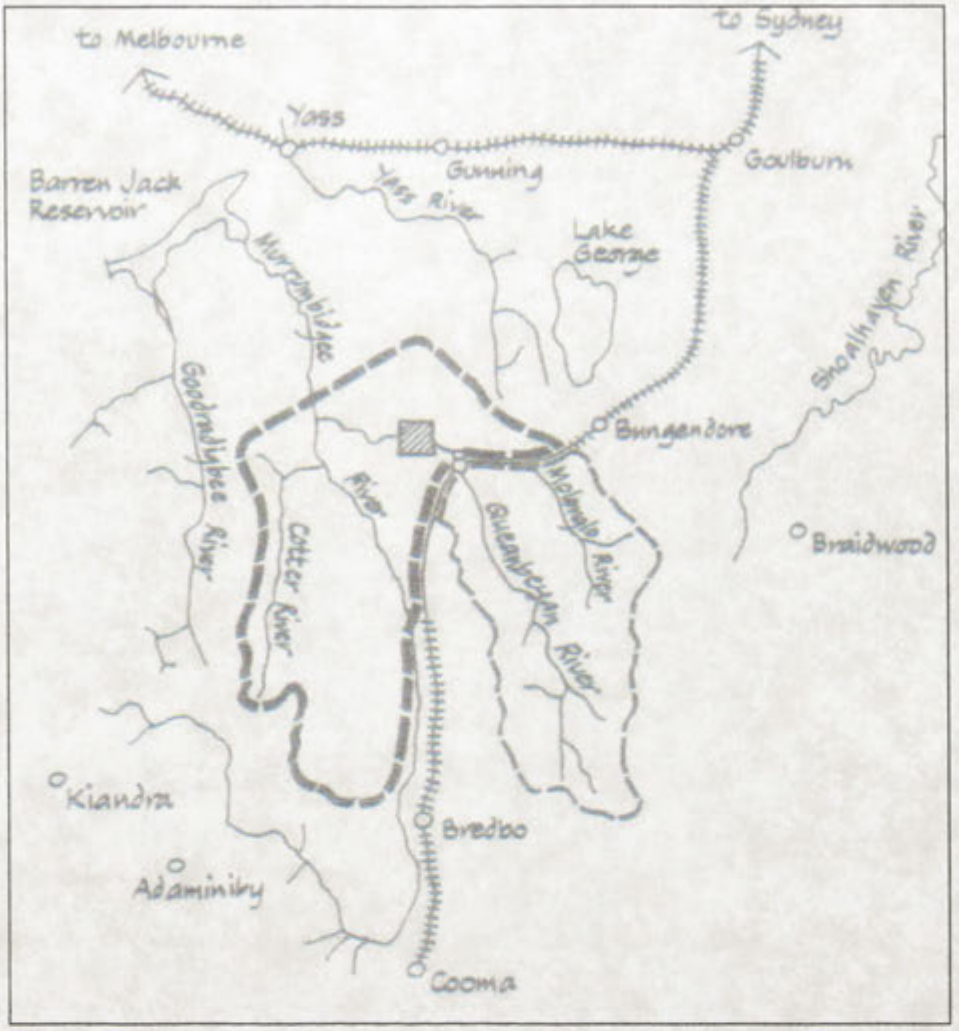


Figure 7 : A diagram map showing the final allocation of territory to best provide water to the ACT, (and meet the political requirements of 1914).

Water to sustain a city, therefore, was a major consideration in the selection of Canberra as the federal city.

It is significant, however, that in assessing the water situation in Canberra in 2007, we need to recognize that annual rainfall for the past seven year period has been one third of the long term average in the water catchment areas. The annual inflows into the three dammed reservoirs / catchment areas of the ACT are shown in Figure 8.

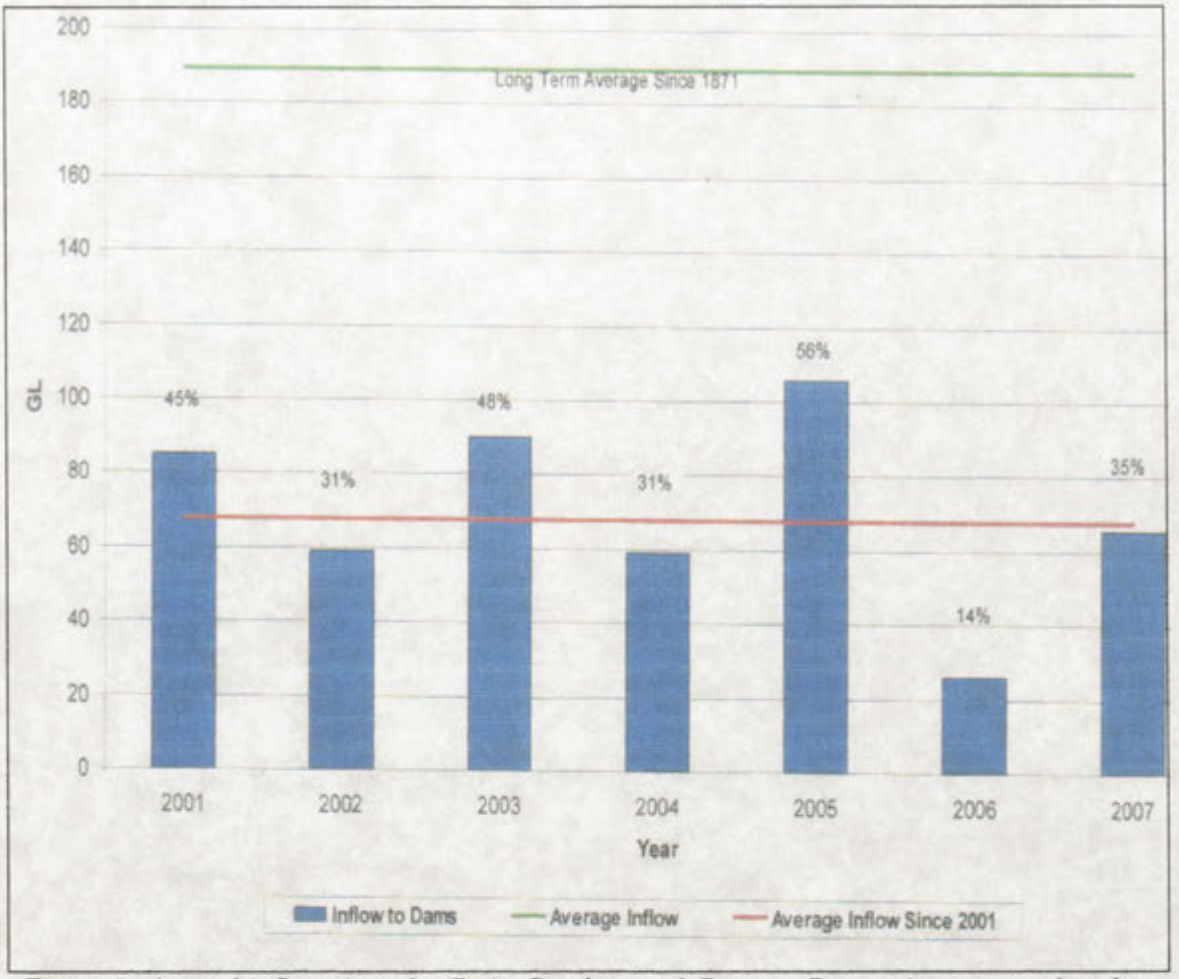


Figure 8 : Annual inflows into the Corin, Bendora and Googong Reservoirs compared to the long term average inflows since 1871. (Source : Actew Corporation : Ms. Marlene Stolt).

On 10 April, 2008 Marlene Stolt, Communication Manager of Actew Corporation was a guest speaker at a regular CPAS Thursday evening seminar. I spoke to Marlene after her presentation and she gave me a copy of her complete set of slides. The two figures and three tables included in this chapter are from this presentation. (Figures 8 and 9, Tables 9 to 11).

On the next page is a sketch map showing the ACT and its water catchments illustrating the four dam catchment areas. (Figure 9).

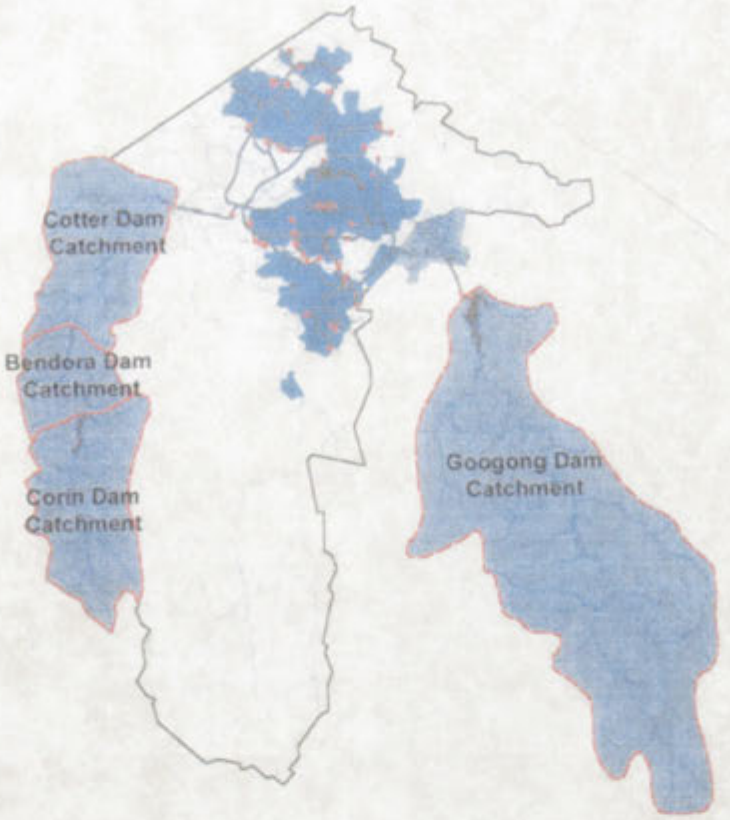


Figure 9 : The ACT water network (Source : Actew Corporation : Ms. Marlene Stolt).

Government Policy

The Commonwealth and ACT Governments have well documented their concerns to ensure the continuing availability of potable water to all potential users, in formal policy statements and in legislation. The provision of water in the ACT is the responsibility of the Actew Corporation. Actew provide documentation, in hard copy and through its web site, of the prevailing water restrictions and the day-to-day water situation, including the provision of this data via the electronic road signs.

The Commonwealth of Australia Government's long term plan, *Water for the Future,* 2004, describes strategies to secure water supply because "Climate change is causing water shortages that pose a serious threat to our economy and way of life. The Government is committed to investing $12.9billion over ten years through its *Water for the Future* initiative" to address four key priorities which have been detailed in Chapter One, (p 3).

In April 2004 the ACT Government published their *Think water, act water* policy statement.

The Chief Minister, (Jon Stanhope, MLA) wrote in his forward :

> The absolute necessity of effective water resource management in the ACT has never been clearer than it is now. We can no longer treat water the way many of us have in the past. Even before the drought and the bushfires, the Government was looking to the future for water, through the development of *The Canberra Plan*, which provides a long-term strategic vision for the ACT. The water resources strategy, *Think water, act water* and accompanying Implementation Plan, provides a framework for partnership between the community and the government in managing, using and conserving the water resources of the region". (p 1).

Volume 1 of the Policy Statement, *Think water, act water,* includes the following graphic. (Figure 10).

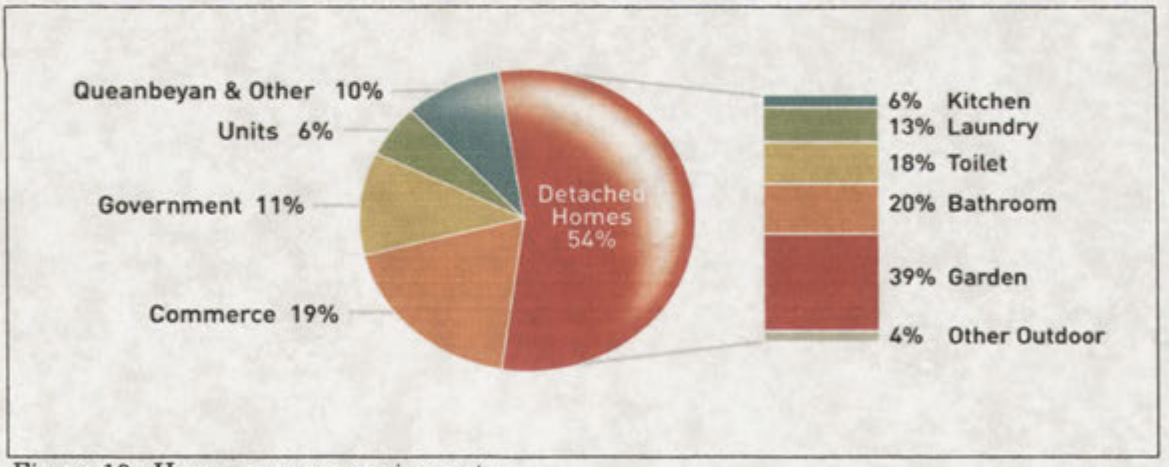


Figure 10 : How we use our mains water.
Source data from Actew Corporation, *Think water, act water*, Volume 1, (p 22).

This data shows that residents in detached houses use more than half the water consumed in the ACT. The major contributor to domestic consumption is potable water used in the garden. The various stages of water restrictions imposed upon ACT residents have, therefore, been targeted to detached homes and, in particular, water used on gardens.

Volume One of the *Think water, act water* document states : "Water use in the average Canberra home could be significantly reduced by installing water efficient appliances, avoiding water wasting practices, installing a rainwater tank, using greywater and having an efficient garden". (p 30). Adapted by Actew Corporation from *The Water-efficient Garden*, (van Dok, 2002).

The estimated use of water in a water efficient and conventional home, taken from *Think water, act water*, Volume 1 is shown in Figure 11.

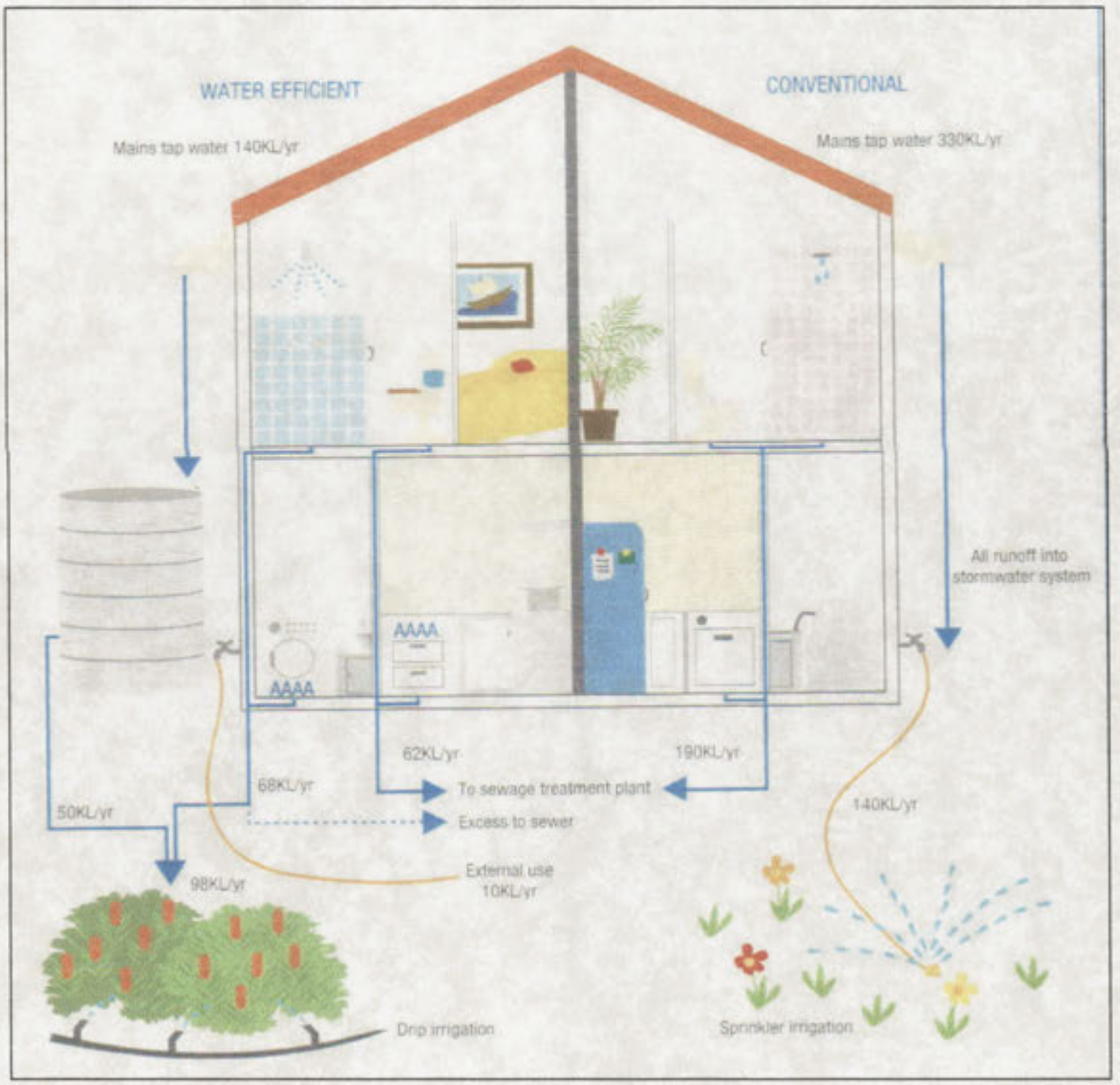


Figure 11 : Water use in a water efficient home and conventional home. (*Think water, act water*, Volume 1, p 30).

The current set of documents issued by Actew Corporation that specifies the prevailing Stage Three water restrictions is available through the Internet www.actew.com.au. The set is listed in Table 6.

Actew Corporation documents
1. Statement of Corporate Intent 2. Water Pricing Schedule 3. Sewerage Pricing Schedule 4. Future water options reports 2005 5. Water Security Review Reports 2007 6. A selection of Photographs related to Actew's business 7. Declaration of Stage 3 Water Restrictions 16 December 2006 8. Minister's Approval of Water Conservation Measures

Table 6 : List of Actew Corporation documents describing the water restriction regime in the ACT

Other Actew Corporation notices

Actew Corporation is consistent with it's notices / advice to ACT water users. Multiple sources of information and distribution are used, such as *The Canberra Times*, their own web-site and other publications to distribute the water conservation message, of which the road signs are a part. There are three aspects of the total communication aspect that were monitored during the study. The first has been the Saturday edition of *The Canberra Times,* confirming the messages that have been given on a daily basis by the road signs. The second was the notification, (within the *Save water for life* booklet), of the individual targets for every resident of the ACT. The individual daily targets and each household's water usage against the target are also confirmed in the householder's quarterly *Water and Sewerage account*. These three notices are described below.

i) 'STOP THE DROP' weekly report in *The Canberra Times*. An Example is shown in Figure 15.

The Saturday morning edition of *The Canberra Times* carries, on page two, a regular report with the banner : "STOP THE DROP". This records the daily water use figures compiled during the previous week, the daily dam levels and the average daily use with comments upon any rainfall. The figures are not always accurate but are another continuing reminder to the ACT resident to conserve water. During the study I noticed several typing errors and on one occasion the previous week's report was printed in error, but the few mistakes were obvious to the diligent reader. The report also averages the daily consumption for the week and compares this to the target figure. A general observation on any rainfall during the week and the weekly average completes the report.

STOP THE DROP

Mandatory Stage 3 water restrictions currently apply in the ACT.

Water Consumption and Dam Storage

Our target average daily consumption for autumn under Stage 3 is 112ml per day.

Our average daily consumption for the last week has been 130ml per day which is above target.

Date	Dam Storage (%)	Consumption (ML)
April 4	475	115
April 5	474	130
April 6	474	142
April 7	474	126
April 8	473	124
April 9	473	132
April 10	473	139
April 11	472	

Rainfall

Rainfall to date for April at Canberra Airport has been 2.6 mm*; the expected average for April is 46.4 mm*.

*Bureau of Meteorology

The 12 April 2008 report confirming the data shown daily on the variable message signs at the five main road locations within the ACT.

Figure 15 : A 'STOP THE DROP' report
(*The Canberra Times*, 12 April 2008. p.2)

ii) The individual resident's daily water target

Table 7 is reproduced from the Actew Corporation *Save Water for Life* booklet. The accompanying text reads "Here's what you should aim for, but remember, less is always better". The table nominates the targeted daily water use under all four possible stages of water restriction for each of the four seasons. It is interesting to note that in November 2008 the ACT target was 200 litres per day per person – the target for Victoria was 155 litres per day per person.

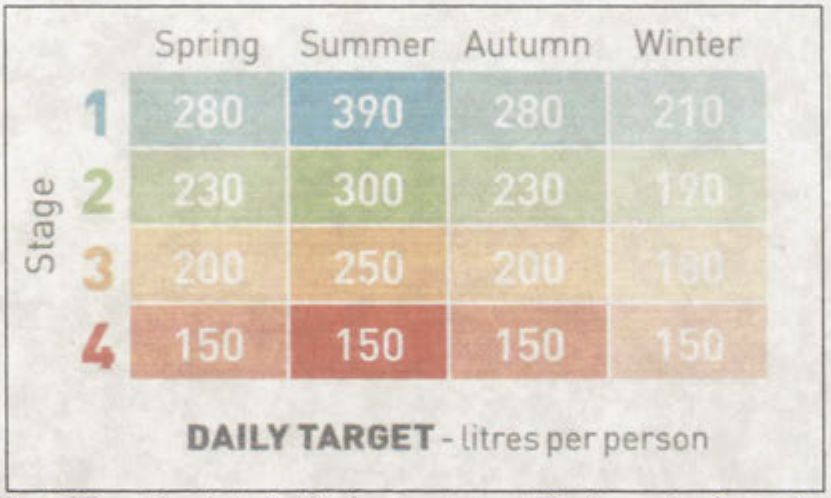


Table 7 : The ACT resident's individual water target. The 'stages' refer to the prevailing level of water restriction. (*Think water, act water* Volume 1, 2004, p.22)

The Think water, act water, Volume 1 : Strategy for sustainable water resource management in the ACT continues :

> If no action is taken now, based upon the current population projections and per capita consumption, existing water supply infrastructure is expected to meet demand until we reach a population of about 405,000 people, anticipated about 2017. However, this expectation does not take uncertainties, such as reduced rainfall, reduced catchment yields as a result of bushfires, unexpected population growth, or any future decision to extend cross-border water supply into account. (p.22).

Canberra's per capita water consumption is 20 percent less than it was in the early 1990's following changes to pricing and education campaigns. (p.23).

iii) The householders' quarterly account for water and sewerage

The example reproduced below is from my own (edited) tax invoice dated 18 October 2008 and shown as Figure 13.

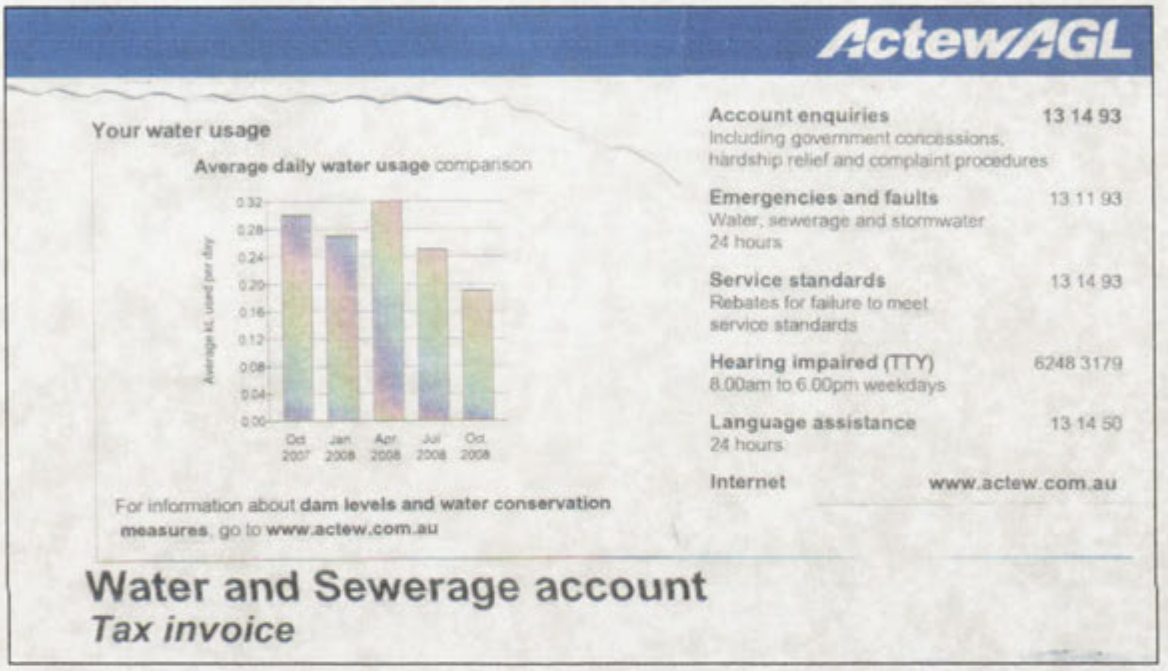


Figure 13 : The average daily water usage as shown on the quarterly Actew water invoice.

My average daily water usage is just less than 200 litres each day for the quarter ending October 2008. In my household, of two persons, the target is 2 x 200 litres. A good result, no doubt influenced by what I have learned through this study.

Actew Corporation communications strategy

As presented by Marlene Stolt to CPAS on 10 April, 2008, the communications strategy of Actew Corporation is encapsulated within an ultimate objective and four additional points. (Table 8).

Actew Corporation communications strategy
1. Achieve target savings to sustain supply 2. Target the whole community 3. Focus on residential irrigation 4. Display law as easily understood rules 5. Time with peak consumption periods

Table 8 : Actew Corporation communications strategy for water conservation (Source : Ms. Marlene Stolt).

The Actew Corporation 2003 demand management plan has the ambition of achieving a phased target reduction per person in the ACT as shown in (Table 9).

Actew Corporation demand management targets
1. 12% by 2013 2. 25% by 2023

Table 9 : Actew Corporation demand management plan. (Source : Ms Marlene Stolt).

The Actew 2008 evaluation of their strategy was very positive. Actew Corporation estimate that there have been total water savings of 130 gigalitres, or two years of consumption at the old levels of use. In other words had restrictions not been in place the ACT dams would already be empty. Actew Corporation have also conducted market research, (telephone surveys of 350 residents). A precis of results is shown in Table 10.

Abstract of Actew market research during the years 2005-2008
2005 : 98% of participants said they were aware of the *Stop the Drop* campaign. Of these 77% said the campaign had at least some impact on their consumption behaviours. October 2007 : 81.8% of respondents correctly identified Stage 3 Water Restrictions were in place without being prompted. December 2007 : 66% of respondents said they had introduced new water saving actions as a result of information from *Save water for life* material. Of those who recalled receiving the *Save water for life* booklet, 86% had read at least some of the booklet. March 2008 : 89% of respondents had noticed the electronic road signs. Of these, 80% thought them a useful tool.

Table 10 : The set of survey results presented by Actew Corporation at CPAS.
(Source : Actew Corporation : Ms. Marlene Stolt).

It was particularly interesting to note that in March 2008 the respondents to the Actew research were seeing the road signs and four in five thought them a useful tool. These results provided a useful point of triangulation for this study.

Additional input from Actew Corporation.

Actew Corporation were asked to provide their latest research data of the public response to the electronic road signs on Monday 10 November 2008. The following was received by e-mail from Marlene Stolt the same day.

"Respondents were asked about specific components of Actew's information campaign - electronic information boards that have been placed alongside Canberra' s major roads, and the orange Water Report advertisement notice, placed in Canberra's two main newspapers.

The vast majority of respondents recalled having seen the roadside information boards (89% were sure they had noticed them, while 1% thought they had - see Figure). Awareness of the information boards was considerably lower in South Canberra (67%) than elsewhere, and highest in Tuggeranong (93%).

One-quarter as many residents recalled having seen the Water Report advertisement notice (22%). Awareness of the advertisement was uniform across most districts but particularly low in Gungahlin-Hall (12%) and high in Weston Creek (32%).

More than two thirds of those who had not seen the advertisement indicated that this was because they never or rarely read either of Canberra' s Newspapers

It's likely that the different media have an impact on different demographic groups - in particular :Age groups: Information boards were less frequently noticed by older residents (from 96% of residents aged under 35, to 82% of residents aged 55 and over while the newspaper notice was more frequently noticed (from 5% of residents aged under 35. to 37% of residents aged 55 and over).

Income brackets: Households earning under A$40,000 per annum were more likely than higher-income households to have seen the newspaper notice (31%. compared to 17-25% for higher income brackets, and less likely to have noticed the information boards "63% compared to 89-99% of the higher income group).

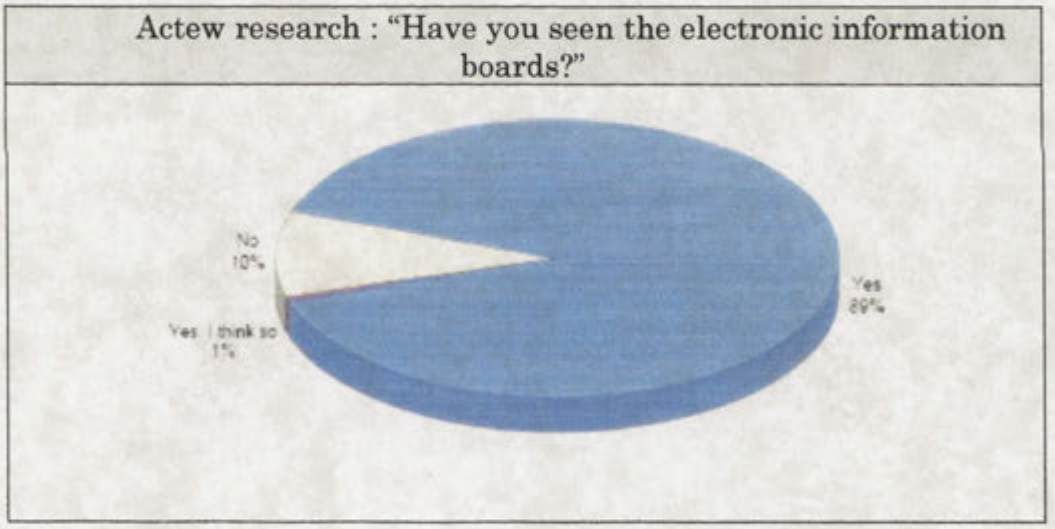


Figure 14 : Have you noticed these electronic information boards?
Base: All respondents (n=360). (Source : Actew Corporation : Ms Marlene Stolt).

The e-mail continued :

"Perceived value of Actew's information

Respondents were asked to rate the usefulness as an information source of both the electronic information boards and the Water Report. By and large both sources were found useful by the people who recalled seeing them, with 53-62% saying these

notices were useful either 'always' or 'most of the time', and only 6-8% indicating that they were 'never useful'.

Older respondents, who are progressively less likely to have noticed the electronic information boards in the first place, are also progressively less likely to find them useful if they do notice them - with 33% of respondents aged 55 and over indicating they are 'rarely' or 'never useful (compared to 9% of respondents aged under 35).
Females were much more likely than males to find Actew's newspaper Water Report useful (72% of females indicating it was useful 'most of the time' or 'always', compared to 33% of males).
The following figure shows that most respondents (83%) believe that Actew should continue using its roadside information boards - with a majority of all respondents indicating that these displays should continue throughout the year, rather than just in summer.
Respondents aged 55 and over were more likely than younger respondents to say that use of the signs should be discontinued altogether (32%, compared to 11-14% of younger age groups).
Households on incomes of under A$40,000 per year were also the least likely to find the signs useful, and to wish to see Actew continue to use them.

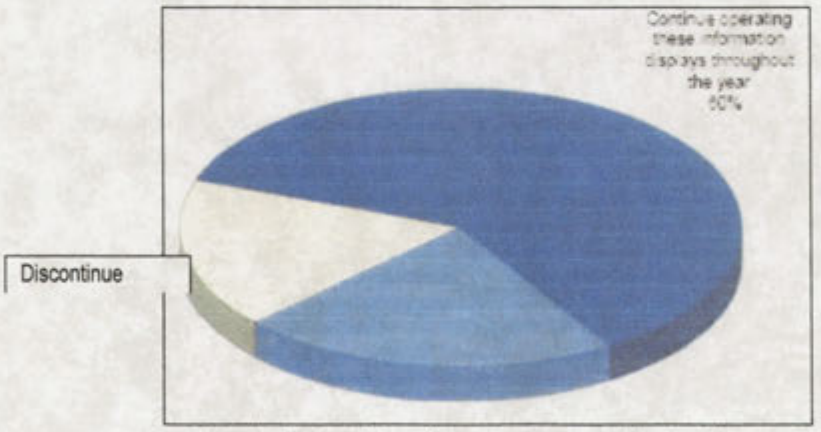


Figure 15 : Thinking about what Actew should do with these signs, would you like to see Actew retain or discontinue the electronic signs? (Source : Ms Marlene Stolt).

3. Social Marketing theory.

I have principally used one social marketing text within the study. This text, *Fostering Sustainable Behaviour* is an introduction to Community-

Based Social Marketing by McKenzie-Mohr and Smith, (1999) and defines sets of criteria, and check-lists for undertaking social marketing and seeking community behavioural change.

McKenzie-Mohr has produced a check-list of criteria for implementing behavioural change. These criteria were applied in this study (Table 11).

McKenzie-Mohr check-list sequence followed in the study
1. Uncovering barriers to behavioural change 2. Using commitment as an agent for behavioural change 3. Prompts for behavioural change 4. Using norms to encourage behavioural change 5. Effective communication and the 6. Removal of external barriers

Table 11 : The sets of criteria for defining effectiveness in the study. (Edited from McKenzie-Mohr and Smith, 1999, p vi-ix *Outline).*

All of these factors in Table 11 were considered to be important to this study. Each of these criteria has further exposition which enables a research plan to be devised. These are described below. Their use in this study will be explained in Chapter 3.

Doug McKenzie-Mohr and I communicated via e-mail, because I was most keen to learn if the variable message signs had been used elsewhere in a social marketing environment, (in other words as other than as road traffic warning hazard signs). He confirmed that he has not heard of any other projects using the variable message signs as a science communication device for issue of affirmative messages. McKenzie-Mohr recommended I ask the same question via his publisher's 'chat-room', (New Society Publishers of British Columbia, Canada). No-one has claimed to have seen signs used in a similar manner.

i) Uncovering barriers to behavioural change.

Doug McKenzie-Mohr follows a conventional approach to this subject, but it is included here for completeness as Table 12.

Uncovering barriers to behavioural change
1. Literature review 2. Qualitative research 3. Survey.

Table 12 : Sequence of events in uncovering barriers to behavioural change. (McKenzie-Mohr & Smith, 1999, p. 19-31).

Within this study it is not possible to evaluate the extent to which these steps were undertaken by the ACT Government and Actew Corporation. However, with the installation of the signs the opportunity is presented to evaluate their effectiveness under the several different headings recommended by McKenzie-Mohr and Smith.

ii) A checklist for reinforcing commitment as an agent for behavioural change

Why does seeking commitment to an initial small request work? There are likely two reasons. First, when people go along with an initial request, it often alters the way they perceive themselves. Second, we have a strong desire to be seen as consistent by others. Commitment as a behaviour change tool has been utilized in a variety of studies often with dramatic results. (McKenzie-Mohr & Smith, 1999, p. 58). The author's recommendations for this commitment stage are shown in Table 13.

Commitment as an agent for behavioural change
1. Emphasise written over verbal commitments 2. Ask for public commitments 3. Seek groups' commitments 4. Actively involve the person 5. Consider cost-effective ways to obtain commitments 6. Use existing points of contact to obtain commitments 7. Help people to view themselves as environmentally concerned 8. Don't use coercion, (commitments must be freely volunteered) 9. Combine commitment with other behaviour change techniques.

Table 13 : A checklist for reinforcing commitments as an agent for behavioural change. (McKenzie-Mohr & Smith, 1999, p. 58).

iii) Prompts as agents for behavioural change.

"Prompts are visual or auditory which remind us to carry out an activity that we might otherwise forget". (McKenzie-Mohr and Smith, 1999, p 66). In considering using prompts the following guidelines are recommended. (Table 14).

Prompts as an agent for behavioural change
1. Make the prompt noticeable 2. The prompt should be self-explanatory 3. The prompt should be presented as close in time and space as possible to the targeted behaviour 4. Use prompts to encourage people to engage in positive behaviours rather than to avoid environmentally harmful actions 5. Use commitment strategies and norms to encourage people to act on the prompt.

Table 14 : A checklist for using prompts towards behavioural change. (McKenzie-Mohr & Smith, 1999, p. 66).

iv) A checklist for using norms.

"Community norms support people engaging in sustainable behaviour. Norms guide how we should behave. If we observe others acting unsustainably, such as using water inefficiently , we are more likely to act similarly. In contrast, if we observe members of our community acting sustainably we are more likely to do the same". (McKenzie-Mohr and Smith, 1999, p. 80).

Recommended norms are shown in Table 15.

Norms as an agent for behavioural change
1. The norm should be noticeable 2. As with the prompts, the norm should be made explicit at the time the targeted behaviour is to occur 3. As with prompts, when possible use norms to encourage people to engage in positive behaviours rather than to avoid environmentally harmful actions.

Table 15 : A checklist for using norms as an agent for behavioural change. (McKenzie-Mohr & Smith, 1999, p. 88).

v) Effective communication.

> "All programmes to foster sustainable behaviour include a communications component. The impact of communications upon behaviour can vary dramatically based upon how the communication is developed". (McKenzie-Mohr & Smith, 1999, p. 101).

Table 16 lists recommendations for effective communications.

McKenzie-Mohr check-list for effective communications
1. Make sure that your message is vivid, personal and concrete 2. Explore the attitudes and behaviour of your intended audience prior to developing your message 3. Have your message delivered by an individual or organization who is credible with the audience you are trying to reach 4. Frame your message to indicate what the individual is losing by not acting, rather than what he/she is saving by acting 5. If you use a threatening message, make sure that you couple it with specific suggestions regarding what actions an individual can take 6. Use a one-sided or two-sided message depending upon the knowledge of your audience regarding the particular issue 7. Make your communication, especially instructions for a desired behaviour, clear and specific 8. Make it easy for people to remember what to do, and how and when to do it 9. Integrate personal or community goals into the delivery of the programme 10. Model the activities you would like people to engage in 11. Make sure that your programme enhances social diffusion by increasing the likelihood that people will discuss their new activity with others 12. Where possible, use personal contact to deliver your message 13. Provide feedback at both the individual and community levels about the impact of sustainable behaviours.

Table 16 : A checklist for assessing effectiveness of a sustainable behavioural change project. (McKenzie-Mohr & Smith, 1999, p. 101).

The electronic road signs are designed to persuade a change in behaviour by the person seeing and registering the message contained.

vi) Removal of external barriers.

External barriers to behavioural change exist if people think the new behaviour will be inconvenient, unpleasant, costly or time consuming.

Identification of presumed, real or imagined, fears allow the social marketeer to develop steps to remove those barriers.

Examples of barriers we might anticipate prior to the study include :

- A dislike of the electronic road signs and their being ignored
- ignorance, not knowing if the house has leaks in pipes and, therefore,wasting water
- not knowing if tap, shower flows and toilet flushes are excessive
- ignorance of all the water saving options.

Learning and understanding the barriers through this study will allow for recommendations to be made to Actew Corporation to overcome them.

4. Other sources of information.

i) Consumer behaviour.

The literature discussing 'Consumer Behaviour', in its many guises was interesting but not specific enough to be of use in this study. The lack of documentation on other water conservation schemes was disappointing but re-inforced the hypothesis that the Actew Corporation's use of the electronic signs for affirmative messages is unique. Asseil (1987), Blackwell and Engel (1982), Hawkins (1983), Loudon (1993), Mowen (1985), Schiffman and Kanuk (1990), Sheth (2002), Solomon and others (2005) and Tongren (1987) all review the processes involved when individuals or groups select, purchase and use products, services or experiences to satisfy needs and desires. They discuss changing attitudes through various elements of communication and persuasion but specifically not community schemes in any detail. Looking into the research on display and poster / billboard advertisements disappointed and did not provide relevant data.

ii) Road sign technology

Research on road signs from the Road Management Technical Centre was another disappointment. Facts derived from the Australian Transport Safety Bureau defined the rules and regulations for the positioning of the signs on the roadside. This was beyond the immediate scope of the study but

is mentioned in Appendix 8. The University of Queensland, Road Traffic Department, was contacted to seek guidance on the study. They asked that any results derived through this study be shared with them but could give no guidance.

iii) Design of posters.

The Internet was rich in giving advice on 'How to' develop posters. Some research is available for the effectiveness of posters in giving lifestyle advice. In the main the research has had a health bias as studied through the US National Library of Medicine.

> Do patients read health promotion posters in a waiting room? *(The British Journal of General Practice,* 1994).
> Of 319 patients attending a doctor over the study period 82% said they had noticed the posters, 95% of whom reported that they had also read them. Patients over 50 years of age were significantly more likely to say that they had read the posters than younger patients.
> Conclusion : Patients say they read and remember the subject of waiting room posters. Posters in the waiting room can increase awareness of health promotion issues.
>
> The effectiveness of waiting room notice-boards as a vehicle for health education was also discussed. (*Family Practice,* 1994).
> Two notice-boards carried between 1 to 4 topics over four study periods. 22% of questionnaire respondents recalled at least one topic. Increasing the number of topics reduced the number remembering each individual topic. Patients over 60 years were less likely to recall topics.
> Observation : The waiting room might best function not as an area where a captive audience can be bombarded with health promotion messages, but rather as a place for relaxation before consulting a health professional, making patients more receptive to health advice in the consultation.

This gives no hint as to how an ACT user will react to the road signs. The ACT road user will be occupied as either driver or passenger upon the total road situation when they pass the electronic road signs, and will not necessarily be relaxed at the time they pass the signs.

iv) Persuasion

Persuasion is a topic that has been considered in the Master's course and the classic text books, (Cialdini (2008) Hamilton (1992) and Sheth (2002), were of interest. But it was a '*New Scientist*' article of 10 May 2008 by Dan Jones and Alison Motluk entitled "*How to get exactly what you want*" that struck a chord with me and elucidated what I wanted to understand about the effectiveness of the road signs to contribute to an analysis that might be made of the signs. The headings within the article that have a relevance to this study are :

a) "*Look at it this way*"...

In this study we are dealing with static signs and a totally visual medium. The signs need to be and are visible in all weather conditions and the message is pertinent and personal.

b) "*Less is more*" – *if you want to persuade people by getting them to think positively about your message, idea, product or whatever, ask them to generate just a few positive thoughts – three at most – because that's easy and they'll feel confident about their positive thoughts*".

The road signs convey three messages conforming to what Jones and Mortluk (2008) are recommending. What will be relevant to this study is to determine if the time during which the road user is exposed to the messages is long enough? Some messages, if water usage is conspicuously more than the target figure will be, by implication, negative. Will this cause the reader to consciously use less water to make up for the deficiency?

c) "*Grind them down – subconscious*". "*Of course there is a form of mental exhaustion that does not require thought : nag them into submission. Children have got this technique sussed*".

The regular road user will, of course, become used to looking out for today's report on the water situation, a continuing reminder of their water responsibility. This study will determine whether the ACT road user feels he is being "ground down" by the constant reminders.

d) *"The medium is the means".*

The authors discuss here their observation that "women can be more likely be persuaded by a face-to-face meeting with another woman, while for men it is less confrontational if contacted via technology".

Do the electronic road signs confront? Might it be important that the driver will often be alone to contemplate what he / she has just seen?

e) *"Style over substance".*

Style was seen to be important. When hesitant language is used, people were less easily convinced.....even when the choice was logical. Style was especially important, the researchers found, when time was limited. (*Journal of Applied Social Psychology*. Volume 38, p. 37). "If you can't pay attention to what the speaker is saying..... you pay attention to how they are saying it". The messages conveyed by the road signs are very specific and it is not expected that style will be an issue.

v) Public Events

Complementing the Old Parliament House exhibition *Beyond Reasonable Drought* during Science Week 2008, the Australian and ACT Governments funded a well attended event on 21 August : *Back Paddock Dreaming.* Hosted by James O'Loghlin of ABC TV's *The New Inventors*, this event featured a lineup of respected thinkers, including Professor David Lindenmayer, Dr Mark Howden, Geoff Hyles and Professor Ian Rutherford. They took a closer look at sustainability in water, climate change, conservation, farming and biodiversity by describing their personal visions for a sustainable future.

Professor Rutherfurd stated "Security of supply measures have very little real effect on the use of water". Professor Rutherfurd was, of course, looking at the big picture particularly with reference to the water flows in 2008 of

the Murray-Darling waterways. However, in the context of this study this was noted for comment in Chapter Five.

v) Australia Post – A Prestige Stamp booklet

During 2008, and within the time span of the study, Australia Post issued a set of stamps and a prestige booklet of those stamps to promote "Living Green". A prestige booklet is sold at a premium, (largely for the avid stamp collector), and provides a back-ground to a standard stamp issue in addition to stamps unique to this format. I have assumed that these stamps may have been seen and used by the general public during the time of this study.

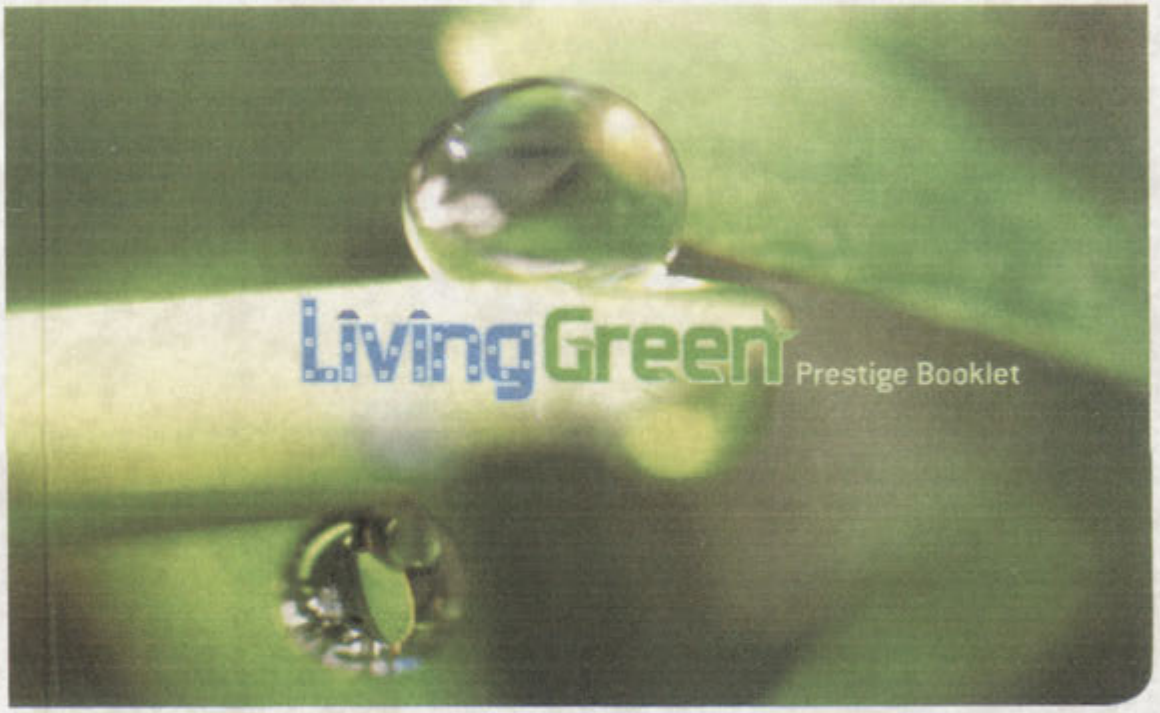


Figure 16 : The cover of the Australia Post Prestige booklet issued July 2008.

Within the booklet are five sections and a set of four stamps :

- Climate change the big picture
- Saving water
- Reducing waste
- Saving energy
- Travel smart

Figure 17 : The 50cent 'save water' stamp.

One stamp in the set of four stamps specifically targets the user to "save water."

Figure18 : The page of the booklet describing the need to save water

Figure 19 : Page of the booklet including four stamps for 'peel and stick' use.

Summary

A review of available literature should include what the study respondents are reading as well as what is useful to the research. Climate change and what the world should do to mitigate its effects is a topical subject. There have been many newspaper articles during the course of the study to prompt the ACT resident to conserve water. The electronic road signs are a daily reminder of the on-going situation and, with familiarity, the signs themselves have been used for provide a context for newspaper and magazine articles on the prevailing water shortages and drought. The electronic road signs are but one medium in expressing the need to conserve water in the ACT. These multiple sources of information cannot be addressed but need to be borne in mind throughout this thesis.

Chapter Three : Research Methodology

Introduction.

This study aims to understand whether the installation of signs detailing day-to-day water usage were seen and acted upon in the community.

The research question was defined to be :
Are road users seeing the (electronic road signs) message and is it changing their behaviours of water use?

The nature of the study changed during the course of the research. Actew Corporation installed the signs as a preventative measure and an attempt to delay Stage Four Water Restrictions in the ACT. The original intention had been to keep the signs in place over the summer period December 2007 through February 2008. The original concept was that the basis of the project would be a case study to investigate a phenomenon within a real life context, as described by Yin (1994).

Actew Corporation's research in March 2008 indicated to them that the road signs were successful at presenting 'community based' information to residents.
"89% of respondents had noticed the electronic road signs. Of these, 80% thought them a useful tool".
Retention of the signs and extending their use changed the overall approach from a case study confined to a short-term phenomenon to a study to determine the effect of the electronic road signs in promoting awareness of the continuing need to 'save water' as a part of overall advertising activities.

A frame-work for the study

"*Fostering Sustainable Behaviour, An introduction to Community-Based Social Marketing*", (McKenzie-Mohr and Smith, 1999), offers a framework for the design on this study. The framework includes :

i) The identification of barriers to community change and associated benefits.

ii) The tools of behavioural change that include commitment, prompts, norms, communication and incentives, the removal of external barriers and the evaluation of a community scheme.

> Community-based social marketing is based upon research in the social sciences that demonstrates that behaviour change is most effectively achieved through initiatives delivered at the community level which focus on removing barriers to an activity while simultaneously enhancing the activities benefits. (McKenzie-Mohr and Smith, 1999, p. 150).

This investigation seeks to examine whether people change behaviour as a consequence of seeing the ACT signs." The recommendations put forward by McKenzie-Mohr were classified under twelve specific headings, (Table 17), and formed the basis for the study design.

1. Are the signs a viable prompt to foster a sustainable behaviour change?
2. Can we determine effectiveness of the messages on the signs?
3. Are the messages vivid, personal and concrete?
4. Are the attitudes and behaviour of the intended audience understood.
5. Are the signs a credible medium?
6. Are the messages correctly framed for the individual ACT resident?
7. The signs give three messages, do these fit and tell a consistent story?
8. Are the messages easy for people to remember?
9. Are the community goals obvious?
10. Are behaviour change prompts obvious?
11. Are the messages personal?
12. Is feedback being provided to both the individual and community about the ongoing water resource issue?

Table 17 : Recommendations to be followed in assessing the effectiveness of the electronic road signs. (After McKenzie-Mohr & Smith, 1999, p. 101).

Selection of the research method

Three research methods available for society-based research are:

- observation
- focus groups
- survey

(McKenzie-Mohr and Smith, 1999, p. 23-43).

All three methods were considered as follows :

Observation :

> Observational studies involve watching individuals carry out a desired behaviour in settings that are as natural as possible. Since behaviour is observed directly this technique sidesteps the inherent limitations of asking people about their behaviour. Often when individuals are questioned via a focus group or a survey, their self-reports exaggerate the extent to which they engage in an activity. (McKenzie-Mohr and Smith, 1999, p. 23).

Despite a preference for this method, the observation option was discounted on the basis that some of the potential behavioural changes would be conducted within the privacy of the home.

Focus groups :

> Focus groups provide an opportunity to discuss in-depth the perceptions and present behaviours of community residents relevant to the activity you are planning to promote. A focus group consists of six to eight community residents....if volunteers there is a strong possibility that they are participating because they have a greater interest in the topic than others in the community. (McKenzie-Mohr and Smith, 1999, p 27-30).

Focus groups allow for an in-depth discussion of specific issues. Groups are led by a facilitator to guide discussion. It was thought that a focus group would not provide sufficient generalisable information to answer the

research question. A wider sample of residents was, therefore, required for this study.

Survey :

Under the general heading of 'survey' "several methods are available for obtaining reliable information on the current beliefs and behaviours of community residents regarding the activity" under study. "These methods are person-to-person interviews, a mailed survey and a phone survey". (McKenzie-Mohr and Smith, 1999, p. 30-43).

For this study the survey approach through a questionnaire available in hard-copy or online was chosen, to access as wide a potential audience as possible.

Initial consultations

It was considered mandatory that the two bodies who initiated the installation of the electronic road signs be consulted.

Consultation with Actew Corporation, who supply water on behalf of the ACT Government, elicited research results from their on-going telephone surveys. Marlene Stolt, of Actew Corporation, asked that specific water conservation options, (change to drought resistant plants and the use of drip irrigation), be included in the CPAS study to complement Actew Corporation research findings.

Meetings were held with both the ACT Government, Chief Minister's Department, (Bruce Thompson, Communications Manager), and with Karen Civil, Communications and Policy Manager of the Department of Territory and Municipal Services. These Government representatives showed an interest in the investigation of the effectiveness of the electronic road signs, (to whose expense the Government had contributed $10,000 of the first $50,000 for the trial of the three month installation during the 2007/2008

summer months). They did not want to add anything / provide input to the project but did request that they be updated on any findings.

The questionnaire

I have some experience in the writing of questionnaires and was able to design a survey in a logical sequence with a number of yes / no responses. I had a real interest, also, in eliciting textual data to be able to attempt to map public sentiment in addition to looking at the influence of the the electronic road signs in changing habits.

Great care was taken to ensure that the questionnaire looked manageable and not too onerous a task to complete. The hard-copy questionnaire used primarily for the pilot survey was restricted to both sides of a single sheet. It was anticipated that the questionnaire would take no longer than 10 minutes to complete.

It was hoped that written responses would allow for some content analysis to substantiate the direct questions and afford a more complete picture of the effectiveness of the medium through the presence of words, phrases and themes in the answers. The two main purposes of the open-ended questions were to assess the groups' ideas as to water conservation and establish the level of penetration and / or acceptance of the message given through the medium of the road signs. One question sought a more sophisticated response. This question asked for a positive or negative response to a list of various water saving habits, "Have you done this?" The question then led the respondent into stating whether they had "considered, or not", that option. Also included were four opportunities for the respondent to write a comment, three prompted within the context of the question and a final 'open-ended' suggestion to comment upon the study as a whole.
A copy of the questionnaire is included as Appendix 6.

ANU Ethics Committee approval.

A request to proceed with the study was submitted to the ANU (Human) Ethics Committee and approved. (A copy of the approval is included as Appendix 11). A variance, to make the questionnaire available online was also approved (Appendix 12). An information sheet, approved by the ANU Ethics (Human) Committee, accompanied the questionnaire explaining its use, confidentiality and contact information should the respondent want to make further comment.

Demographic information was sought at the end of the questionnaire to be able to place the sample's answers in a more general context and perhaps extrapolate for the community.

Pilot survey

I am a member of the ACT Masters Athletics Club, ACTMA. The Club President agreed to a request that I ask club members attending the organisation's 19 May, 2008 Annual General Meeting to complete a 'pilot study'.

A hardcopy questionnaire on two sides of a single page attached to an information sheet was used for the pilot survey to determine the appropriateness of the questions. The response represented 60% of the 50 club members attending the AGM. Most respondents commented positively to me when returning the completed questionnaires.

No modifications were thought necessary to the pilot questionnaire before it was used in the wider study except that it was decided to also make the questionnaire available online when an obstacle was raised to the use of the hard-copy option within the population sample chosen. This is explained below.

Identification of a suitable sample

Both the Actew Corporation and the ACT Government were asked if they would allow their customer billing system / mailing list to be used to distribute a hard-copy survey. Without hesitation, both representatives said that privacy issues forbade any use of their customer database.

As the survey was to concentrate upon the effectiveness of the electronic road signs seen by road users, several e-message approaches were made to officers within the National Roads and Motorists Association, NRMA, management but elicited a zero response. Messages left on voice-mail were similarly ignored.
The question remained – who to ask to complete the survey?

Sample and population

After consultation with my thesis supervisor it was decided that the membership of ACTMA again be used for the full survey. The use of paid survey-respondents was considered but not taken further. It was recognized that ACTMA was not fully representative of the ACT population but it provided a readily available sample.

The target group for the study is a closed user group of older Canberran residents, members of an athletics club. The club is the ACT Masters' Athletics Club which is supported with an ACT Government grant. The club has the motto of "Fitness through Fellowship." The club makes an annual submission to the Government for a grant on the basis that this group of 500 club members are keeping themselves fit and healthy and should, therefore, not be a burden on the public health purse. The club's minimum age is 30. The club's main activities are competitions once-a-month for cross-country runs and a twice per month throwing competition, (discus, javelin, shot put and the hammer). The foot race attracts 250 runners and / or walkers and the throwing events 30-40 members. In the summer months

the club has a weekly competition of 'track and field' events at the Australian Institute of Sports stadium in Bruce. This attracts over 100 members in the season. A monthly social event attracts only a core group of the really keen athletes, (20-30 in number), who discuss their 'personal best' athletic achievements and the many obstacles that might prevent them achieving a better 'best' time or distance. Training is provided most days of the week across Canberra.

I sought permission to include the covering letter and questionnaire in the ACTMA monthly newsletter *Vetrunner*. The Club President was again in favour, however, the ACTMA general committee voted against this use of their newsletter. The committee decision was "*Vetrunner* is a vehicle for athletics notices and athletic results and not the pursuit of individual members ambitions, no matter how worthy". Not being able to distribute hard-copy questionnaires necessitated, therefore, putting the survey on-line. The ANU Apollo online facility was chosen and the questionnaire transferred to this medium. Transfer was relatively simple although some implementation difficulty was experienced in opening up "open-answer / comment boxes" within a specific question and not creating a new question identifier. Subsequent discussion with one of the Apollo designers, (Robin Collins then deputy Director of the ANU Centre for Educational Development and Academic Methods, (CEDAM), resolved this difficulty).

To initiate the survey I wrote a letter to the editor of *Vetrunner* and took a third-of-a-page advertisement to advertise the survey / study to ask for members to complete the questionnaire. These appeared in the September 2008 issue. The letter and advertisement are reproduced as Figures 21 and 22.

Pre-paid addressed envelopes were provided to respondents who chose to complete the hard-copy questionnaire in preference to going online. On receipt of the hard-copy form it was allocated an unique designator. The

ANU Apollo system, by default, uses a similar system to identify every reply.

Interface with the sample population, members of the ACT Masters' Athletics Club

I am a regular contributor to the monthly club magazine *Vetrunner* and I have a good relationship with the editor. When I wrote to the editor I was confident that publication of the letter would not be held up and that the study timeline could be maintained.

The first of four items of correspondence, over three months and three issues of *Vetrunner*, with the potential sample respondents was a *Thank You* letter to those who had completed the pilot survey on 19 May 2008. This is shown as Figure 20.

Letter to the Editor

1) I wish to thank club members who completed my pilot survey / questionnaire at the AGM. The responses were valuable and shewed that everyone had seen and registered the information from the electronic road signs. In place since last December the signs daily advise road users of yesterday's water usage, the seasonal target and the level of storage in the dams.

My ANU research is to determine if the signs have been effective in changing peoples' water use habits? I shall use the Internet for the full survey and hope that club members will want to participate.

2) And to answer the several enquiries I have had. Yes, I am still finding 5 cent coins regularly on my training run along the eastern edge of Macgregor. I described the phenomenon in the February issue of 'Vetrunner'. My benefactor must have been out of town and there have been gaps when I come home empty handed. But on 23 additional occasions I have found cash. Can't be bad. I still cannot understand why anyone wants to leave money for my benefit?

Chris Yardley / 13.vii.08.

Figure 20 : Letter to the Editor, *Vetrunner* August 2008.

One month later my contributions were a letter to the editor and an 'advertisement'. Figures 21 and 22.

To the Editor,

1. I am writing to draw club members' attention to my advertisment in this month's issue (see Page 7).

I am asking that everybody visits the Internet to complete my on-line survey about the effectiveness of the electronic road signs.

The e-address is a bit different as it is complicated and does not require www to get into the ANU system. The address is http//:apollo.anu.edu.au/defaultasp?pid=3097

Even if you have completed the pilot (paper) questionnaire at the AGM I shall be pleased if you would complete this one or ask someone else to do so. I need numbers. Thank you in anticipation.

2. Its been an impecunious August on the training run with cash on the track only three times. Perhaps I have not been out there often enough?

Chris Yardley / 15.viii.08.

Figure 21 : Letter to the editor, *Vetrunner* September 2008.

I had great support to achieve one 2008 target.

Chris Yardley

I am now asking club colleagues, running and throwing pals, to help with my ANU M.Sc.

I am researching the effectiveness of the electronic road signs telling us about our daily use of water, the target use and yesterday's dam levels.

Please complete for me, (in total confidence), the questionnaire you will find at http://apollo.anu.edu.au/default.asp?pid=3097

Figure 22 : Advertisement, *Vetrunner* September 2008.

For inclusion in the club magazine in the third month, September, I submitted a follow-up letter to again request club members to complete the online survey. This is shown as Figure 23.

To the Editor

I am writing to thank the club members who have answered my on-line questionnaire in which I am looking at the effectiveness of the electronic road signs telling us of our water use.

I cannot thank them personally as the security system in place means that I shall never know who has replied.

But I need to ask again. I am hoping another 400 members will go on-line to complete the survey. It will take 10 minutes maximum..... unless there is a lot you want to get off your chest.

Please go to **http://Apollo.anu.edu.au/default.asp?pid=3097** (Note no 'www' in address).

Every best wish.
Chris Yardley / 15.ix.08. / 6255 3001 / Cannava@Alphalink.com.au

Figure 23 : Another letter to the editor was published in *Vetrunner* October 2008.

A further written request to the club to be allowed to e-mail all club members to increase study participation using the ACTMA e-address list was also rejected by the general committee on privacy and security grounds.

Data processing and analysis

SPSS, (Special Purpose Statistical System), software was used to compile the statistics from the hard-copy responses. The information included as responses to open-ended questions and / or comment invitations was put in tabular form, with unique identifiers, for analysis and coding.

The online Apollo system compiled results on an on-going basis and these results were transferred into SPSS compatible form for integration into a single database.

2008 timeline of the Project

- 3 March - suggestion for this study made to my thesis supervisor
- 29 March - "Earth Hour", a similar community exercise discussed within this thesis
- 10 April - Actew Corporation, Marlene Stolt, presentation to CPAS
- 28 April - I answer an Actew Corporation, (31 minute) telephone survey
- 13 May - Meeting with Actew Corporation, Marlene Stolt, to discuss the project
- 19 May - Pilot survey undertaken at ACTMA Club AGM
- 10 July - Meeting with representatives of the ACT Government, Chief Ministers' Department
- 13 July – Letter to club magazine *Vetrunner* (August issue) thanking club members for completing the pilot survey
- 21 July - Meeting with a representative of the ACT Government, Department of Territory and Municipal Services
- 15 August – Letter to the club magazine *Vetrunner* (September issue) requesting club members to participate in the online survey
- 29 August – The hard-copy and online questionnaire were available for 69 days
- 30 August - Advertisement and letter appeared in the September issue of *Vetrunner* confirming the request to club members to participate in the online survey
- 15 September – Follow-up letter to club magazine *Vetrunner* (October issue) again asking club members to consider completing the survey
- 5 November - Questionnaire closed
- 10 November - Most recent Actew Corporation research data received
- 30 November – This study concluded

Table 18 : Timeline of the study.

Limitations of the research method

Accessing a 'closed user-group' – the Masters' Athletic Club – restricts the available population and it might be argued that members of an organisation whose motto is "Fitness through Fellowship" will be an older, biased group and one sympathetic to water conservation. The club members nevertheless represent a sample population of home-owners able to influence the use of domestic water which is the target for the study.

Mobility is implied with membership of an athletics club. People restricted to their homes are, by default, excluded from the study. The fact that the club runs on cross-country courses in many suburbs also means that respondents are more likely to have travelled the main roads to see the signs. It is acknowledged, however, that this group is not representative of the population as a whole. In particular the age group in the sample is unrepresentative and that this limits the generalisability of the findings.

There was a typing error introduced into the "letter to the editor" of the September 2008 *Vetrunner*. The error was in the online Apollo Internet address – the address in the associated advertisement was correct. The correct address was repeated in the October issue 'letter to the editor'.

As described above, time was lost while the ACTMA general committee debated whether to allow the distribution of the hard-copy survey through the club newsletter. I do not think this has prejudiced the final number of respondents and the results.

Summary

A questionnaire survey was chosen for this project.
A pilot study was undertaken. The pilot raised no problems and the format for the main survey was unchanged from the pilot survey. A coding regime for the open-ended questions allowing for content analysis was developed from the pilot survey results.
An online version of the questionnaire was made available, as an alternative to the hard-copy version through the ANU Apollo facility.

The survey was open for 69 days.

The research findings and results are discussed in the next chapter.

Chapter Four. The Research Findings and Results

Introduction

The research question of this thesis is "Are road users seeing the (electronic road signs) message and is it changing their behaviours of water use?"

A questionnaire survey was conducted in two parts. A pilot survey tested that the questions made sense to respondents and that they understood the questions. The pilot responses were used to develop the coding regime for the open-ended questions in the full survey. No changes were made to the questionnaire following the pilot survey. Format changes were made to facilitate conversion of the paper questionnaire to the online version using the ANU Apollo system. These changes were not substantial. Before looking at the answers to specific questions the overall framework for the study will be discussed

1. Social Marketing theory.

Is it possible to state that the signs have been effective in telling their message? The project affords the opportunity to check the validity of the checklists from the book "*Fostering Sustainable Behaviour*" outlined in Chapter Two. The book was originally published in 1999 in Canada introducing the concept of Social Marketing. The check-lists have facilitated a methodical approach in assessing the electronic road signs of this study as a science communication medium.

The lists are replicated below with a comment / indication as to how well the electronic signs, (as a part of the overall Actew Corporation and ACT Government water saving initiatives) conform to the textbook recommendations as shown from the answers to the study.

A checklist for reinforcing commitment as an agent for behavioural change (from McKenzie-Mohr and Smith, (1999), p. 58).

Item	Criteria	Applicable to road signs
1	Emphasis of written over verbal commitments	not relevant
2	Asking for public commitments	✓
3	Seeking groups' commitments	✓
4	Actively involve the person	✓
5	Consider cost-effective ways to obtain commitments	not relevant
6	Use existing points of contact to obtain commitments	implied
7	Help people to view themselves as environmentally concerned	implied
8	Don't use coercion, (commitments must be freely volunteered)	implied
9	Combine commitment with other behaviour change techniques	✓

Table 14 A (annotated) : Checklist for reinforcing commitments as an agent for behavioural change. (From McKenzie-Mohr & Smith, (1999), p. 58).

The tick marks (✓) are a short-hand for yes. I believe that the road signs do ask for and reinforce a commitment by the observer. Other criteria are implied by their use on the signs as a part of the wider advertising.

A checklist for using prompts (from McKenzie-Mohr and Smith, (1999), p.66).

How closely do the electronic road signs follow these recommendations?

Item	Criteria	Applicable to road signs
1	Make the prompt noticeable	✓
2	The prompt should be self-explanatory	✓
3	The prompt should be presented as close in time and space as possible to the targeted behaviour	✓
4	Use prompts to encourage people to engage in positive behaviours rather than to avoid environmentally harmful actions	implied
5	Use commitment strategies and norms to encourage people to act on the prompt	implied

Table 15 A (annotated) : Checklist for using prompts towards behavioural change. (from McKenzie-Mohr & Smith, (19990. P. 66).

It is clear that the road signs do reinforce a prompt to the observer to take an action.

A checklist for using norms (from McKenzie-Mohr and Smith, (1999), p. 80).

How closely do the electronic road signs follow these recommendations?

Item	Criteria	Applicable to road signs
1	The norm should be noticeable	✓
2	The norm should be made explicit at the time the target behaviour is to occur	the target figure is shown
3	When possible use norms to encourage people to engage on positive behaviours rather than to avoid environmentally harmful actions	implied

Table 16 A (annotated) : Checklist for using norms as an agent for behavioural change. (From McKenzie-Mohr & Smith, (1999), p. 80).

I believe that the road signs do reinforce norms to the observer to take an action.

A checklist for effective communications (from McKenzie-Mohr and Smith, (1999), p. 101)

How closely do the electronic road signs follow these recommendations?

Item	Criteria	Applicable to road signs
1	Make sure that your message is vivid, personal and concrete	✓
2	Explore the attitudes and behaviour of your intended audience prior to developing your message	implied
3	Have your message delivered by an individual or organization who is credible with the audience you are trying to reach	✓
4	Frame your message to indicate what the individual is losing by not acting, rather than what he/she is saving by acting	implied
5	If you use a threatening message, make sure that you couple it with specific suggestions regarding what actions an individual can take	not relevant
6	Use a one-sided or two sided message depending on the knowledge of your audience regarding the particular message	not relevant
7	Make your communication, especially instructions for a desired behaviour clear and specific	✓
8	Make it easy for people to remember what to do, and how and when to do it.	addressed in survey
9	Integrate personal and community goals into the delivery of the programme	see note below
10	Model the activities you would like people to engage	implied

	in	
11	Make sure that your programme enhances social diffusion by increasing the likelihood that people will discuss their new activity with others	some indication this happens
12	Where possible, use personal contact to deliver your message	✗
13	Provide feedback at both the individual and community levels about the impact of sustainable behaviours	implied every day on road signs

Table 17 A (annotated) : Checklist for assessing effectiveness of a sustainable behavioural change project. (From McKenzie-Mohr & Smith, (1999), p. 101)

The tick marks (✓) are a short-hand for yes. One or two of the general criteria are not relevant. Other criteria are implied by their use on the signs. The road signs do comply with most of the criteria considered effective by McKenzie-Mohr and Smith. It is beyond the scope of this study to investigate the level of research undertaken by the ACT Government and / or Actew Corporation prior to the installation of the signs but they seem to have conformed to recommended practice.

In summary, therefore, the study confirms the applicability of the signs in making it easy for the road user to remember there is a water problem, They integrate the water conservation message into the total advertising campaign and provide a daily feedback of how the community is responding.

For example, (and these comments are repeated later in this chapter), respondents have commented :

- *"Am now more likely to talk to neighbours etc. about wasteful uses of water".*
- *"Always conscious of water issues now".*
- *"the signs.... have helped to improve my awareness of water issues".*
- *"The electronic signs are an excellent idea for raising community awareness of this issue".*

2. The pilot study

30 respondents completed the pilot survey in my presence. I was available to answer any queries but there were none. On a face-to-face basis I was pleased with the public reception of the survey and several people

complimented me on the initiative. One person did suggest it was "shallow" for a University study. I knew the person and have subsequently been able to discuss results with him. The analysis of the "have you done / are you considering" question and the open-ended questions were of interest to him and he expressed pleasure that I had made an effort to follow-up and that the results were so informative.

No changes were made to the pilot study questionnaire before the hard-copy version was used for the main study. Results from the pilot study are, therefore, included within the full study results. Minor format changes were needed to convert the questionnaire for completion on-line. The questions and sequence were unchanged.

3. Coding protocol of the open-ended responses / content analysis

Coding the textual answers was relatively easy. The coding work sheets from the pilot study are included in this document as Appendix 8. For example :
"Do you currently recycle water in your home for any purpose, (so called greywater use)? If so, please tell us about it".
21 of the 25, (84%), people who responded by writing a text description of their use of greywater mentioned the "garden, lawn or plants " as the reason for recycling. Other answers imply "garden" but the washing of dogs and / or using greywater for dogs to drink are also mentioned.

The coding developed from the pilot study has been carried through the full study.

Chapter Four : The research findings and results

Respondents completed a total of 107 questionnaires.

49 completed the single page, two sided, hard-copy questionnaire, (46%).
58 used the ANU Polling Online, Apollo, system, (54% of the total response).

Respondents were generous in offering written comments in addition to completing the multiple choice questions. With 4 opportunities to answer an open-ended question or add a comment, on average each respondent wrote 2.3 observations. The hard-copy version of the questionnaire elicited a higher average, 2.6 observations compared to the average of 2 online comments per respondent.

The demographics of the respondents

Members of the ACT Masters' Athletics Club were the chosen survey sample. The results reflect the sample.
Question 10, of the hard-copy questionnaire. *What is your age group?*

Age	#	
18-29	5	4.7%
30-39	10	9.3%
40-49	14	13.1%
50-59	18	16.8%
Over 60	60	56.1%

Table 20 : Survey respondents' age group

All respondents answered this question.
That any persons under the age of 30 answered the survey is encouraging – 30 is the minimum age for the club. Potential respondents did ask if they might hand the questionnaire to family members. I agreed, on the basis that the respondent would still be a responsible adult and able to influence the home's use of water. They must have done so.

How well does our sample match the Australian and ACT population statistics of persons over the age of 18?

Age	Study	ACT population	Australia population
18-29	4.7%	26%	22.1%
30-39	9.3%	20.0%	18.7%
40-49	13.1%	18.6%	18.7%
50-59	16.8%	16.2%	16.4%
Over 60	56.1%	19.2%	24.1%

Table 21 : A comparison of the respondent's age to the ACT and National populations. (The latter figures from the Australian Bureau of Statistics, (2008), *Australian Demographic statistics).*

This table proves the expected skew of the sample group, a group of older persons by definition.

Question 11, of the hard-copy questionnaire. *What is your gender?*

Gender	#	
Male	45	42%
Female	61	58%

Table 21 : Survey respondents' gender

All respondents answered this question.

There is an intriguing anomaly between the gender mix for the hard-copy and online respondees. 55% of the hard-copy returns were from males but only 32% of the online returns. Could it be that women in the home are the masters of the Internet? The overall return with more women replying reflects the gender mix of the club.

Question 12, of the hard-copy questionnaire. *Your home situation?*

Domicile	#	
Owner	95	89%
You rent	9	8%
Other	3	3%

Table 22 : Survey respondent's home ownership situation

All respondents answered the home situation question. Three respondents answered 'other' and the assumption is made that this refers to respondents living with family. The number of owner occupiers is higher than the Australian and ACT snapshot, as published by the Australian Bureau of Statistics :

"The overall rate of home ownership in Australia has been steady since the 1960's, with about 70% of occupied private dwellings being owned outsight or being purchased. In 2001, three-quarters of ACT households either owned or were purchasing their home." (Australian Bureau of Statistics, (2004), *Australian Social Trends*, 2004, p.2).

Question 12. continued ..... *and you live in*

Home description	#	
a detached home	87	83%
an apartment	8	8%
a unit	10	9%

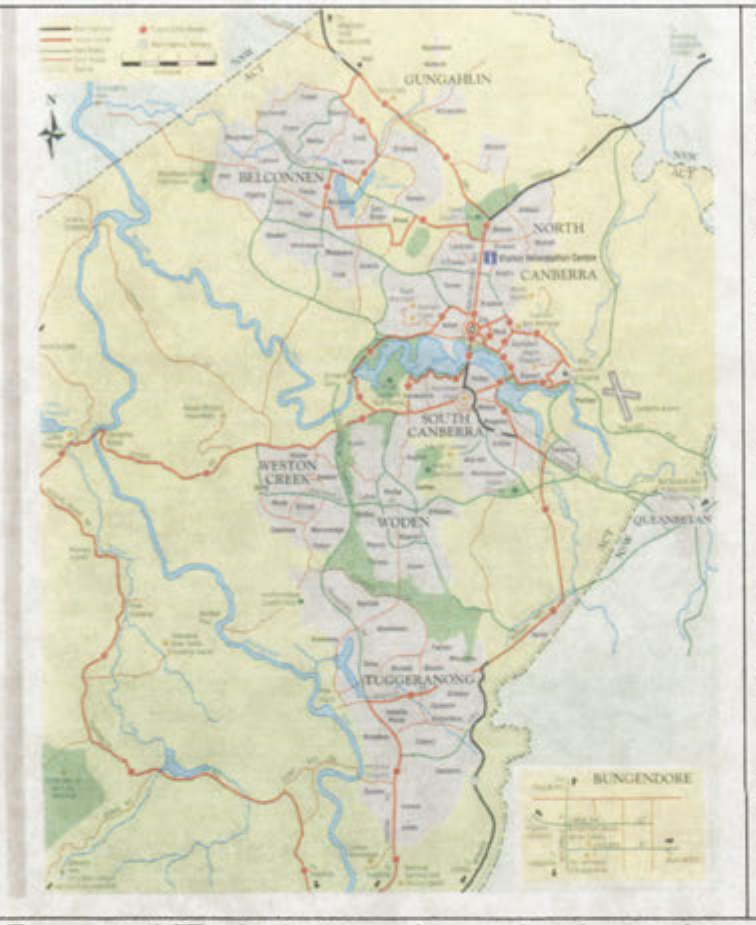
Table 23 : Survey respondent's type of home

2 respondents did not answer this question.

These ratios are consistent with ACT statistics. The ACT Government and Actew Corporation have targeted their water conservation messages, not only the electronic road signs, at the occupants of detached homes. (See Figures 8 and 9 within Chapter Two above).

Question 12. continued *Your post code*?

Post code		
Answering	107	100%



Using the map as a guide to the areas of Canberra the respondents were from :

Belconnen – 23 (21%)

North Canberra – 33 (31%)

CBD – 5 (5%)

South Canberra - 5 (5%)

Weston Creek - 3 (3%)
Woden – 12 (11%)
Queanbeyan – 9 (8%)

Tuggeranong – 17 (16%)

Figure 24 : ACT suburbs map and respondents' post codes

All respondents provided a post code.

The membership of the club is from all parts of Canberra and this is reflected in the results shown above.

Question 13, of the hard-copy questionnaire. *What level of study have you completed?*

Level of study	#	
Primary school	2	2%
High school	12	11%
Tertiary	43	40%
Post-graduate	50	47%

Table 24 : The levels of study completed by the survey respondents

All respondents answered this question. It shows a high level of study. This potentially introduces another bias / limitation in the discussion of the generalisation of the study to the community. Beyond the scope of this study is the implication that highly educated persons are more likely to exercise into old age. Club members would like to think this is so.

The sustainability of potable water / the message being studied

Question 1, of the hard-copy questionnaire. *Do you think water will become scarce enough in the next ten years that we shall need to consider alternative ways to provide it?*

Water scarcity	#	
Yes	91	87%
No	14	13%

Table 25 : Survey respondents' thoughts on the future scarcity of water

2 respondents did not answer this question.

This question essentially frames the questionnaire and sets the scene for further questions.

Examples of written comments that address water scarcity cover the whole range of feelings and include :

A neutral comment :

- *"More concerned about wastage around the home".*

Anger :

- *"I have always been water aware. I was raised in S.A. My parents instilled in us the importance of not wasting water. I am angry it has taken so long to address the issue".*

A negative reaction :

- *"I see no need to recycle, as I do not think declining rainfall is a permanent condition but part of a natural fluctuation. Indeed we are 50% full at the moment yet a year or so ago we are at 30% and alarmism was setting in. The expansion of the Cotter dam makes much more sense than the 'privatisation' inherent in recycling at home".*

A positive reaction :

- *"I have been conscious of water use since the late 1970s. Doing a course at the ANU at the time called Human Ecology was extremely informative and influential on habits".*

Public policy and ethical issues :

- *"Each town should have access only to water from its own catchment: Canberra's use of water piped from 'bidgee' is amoral. Connection to town water should be gratis, and price per unit much (?1000x) higher. Until we charge a lot more for water used, we cannot pretend to be serious about encouraging reduced consumption".*
- *"I think we should cap the population of Canberra commensurate with expected water needs, i.e. it should be a core component of planning decisions."*
- *"Stop encouraging increased Canberra and surrounds population."*

Question 2, of the hard-copy questionnaire. *Have you seen the electronic water usage signs on the roadside since December 2007 telling us about the water usage target and dam levels?*

Signs seen	#	
Yes	106	99%
No	1	1%

Table 26 : Have the survey respondents seen the electronic road signs?

All respondents answered this question.

Examples of written comments that address the signs include both favourable and negative comments. For example, respondents said :

- *"The electronic signs are an excellent idea for raising community awareness of this issue".*
- *"It's a good idea if it makes anyone more conscious of the situation and prompts them into taking things seriously."*
- *"I look at the road signs, but was already aware of the issue. The Actew web-site for dam capacity is one of my favourites. I believe the signs probably help get the message out – I used to be amazed at colleagues lack of knowledge prior to the signs."*
- *"Am now more likely to talk to neighbours etc. about wasteful uses of water".*

- *"Always conscious of water issues now".*
- *"The campaign only reinforces what I already know / do".*
- *"The public signs, seen whilst walking, make me v. cross at how wasteful we are".*

One respondent commented upon the prompt provided by the signs and made an observation as to their effect or otherwise :

- *"The signs indicate a total disregard of water usage, e.g. 110ML (average 112ML) 2 days after raining 40mm over Canberra, also weekend usage is always higher."*

Other respondents found the signs distracting and in some cases annoying. The signs as a distraction :

- *"I find the signs very irritating, they are in the category of other admonishments that abound in Australia such as don't speed, don't drink and drive, fasten your seatbelt. I think everyone is aware of what should be done without constant reminders about it".*
- *"Road ads upset me : distraction road traffic visual hazard. Roads are for safe transport not communication of other issues".*
- *"The road signs are a useless distraction for drivers whose attention should not be diverted from driving".*

The annoying aspect of the signs :

- *"There are enough bloody road signs already without having these water signs to distract you. When I see them all I get is annoyed".*

But in the main our respondents have accepted the road signs for what they are, a daily reminder of a responsibility to help sustain the supply of potable water to the community.

Question 3, of the hard-copy questionnaire. *Are you more often the driver or the passenger when you see the signs?*

Activity in vehicle	#	
Driver	88	96%
Passenger	3	3%
Both	1	1%

Table 27 : Were the survey respondents drivers or passengers ?

The question was not asked so neatly within the online questionnaire and is most likely the reason for the discrepancy in the respondent levels, as 15 respondents did not answer this question in its online version. This question was one that Actew Corporation, Ms. Marlene Stolt, recommended be included in the study. The question did not elicit much notice in the open-ended responses although :

- *"I notice the signs as both the driver and the passenger, no difference in the roles as far as the sign is concerned."*
- *What relevance does this question have? – does it indicate lack of attention? Or does one think more as a passenger?"*

Relevance of the electronic road signs

Question 4, of the hard-copy questionnaire. *Do you find it personally relevant there is a daily update?*

Signs relevant	#	
Yes	68	65%
No	37	35%

Table 28 : Do the survey respondents believe a daily update is relevant?

2 respondents did not answer this question. Clearly the majority of respondents found the signs to be relevant in their daily lives. The written comment that I found the most satisfying for the study was : *"I used to be amazed at colleagues lack of knowledge prior to the signs,"* as it implies the data is discussed and that knowing the facts makes it more meaningful. Another respondent commented on their increased awareness : *"Am now more likely to talk to neighbours etc. about wasteful uses of water."*

Behavioural change as a result of seeing the electronic road signs

Question 5, of the hard-copy questionnaire. *Has this knowledge prompted you to think differently about your own use of water?*

Think differently	#	
Yes	67	63%
No	40	37%

Table 29 : Are the survey respondents prompted to think differently?

All respondents answered this simple yes/no question. The number of respondents who have found the signs relevant closely matches the number of people who recognise they are thinking differently about their use of water, prompted by the signs. Looking at the actual questionnaire responses, the correlation is quite clear.

Question 6, of the hard-copy questionnaire. *Have you changed any of your water use habits as a result of the continuing publicity regarding the long term possibilities of water shortages?*

Water use change	#	
Yes	81	77%
No	24	23%

Table 30 : Have the survey respondents changed their water use habits?

2 respondents did not answer this question. These answers add a confirmation, through the recognition of a change in water habits, that the continuing publicity is having the desired effect. Three out of four respondents have changed water habits.

Question 6 continued – *If yes, which water use habits have you changed?*

The respondent were offered an open 'comments' box.

Habits changed	Total	
Commenting	77	72%
No comment	30	28%

Table 31 : Noting the number of survey respondents who have discussed changed habits.

These responses have been analysed and coded. Those who commented generally listed their changed water use habits. The average number of items listed as changes was 2.3 per respondent. The hard-copy answers listed an average of 2.6 changes and those online 2 changes.

The following lists the specific answers obtained to the open question *"have you changed any of your water habits....."* There is some apparent duplication depending on how the statement is read.

Changed water habits in and around the home :

i) Saving water

Reduced domestic (internal) water consumption

More concerned about wastage around the home

Restriction in output with water efficient heads on all outlets

Save water from hot tap when first turned on waiting to warm up

Do not hose windows or decks

Bought a greywater hose

ii) Actions to prevent waste :

Check all taps for drips

Not leave taps running

Renewed all tap washers

Recycle water (generally)

Not allowing excess water to go down the drain

Changed water habits in the toilet :

Reduced water flow in toilet

Dual flush toilet

Only flushing occasionally/ reduce toilet flushing frequency

Compost toilet

Changed water habits in the bathroom :

Reduced water flow in shower

Water-saving shower heads

Reduced the frequency of showers

Conscious of shower usage

Shorter showers

Water during showers and bath water is collected in buckets for garden

...a very personal admission :

"I bathe with a dish / basin of water in bath tub."

Changed water habits in the kitchen :

Wash up less frequently

Wash up once a day

Use a smaller washing up bowl

Full load in dishwasher

Recycling water, especially greywater

Gave up washing dishes

Changed water habits in the laundry :

Full load in washing machine

Fewer clothes washes

Pump washing machine water onto garden

Changed water habits in and around the garden :

i) Saving water

Restrict watering

Reduced garden watering

Watering garden by hose as a last resort

Increase mulch on garden

Stopped watering the lawn

Changing garden to less lawn and more drought tolerant plants

Removed lawn

Redesigned garden for less water use

Considering native plants for the garden

Since the drought have stopped watering 75% of our garden

Close check on whether the garden really needs water

ii) Actions to prevent waste

Capture roof water to use in the garden

Install a rain water tank

Use waste water to water plants

Use of dripper and soaker hoses instead of hand-held

Plant watering regime use of kitchen waste water

"Do <u>not</u> water garden just because it is my turn."

Changed water habits regarding the car :

Do not wash car

Infrequent washing of car

Examples of actual written comments illustrate the range of actions being taken by individuals. For example :

- *"Saving water around the home, (shower, laundry, dishwashing). Removing lawn. Increasing mulch around plants. Installing a rainwater tank".*
- *"Shorter showers, Using some waste water to water plants. Increasing mulch on garden and some hand-watering. Full load in washing machine and dishwasher".*
- *"Do not run tap. Water garden less. No in ground sprinkler use. Do not wash car. Do not hose windows or decks. Check all taps for drips".*
- *"Do not water the garden as much. Shorter showers – fewer clothes washes".*

The questionnaire then leads on to an analysis of how many people have made specific habit changes (Question 8) but this is preceded by a look at greywater specifically.

Question 7, of the hard-copy questionnaire. *Do you currently recycle water in your home for any purpose, (so called greywater use)? If so please tell us about it.*

The respondents were offered an open 'comments' box.

Use of greywater	Total	
Commenting	69	65%
No comment	38	35%

Table 32 : Noting the number of survey respondents who commented on their use of greywater.

The over-riding purpose for which greywater is saved was stated to be for the garden, constituting 83% of those commenting.

Some of the comments were quite detailed :

- *"Even before everyone became aware of the need to economise water usage, for many years our household collected shower water and used it to flush the toilet. Similarly we collect water from the wash basin. Washing machine water goes back into a bucket and is used to water the flowers. We got rid of*

the dishwasher and wash dishes by hand using minimum of water. Shower head is the economical one. Our household uses minimum water possible and 80% to 90% of the little water used is recycled".

- *"I changed my laundry detergent to one that has less (or no) phosphorous – called AWARE. I use the greywater on some shrubs (especially camellias and azaleas).*
- *"Use bucket in shower to capture water before hot water flows. Periodic use of waste water hose or bucket from washing machine outlet on back garden".*
- *"We only use greywater for the garden. I think this should be heavily subsidized by the gov. Squeezing the conscience of the individual is not smart".*

The level of awareness of water-saving ideas was high. One or two respondents explained why they are not able to recycle water :

- *"No – too difficult to put laundry water on garden (would need a pump). Considering using bathroom water – would need to be plumbed, but would think water probably has less chemicals".*
- *"Live in unit on my own so difficult, but do so if I can".*

The recycling of greywater is the foremost action being taken by the sample population. It has become a way of life to the extent that respondents not doing it have seen the need to explain why.

Question 8, of the hard-copy questionnaire. *There are a number of water / energy saving initiatives available. Which have you done? Have you considered?*

The hard-copy question offered a grid of possible options that anticipated a tick response. (See Appendix 6). The online questionnaire was slightly different as each option was shown as a separate question. (See Appendix 7). The combined results, shown as percentages of the total number of respondents is shown in a similar grid format as Table 33.

Action	Do it now %	Considering %	Not considering %	No answer %
Save sink run-off	38.3	19.6	13.1	29.0
Save shower water	47.7	19.6	13.1	20.6
Save greywater for garden	60.7	11.2	10.3	17.8
Installed own water tank	28.0	29.9	20.6	21.5
Installed solar water heating	15.0	27.1	23.3	34.6
Drought resistant plants	53.3	15.9	7.5	23.3
Installed drip irrigation	44.8	15.9	15.0	24.3
Other actions	15.0	3.7	0	81.3

Table 33 : Have the respondents taken, or are they considering taking, a series of water saving options?

The respondent answering rate was approximately 80% for most of the options listed with the exception of the question about the installation of solar water heating and the opportunity to state which other options they might be thinking of. The answer rate was a disappointing 20% for this latter question. Perhaps it was too hard and the respondents decided not to write a descriptive answer?

It is thought pertinent, however, to record the comments from those questionnaires that were completed : *There are a number of water / energy saving initiatives available. Which have you done? Have you considered?* There were no comments offered on the subjects of sink run-off, shower water. Some commented, however, on greywater, for which more respondents said they have implemented the option of saving greywater for the garden than any of the other options offered.

Examples of written comments include :

- *"We share our bathwater and then put this water onto the garden".*
- *"Use washing up rinse water for garden pots, reuse washing machine suds for second wash".*

Installed own water tank :

One in three households state they have installed their own water tanks, a similar proportion are considering doing so. Almost as many people say they are not considering this option.

Examples of these written comments elicited some substantial remarks :

- *"Installed two rainwater tanks at a cost of $7,000. This was as much in response to shortages at the time".*
- *"I really think tanks are a false saving. They just deprive the river systems and, therefore, others down stream of water. What is really needed is dual reticulation – potable and non-potable systems."*
- *"Would support full funding of water tanks on all suitable properties as an alternative to further dams in in the short term, and support public water recycling."*
- *"I believe the rebate should apply to all water tanks, not just rainwater tanks plumbed into the home. There should be as many incentives to use less mains water and rain water harvested and returned to the soil/garden should be rewarded too. We should also be encouraged to use fairly inexpensive systems that 'create' water out of air-vapour, (e.g. several innovative inventions on the ABC show New Inventors). Canberra has great diurnal temperature ranges which makes it an ideal climatic locale for such systems."*

Installed solar water heating :

Six out of ten respondents have already installed or are considering solar water heating.

Examples of written comments include a negative :

- *"UNINSTALLED solar hot water due to expensive tank replacement costs."*

Changed to drought resistant plants :

This the second most implemented option already taken by our respondents with one in five households still considering changing to drought resistant plants.

Examples of written comments include :

- *"I think using native plants is silly The world is our environment and any plant that performs well should be encouraged".*
- *"Public plantings should use local native species of herbs and grasses instead of the appallingly high-water introduced soft-foliaged species too commonly used : no more petunias and / or pansies".*

Installed drip irrigation :

Almost as popular as the use of drought resistant plants the gardeners of the ACT have, or are considering, drip irrigation. There were no particular comments on the subject of drip irrigation.

- Any others?

87 respondents declined to answer this question, which is rather disappointing but made up by respondents with the overall fullness and detail of their written answers.

Examples of written comments include :

- *"I did some research of my own and was surprised to discover how much water Canberrans use to flush their toilets. I now flush mine less fully".*
- *"I cannot think of an alternative that we have NOT considered."*

The survey included a comments box for "*any others*" to be noted.

	Total	
Commenting	17	29%
No comment	41	71%

Table 34 : The number of survey respondents who have commented on other initiatives.

The comments reinforce the notion that respondents are saving water to use on the garden and in a few cases state they have changed their detergents / soaps to 'biodegradable' products to additionally protect their plants.

'Compost toilets' were mentioned by two people. One ACTMA member, whom I presume had completed a questionnaire, asked if I knew what this was. He invited me to Gundaroo to see his 'loo'. The compost toilet functions in the same way as the conventional toilet but instead of flushing with water, wood chippings are added. A requirement for the device is access to the gravity fed tank, generally under the house, for a two-yearly cycle of emptying the tank and using the compost for the garden / lawn. If my home had been built with such a facility I would consider it.

One different response to this question was "*Make the people with bores pay for the water they take from the water table + also restrict the amount they take*". Intervention through legislation was a common theme of the general open-question asked at the end of the questionnaire, question 14 below.

Question 9, of the hard-copy questionnaire. *What would be the prompt to change your ticks above in the "yes, considered" column to become positive action?*

The respondent were offered an open 'comments' box.

Defining prompts	Total	
Commenting	55	51%
No comment	52	49%

Table 35 : The number of survey respondents who have commented on prompts for them to implement additional measures.

Five out of every ten respondents have taken the trouble to think about the sustainability of water supply and what can I do / should I do next? The most obvious prompt is that of "cost" mentioned by 44% of the respondents to this question. Most answers are quite short, for example :

- *"Financial incentives seem to work better than anything else."*
- *"Will upgrade at that time as prices improve and technology gets better."*

"Legislation" for change is a general theme within the open-ended question that sought general comments but one respondent raises the issue in response to the prompt question :

- *"Changes to the 'laws' regarding siting of water tanks would be needed, (greywater / own water tank)."*

A reflection upon the sample population :

- *"Solar water heating or installation of own water tank for a one-person household does not seem to be financially viable."*

Other prompts for change detailed by respondents include :

The effect of the on-going drought :

- *"Seeing native vegetation dying in the drought and as a result of overgrazing by native herbivores : I'd never seen this before, and have been really shocked by it."*
- *"Sick trees everywhere."*

And lingering doubts that there is a problem :

- *"When it has become clear that water saving has become a necessity."*
- *"A catastrophic prediction of water shortage backed up by formal evidence, (no specifics)."*
- *"Water provision should be a Government priority."*
- *"demonstrated that this is an issue instead of a lack of Government planning, action and investment in infrastructure."*

Once again respondents show that thought has gone into the question and response :

- *"I have not seen a bathroom water recycling system. I discussed this with a plumber who had not done it – he thought it would probably be viable as the bathroom water has an external pipe from upstairs".*
- *"Solar panels need to be elevated towards the sun. My roof has a pitch of only 15°. To put a solar panel construction on the roof would look too ugly for me".*
- *"Installing solar powered hot water. Heating does not necessarily save water".*
- *"Difficult to implement in unit; did have solar hot water when had built own home. No garden".*

General observations about the questionnaire offered by the survey respondents.

Question 14, of the hard-copy questionnaire. *Do you have any comments you would like to make about this questionnaire, or about water / energy conservation in Canberra in general?*
The respondent offered an open 'comments' box.

Response	Total	
Commenting	62	58%
No comment	45	42%

Table 36 : The number of survey respondents who have commented on the questionnaire.

"Legislation" was again the predominant theme put forward by 39% of respondents commenting on this open question. For example *"It should be*

mandatory to install water saving in all new homes. Real support should be given for retrofitting older homes".

Examples of other written comments seeking a government involvement include :

- *"At an individual household level this is SO expensive it clearly would be most responsive to consider PUBLIC, Joint, 'Government' action".*
- *"Would support full funding of water tanks on all suitable properties as an alternative to further dams in the short term, and support public water recycling. Am concerned that water restrictions are hitting gardeners unfairly, given that back-yard produce uses much less water than commercially grown as well as far less energy. Also, established trees should be seen as CO2 and climate and energy management asset(e.g. shading of northern windows), as well as recognized for their equal aesthetic value to the built environment and not allowed to be sacrificed during water restrictions. Energy – would support following example of some European countries where installation of solar panels is treated as a financial investment by home owners, and the $ per KW returns from the electricity utilities are an investment incentive to make the initial outlay".*
- *"Build another dam."*

As might be expected several people commented upon the theme of the questionnaire to give their opinion on the electronic road signs. For example, favourable comments on the subject of the signs themselves included :

- *"Whilst I have observed the electronic signs they are not on roads I travel on a daily basis. The information, seen fleetingly, did not impact on my usage of water but it may impact on some people who pass the signs daily".*
- *"I haven't specifically changed my water habits as a result of the signs, but they have helped to improve my awareness of water issues. They are a good idea".*
- *"The electronic signs are an excellent idea for raising community awareness of this issue".*
- *... "I believe the signs probably help get the message out – I used to be amazed at colleagues' lack of knowledge prior to the signs".*
- *"Good initiative and a prompt to keep thinking about solutions".*

Unfavourable comments on the actual signs included:

- *"I personally find the electronic signs very irritating. They are pointless. They certainly don't make me think, oh dear me I must go home and make a greater effort"*
- *"... only that those road signs are bloody annoying".*
- *"The roadside signs have been there too long – need to change the presentation or people stop reading".*

There are also interesting comments on other issues. One person thought there was an underlying motive behind the initiative :

- *"I would like to know the 'hidden agenda' of the government's intentions for future dams in the ACT – I don't believe they have told us the full story about need, sunk costs, etc".*

Comments regarding buildings and building regulations :

- "For older people cost is an important issue e.g. solar water heating (return on investment is an issue when retirees have limited time to recoup costs). Also as an owner in a Body Corporate complex, some initiatives are better handled collectively but getting agreement of all owners is not always easy. Resident and non-resident owners have different priorities/motivation re investment in water saving measures".

- "Water is and has always been too cheap and multi dwelling buildings should be forced to install individual meters so occupants pay directly for what they use".

- "When I (used to) wash my car with the hose I was very frugal – just to flush the dust and rinse the suds. Using a bucket for this seems to use more water as I cannot control it as well. So I don't wash the car. Energy conservation – why are there not proper building regulations for new buildings – it is very difficult to retrofit this stuff".

Respondents looking beyond the ACT boundaries also had their say :

- "I recently received a flyer from "Water our Garden City Inc." complaining about environmental flows. While I support releasing water for use downstream I do feel annoyed when I travel to Wagga and Gundagai and other places downstream and see people using sprinklers on grass in the middle of the day. More should be done to encourage people elsewhere along the Murrumbidgee River to value our water".

-"It's good that the ACT Government is not bowing to those rightwing reactionary Greens and is expanding the capacity of the Cotter! Rock on!"

- *"I think long distance pipes from the north to capture wet season water should be considered. If we can pipe natural gas and oil, then why not water, which is far more crucial."*

Public Policy issues concerned some people :

- *"Australian governments need to rethink domestic water policy in many ways. One that concerns me is using water (of any sort) to grow our own fruit and vegetables. Surely this ought to be encouraged, (how many 'food miles' and consequent water does this save?), rather than having blanket restrictions on water use. We also have somewhat more than two centuries of history growing imported plants – and, of course, all our food plants are non-native – so where is the policy that addresses this? It might be a droughty country, but the roses apricots, plums, lettuces, lemons, daphne, stocks and myriad other plants I grow feed not just the bodies that inhabit our house but the souls. Water policy seems a bit half-cocked to me."*
- *"ACTEW initiatives on water have been good. Biggest impacts on domestic power and water require planning initiatives which seem too much for our politicians to contemplate. Kate Carnell stymied good levels of passive solar regulations for THE WHOLE OF GUNGAHLIN. With that sort of 'visionary leadership I spend my money very frugally. [If you suspect I'm angry with our political leaders on these issues then you are correct]."*

Summary

The Mckenzie-Mohr and Smith (1999) text book of social marketing has provided a framework for the study. Results from the road signs questionnaire substantiate their check-lists for sustainable behavioural change.

The sample population who have responded to the survey have provided an insight to their thinking about water shortages. Almost nine out of ten respondents believe water will become so scarce in the next ten years that we shall need to consider alternative ways to provide it. There are still one in ten respondent doubters that there is a problem. Where the doubters express their reasons they argue their distrust in the information being provided. Those respondents recognizing the need to save water have illustrated their commitment to that cause. Government legislation is

viewed as a logical incentive for change to infrastructure and to enforce regulations.

In the next chapter of the study, conclusions are drawn. These include comments upon the limitations inherent in the study and recommendations for further research along similar themes.

Chapter Five. Analysis, Conclusions, Limitations and Recommendations

Introduction.

Droughts and water shortages are a recurrent theme in Australia's history. Water scarcity was a critical factor in the selection of Canberra as the federal city in the early 1900's, but few situations have prejudiced the security of water supply to the extent that the late 2007 dry spell did. The ACT sits within the boundaries of New South Wales, which State was still 65% drought declared in 2008 and water shortage through lack of rain had been prevalent for the last 12 years. A statement from the Bureau of Meteorology's head of climate analysis, David Jones, included the observation "without historical precedent". Water storage levels in the ACT's dams were approaching a low 30% and summer was imminent when the ACT Government and its water supplier Actew Corporation decided upon a community-based marketing campaign to remind residents of the increased need to conserve potable water. Prevalent in the Government's mind was the probable decision to legislate for an increased level of water restriction. Electronic road signs were installed on five major exit thoroughfares from the city centre.

The research question addressed in this sub-thesis is :
Are road users seeing the message and is it changing their behaviours of water use?

The survey was conducted by hard-copy or online questionnaire. More than one in five of the sample population, the ACT Masters' Athletics Club, replied to the invitation to complete the survey. The results confirmed the age disposition of the members of the club, the fact that they are predominantly home-owners and have completed a high level of study. Each respondent was given four opportunities to answer 'open-ended' questions within the questionnaire and did so. Some written responses were

long, up to 100 words, and an average 2.6 written responses were given by each respondent, implying an interest in completing the survey for whatever reason.

Analysis

Actew Corporation, through Marlene Stolt, their Communications Manager, have been generous in providing results of their own telephone research surveys which have included some questions about the electronic road signs. Some comparisons are possible :

Basic question	This study		Actew survey	
	"yes"	date	"yes"	date
Seen the signs	99%	Sept / Oct 2008	89%	March 2008
Thought signs useful	63%	Sept / Oct 2008	80%	March 2008
Changed water use	77%	Sept / Oct 2008	66% [*]	December 2007

Table 37 : This study / Actew survey results comparison.
[*] Actew Corporation specifically asked about change having seen their *Save water for life* material as shown in Table 11. Chapter 2, p. 29)

These comparisons make sense as more people will have seen the signs in the six months between the two studies and residents have had the longer time for the persuasiveness of the on-going publicity to get them to change their water use habits. The other comparison is less obvious as different questions were asked.

Later Actew research during November 2008 highlights other differences. Their research states that the road signs "were less frequently noticed by older residents", down to 82% of residents over the age of 55, (Chapter 2, p. 32). Actew also believes that "households earning under A$40,000 were less likely to have noticed the information boards (63% compared to 89-99% of the higher income group)", (Chapter 2, p. 32). No such discrepancies were shown in this study. The sample population of this study have all seen the signs – the one exception was explained in person to me by the respondent who believed that as a Kingston resident he never had occasion to pass

along the major exit roads from Canberra This study did not ask about household incomes. With the bias towards older persons it might be assumed that some respondents are living on pensions and, therefore, likely to have less than A$40,000 income into the household, but this is conjecture. A$40,000 was the marker in the Actew study

Conclusions

1. Seeing the message.

The electronic road signs were seen by 99% of the ACT residents answering the survey.
The signs were perceived as being of value to 65% of the sample but are disliked by 35%.

2. Understanding the message.

The first survey question was "Do you think water will become scarce enough in the next ten years that we shall need to consider alternative ways to provide it?"
87% of the sample respondents answered "yes". The remaining 13% answered "no".

This question 'framed' the survey. The respondents gave evidence of continuing concern for the security of supply for our potable water. This is reflected through the willingness to complete 'open questions' to describe the water conservation measures they have implemented in their homes.

3. Changing residents' behaviours of water use

Two direct questions resulted in positive replies.
- Has (the daily update of water usage) prompted you to think differently about your use of water? and

- Have you changed any of your water use habits as a result of the continuing publicity regarding the long term possibilities of water shortages?

For the first question 63 % of respondents answered "yes". The remaining 37 % answered "no", and for the second 77% of respondents answered "yes" and the remaining 23% answered "no".

4. Summary of residents' attitudes to water conservation requirements and their reaction to the electronic road signs

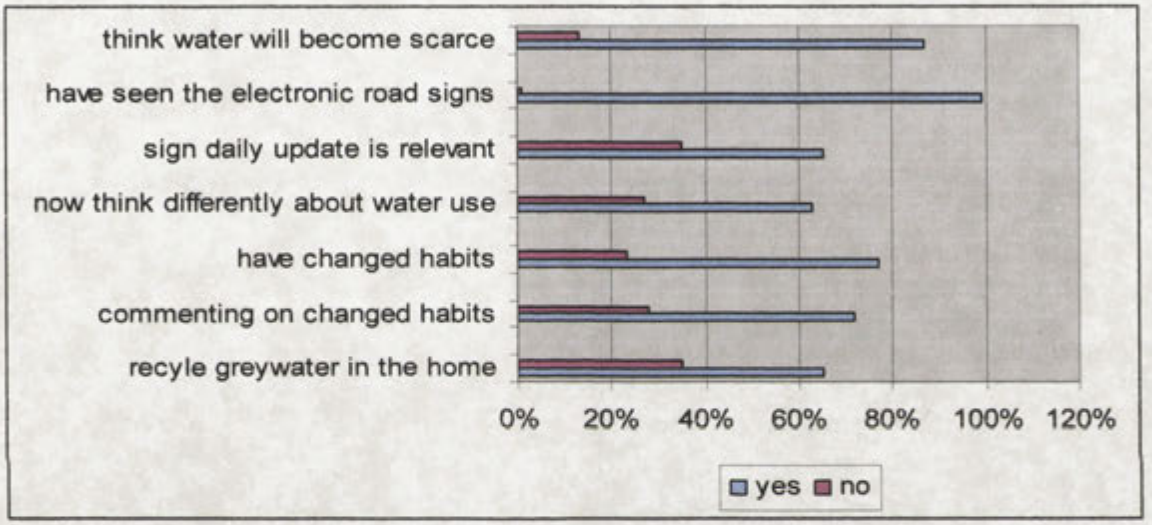


Figure 25 : The survey respondents' attitudes to water conservation and their reaction to the electronic road signs.

60% - 80% of all respondents have said they believe a daily update of water usage is relevant, that they now think differently about water usage and that this has caused them to have changed water use habits and are recycling greywater in their homes. Over 70% of respondents have taken the trouble to comment upon these changed habits.

5. What positive actions are available to the ACT resident?

The electronic road signs are designed to persuade a change in behaviour by the person seeing and registering the message conveyed. In consultation with Actew Corporation a list of seven possible 'actions' was compiled. The survey shows that, after 6 years of voluntary and mandatory water

restrictions, most residents have implemented water / energy saving schemes or are considering what to do next to ensure the availability of potable water. This is summarised in Figure 26 below.

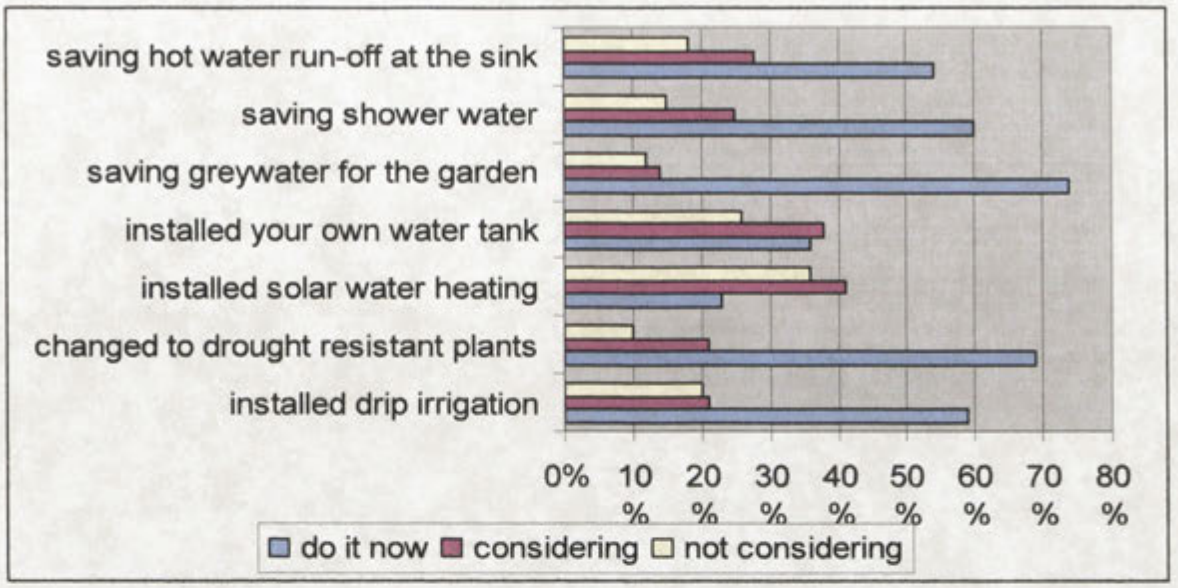


Figure 26 : The behavioural changes already made by the survey respondents to conserve water

In summary, 77% of all respondents claim that they have changed their water use habits as a result of the continuing publicity.

74% of households are now saving greywater to use on their gardens
69% of gardeners have changed to drought resident plants in their gardens
60% of households are now saving (the cold to hot) shower water
59% of gardeners have installed drip irrigation
54% of households claim to save hot water run-off at the sink
36% of households have already installed their own water tanks, and
23% - almost 1 in 4 families - have invested in solar water heating.

These are significant behavioural changes made by ACT residents as a result of the on-going publicity to save water.

In addition 26% of all respondents claim that they are additionally considering their water use habits as a result of the continuing publicity.

I suggest that the 'easy fixes' have been adopted and it is the bigger money-items that are currently being considered by ACT residents. For example 41% of respondents have stated they are still considering installation of their own solar water heating and 38% considering their own water tank option.

ACT residents are well aware of the options available to save water, (and to conform with their peers?) The community has in general recognised the problem and is cooperating in the saving of water as a resource.

Limitations

1. A restricted question set.

If I were to re-write this survey I would not have pursued the perceived necessity of limiting the (hard-copy) questionnaire to two sides of a single sheet. It was a good idea when hard-copy was the preferred medium.

Additional questions such as asking if respondents wanted to see the signs become a permanent feature would have made sense and could have been asked – Actew Corporation have subsequently asked this with interesting results as discussed in Chapter 2.

2. The online ANU Apollo System.

Transfer of the identical format of questions was not possible with the ANU Apollo System. It proved impossible to build the same matrix of options with the online system, for example, *There are a number of water / energy saving initiatives available. Which have you done? Have you considered?*

Method	Invested / do it now		Considered	
	Yes	No	Yes	No
Saving hot water run-off at the sink				
etc.				

Apollo, by default, does not allow the development of an identical table. Each table element becomes a separately numbered question. The hardcopy single question thus became a more forbidding seven questions and an open-ended 'comments' question. This might explain why fewer respondents completed the online version than completed the hard-copy version.

Further comments:

1. How much water can the individual use on a daily basis?

The *Prime Television* early morning show *Sunrise*, of 25 November, discussed Melbourne Water's newly stated individual daily target use of 155 litres. This was graphically illustrated by 15 water dispenser bottles and 5 small drinking bottles placed on a kitchen table. Almost as a 'throw-away' line the comment was made that the ACT individual target was 200 litres. I was reminded of the table in the Actew 2007 *Save Water for Life* booklet reproduced in Table 8 in Chapter Two, page 26. I believe it is a more comprehensible figure than the daily 'mega-litre' figures published on the electronic road signs and in Saturday's *The Canberra Times*. If the survey was repeated the individual figure should be used for comparison

2. Is there a saturation point for community behavioural change?
Two trains of thought have been pursued in considering this question. The first is that I started to think about a saturation level when I looked at the positive actions taken or being considered (for water sustainability) available to the ACT resident :
74% of households are now saving greywater to use on their gardens. Another 14% say they are considering it. That leaves one in eight households saying they are not even considering this basic water saving action.

This led me to re-consider whether research data is already available. I have, therefore, been in e-mail communication with Doug McKenzie-Mohr,

the author of *Fostering Sustainable Behaviour* to ask if he knew of any research that had looked at 'saturation'. He suggested I ask the question through his 'chat-room'. This step has elicited one thought-provoking comment: That I think about the long-standing Government, Health Prevention and Road Traffic Accident Commission safety measures promoting the 'Quit Smoking' campaigns and road traffic accident prevention. Behavioural changes have happened over the years but there is still a core of the community who is ignoring prevailing truths or lapse momentarily, to ensure these events remain a problem. My correspondent, Greg Hunt of the Victorian Government, went on to observe "A high profile, well-funded relentless campaign works – the planet deserves at least as much."

Another reply through the chat-room discussion sought results from this study and suggested a possible joint venture. The respondent was from the New York Director of the Schools Program advocating water sustainability through shorter showers to school-children.

The second idea I wanted to pursue came from the Science Week 2008 event at Old Parliament House on 21 August, Professor Ian Rutherfurd, of the Victoria Government said "Security of supply measures have very little real effect on the use of water". Professor Rutherfurd was addressing the overall picture of river sustainability, with particular reference to his work in Victoria. It would make sense to view this observation in a wider ACT context.

Dare I ask, has the ACT contributed to the water problems in the Murray-Darling Basin by concentrating upon the security of supply? This took me directly into a research report from the World Wildlife Fund.

3. What is the real value of the short term measures to secure water supply?

A fascinating report of the World Wildlife Fund is entitled *Weathercocks and Signposts, the environment movement at a crossroads*, (April 2008). From the Forward : "But if marketing approaches to creating behavioural change are simply not up to generating the systemic changes that are required, then we must develop a new approach". The report states that the social marketing, piece-meal approach to many environmental issues has failed. Small changes may make the protagonists and an individual feel good because something is being done, but will it ever be enough?

> The evidence presented in this report suggests that such (marketing) approaches may actually serve to defer, or even undermine, prospects for the more far-reaching and systemic behavioural changes that are needed. (Page 5).
> and
> The report begins to build an alternative approach to promoting pro-environmental behavioural change. This approach draws not on analogies from Marketing, but rather from political strategy.....evidence that appeals to individualism are unlikely to be adequate. (Page 7).

Many of the responses in this thesis suggested that ACT residents are looking for a Governmental / political initiative for the water supply problems we face. If I were to embark upon a study to take this further I would emphasise the search for underlying expectations via a focus group of the general public. This would require prior research to determine what these big issues are. I would expect to talk to the Chief Scientists, or those with planning responsibility in, for example, the ACT Government, Actew Corporation, the Department of the Environment, and ANU experts.

Recommendations for further research

What is the base-level for water use?

A figure available after the completion of the study is that of the use of water in the ACT on Christmas Day, 2008. This was 102ML. We might presume that this is the one day per year when the 'minimum' water use might be. On Christmas Day 2007 use was 93ML. With the ACT population growing at 1.7% per year it might have been estimated that Christmas Day use in 2008 would be (93ML x 101.7%=) 95ML. A more sophisticated model is required for an on-going study on water requirements.

Verify the basic water usage figures.

During the course of the study, records have been kept of the daily use of water as displayed by the electronic road signs and summarized on a weekly basis in Saturday's *The Canberra Times* in a table entitled "Stop the drop". An example was shown in Chapter Two on page 26. It might be assumed that the major user of water – residents living in the detached residence, (Figure 8, Chapter 2, page 24) – would use more water over the weekend and this would be reflected in the figures. This is not so. Questions therefore include :

> How much water is used by industry / business in the ACT?
>
> Does industry / business consume less water over the weekend and is this reflected in the overall figures?

A full analysis of the use figures would be appropriate to gain a greater understanding.

Recommendations for science communication practice

1. Thinking laterally

In the real-world variable message signs have been developed as hazard / warning signs for road users, particularly in the event of a crisis situation. The review of related literature emphasises this use of these devices to warn

the public in the event of calamities. Indeed. the US Government was severely criticised in the post-mortem of the "Katrina" typhoon that devastated New Orleans for not having similar warning signs available.

The ACT Government and Actew Corporation have thought outside-of-the-square, prompted by Chief Minister Jon Stanhope, to use the electronic signs for affirmative messages. This study proves the effectiveness of the tactic. In November 2008 Actew Corporation asked through a telephone survey whether residents thought the signs should be retained "next summer?" 60% of their respondents agreed the signs should continue.

The signs have been effective in communicating the water message. Perhaps only the use of modern communication technologies, mobile telephone SMS and / or Blackberry messages would be as immediate, but I suspect the community would tire of deleting unsolicited calls.

2. Adopting the McKenzie-Mohr / Smith checklists for the fostering of sustainable behaviour and planning

In this study I have found the book *Fostering Sustainable Behaviour* invaluable in understanding the communications philosophies implied by the installation of the electronic road signs. It helped that the book uses a similar programme as its example, that of road-side recycling. The check-lists have facilitated a methodical framework to assess the electronic road signs as a science communication medium. The framework would, I am sure, also help others conducting a similar social marketing investigation or implementation.

Final comments.

I embarked upon this project in the expectation that it might turn into a political conspiracy story. It has not. There was no debate about the installation of the road signs in the Legislative Chamber. When the installation was completed the Chief Minister of the ACT, Jon Stanhope, was unable to appear at the press-release 'photo-opportunity'. A junior

member of the Labor Caucus in the Assembly, Ms. Karen Macdonald, was available that day and she appeared in the 7 December 2007 announcement, (Appendix 3). Thinking Ms. Macdonald might be a source of information I contacted her. She confided the above story to me. She also told me that she had no direct involvement with the signs and referred me to the Department of Territory and Municipal Services, (TAMS). I met with TAMS and they showed an interest in this study.

I had seen the 7 December announcement in *The Canberra Times.* I started the ANU course three months later and was drawn to explore whether the signs had been effective. The results and conclusions are detailed in this sub-thesis.

The electronic road signs telling a different message.

Actew Corporation has recognized the value of the variable message sign as a communications medium. They, and the ACT Government, have also now used the signs to convey a different message. It was interesting to note that Actew Corporation changed the whole emphasis of the message on the road signs in support of 'Earth Hour'. This project is an Australian initiative now in its third year and influencing 75 million people world-wide to turn off electric lights at home for one hour on 29 March 2008. For two days the signs implored ACT residents to

TURN OFF

ALL

LIGHTS

What, I wonder, did road users make of this message on a dark evening?

"The ACT recorded a 73% switch-off during Earth Hour 2008," reportedly the highest participation rate in the world. (As stated in the official announcement documentation supporting Earth Hour 2009).

After the nominal completion of this study, Actew Corporation have continued to use the road signs for other purposes than the original

reporting of yesterday's water usage. (Appendix 13). Anecdotally, as described in the introduction to this study, and substantiated by the results of the study the electronic road signs have become a recognized part of the ACT scene and psyche and a relevant medium for science communication.

Post-script

As a further thought, is it appropriate to ask another question?
Is the Canberra population growth sustainable? Indeed respondents to the survey asked this same question.

The ACT Government encourages the growth of Canberra. The population is growing at an annual rate of 1.7%. Water resources are already stretched. The Mononglo Water Treatment Plant beyond Holt is running at maximum capacity and has to store excess storm water, prior to treatment and release into the Murrumbidgee River, in an overflow facility. Yet the city continues to grow and seeks to attract more people. The Stanhope Government has solicited the idea of the recycling of waste water for public consumption. This has not been well received. It was interesting to note at the 2008 Science Week event, during August, at the water treatment plant that Actew Corporation have built, at their expense, an experimental recycling system. We hear a lot about "Environmental Impact Studies." Perhaps, an EIS is required for each of the housing developments we see in the suburbs. At the time of federation, one hundred years ago, an adequate water supply was recognized as a requirement for a new federal capital. The problem has not gone away. It has got worse.

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Fostering Sustainable Behaviour – Forum respondents :

1. Greg Hunt, Executive Officer, Western Port Greenhouse Alliance ghunt@casey.vic.gov.au
2. Barry Weinbrom, Director, 'Savingtheeartheveryday.org' baw441.aol.com
3. Megan Saxby, Workcover megan.saxby@workcover.nsw.gov.au

Appendices :

1. The published "Scheme of temporary restrictions on the use of water from Actew Corporation water supply system".
2. Pages from the Actew Corporation web-site :
    a) Preparing for Stage 4 Water Restrictions. The signs are one of the tactics.
    b) Water Wise Achievements, and
    c) The individual water use targets page from the *Save Water for Life* booklet.
3. The ACT Government press release for the use of the variable message signs as published in *The Canberra Times* of 7 December 2007.
4. *The Canberra Times* of 19 March 2008 : A typical article about ACT water consumption using the road signs as the graphic image.
5. *The Canberra Times* of 17 November 2008 : Actew Corporation relax Stage Three water restrictions during the last two weeks of the month.
6. The invitation / information sheet and the hard copy questionnaire used for the pilot study and for respondents preferring this method to the online survey.
7. A copy of the online version of the questionnaire.
8. The pilot survey and development of the coding protocol for the full survey.
9. A copy of the e-message from Marlene Stolt, Communications Manager of Actew Corporation, advising CPAS of their latest research findings. These are included in arguments within this study.
10. A simple specification sheet for the variable message sign.
11. A copy of the ANU Ethics Committee protocol [2008/282] approval for this survey.
12. A copy of the ANU Ethics Committee approval to make the questionnaire available through the ANU Apollo online system.

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13. Post-study and a continuing use for the road signs.

Appendix 1.

The published "Scheme of temporary restrictions on the use of water from Actew Corporation water supply system".

SCHEME OF TEMPORARY RESTRICTIONS ON THE USE OF WATER FROM ACTEW CORPORATION WATER SUPPLY SYSTEM

This Scheme, approved under the ***Utilities (Water Conservation) Regulation 2006***, applies only to water drawn from ACTEW Corporation Limited's potable water supply system unless the contrary intention appears. "Potable water" means water within the health and aesthetic values supplied in accordance with the *Drinking Water Quality Code of Practice* made under the *Public Health Act 1997*.

When it considers that it is necessary or desirable to do so in order to ensure that, on a medium to longer-term sustainable basis, it is able to meet its obligation under section 84 of the ***Utilities Act 2000*** to supply potable water in accordance with its standard customer contract, ACTEW must:

- after consultation with the Minister and the Environment Protection Authority; and
- by reference to the desirability of reducing water usage on an ongoing basis, the source capacity or quality of stored water available to it and/or the level of reduction in current and future water consumption which it considers necessary,

impose water restrictions under a Stage specified in the table below under Regulation 12 of the ***Utilities (Water Conservation) Regulation 2006***.

In deciding the target for reduction in water consumption to be achieved and thus which Stage of temporary restrictions should be in force, ACTEW may have regard to:

- dam storage levels;
- the time of the year and likely future consumption of water;
- daily consumption levels in the immediately preceding period;
- daily consumption levels in corresponding periods in previous years;
- currently available weather forecasts and other meteorological advice;
- the desirability of reducing water usage on an ongoing basis;
- the desirability of avoiding excessive reliance on only one of the ACT's water catchments;
- the possibility that, if restrictions do not sufficiently reduce current water consumption, water available for later supply may be of a quality that may cause damage to property; and
- any other relevant consideration.

When ACTEW considers that continued operation of a Stage of temporary water restrictions is no longer required, ACTEW must revoke the imposition of that Stage of temporary restrictions but may impose another Stage of temporary restrictions if it considers it necessary or desirable to do so.

ACTEW may, whether on application or of its own initiative, grant exemptions or partial exemptions to specified customers, to a specified class of customers, or to all customers, and such exemptions may be expressed to operate for the whole period during which this Scheme is in force or only for a specified period. Where exemptions are granted, ACTEW shall publish notice of that grant in a daily newspaper circulating in the ACT or otherwise directly notify affected customers or members of a class of affected customers.

Where customers can demonstrate serious detriment from application of this Scheme or a Stage of temporary restrictions, application can be made for an exemption or partial exemption. Applications for exemption must be made in writing and submitted to ACTEW, provided that ACTEW may agree to accept particular classes of applications by telephone (for example, where medical reasons limit a person's capacity to make written application). Exemptions or partial exemptions will only be granted in writing. Applications should include a statement of the reasons why an exemption or partial exemption is sought and set out, in particular, what serious detriment is claimed will be incurred if the application is not granted. Without limiting the grounds on which ACTEW might grant an exemption or partial exemption, applications may be granted where there is a compelling health or public hygiene reason or where compliance with temporary restrictions would be likely to cause disproportionate or unintended financial damage to the applicant.

At any time, the ACT Government retains discretion to declare a State of Emergency under the *Emergencies Act 2004* under which supply and/or use of water may be restricted to Emergency Use Only.

	Stage 1	Stage 2	Stage 3	Stage 4
Target Annual Reduction *Relative to Water Conservation Measures*	10%	25%	35%	55%
	Restrictions on Use	**Restrictions on Use**	**Restrictions on Use**	**Restrictions on Use**
1. Private gardens and lawns; commercial nurseries, market gardens and turf-growing businesses	Sprinkler and other irrigation systems can be used to water lawns and plants only between 7am and 10am and between 7pm and 10pm on alternate days as per the "odds and evens" system. A hand-held hose fitted with a trigger nozzle, a bucket or a watering can may be used at any time. At all times gardens and lawns may only be watered without causing pooling or runoff.	No sprinkler or other irrigation system, other than a dripper system, may be used. A hand-held hose fitted with a trigger nozzle, a bucket, a watering can or a dripper system may be used to water lawns and plants between 7am and 10am and between 7pm and 10pm on alternate days as per the "odds and evens" system. At all times gardens and lawns may only be watered without causing pooling or runoff.	No sprinkler or other irrigation system may be used. Watering of lawns not permitted. A hand-held hose fitted with a trigger nozzle, a bucket or a watering can may be used to water plants between 7am and 10am and between 7pm and 10pm on alternate days as per the "odds and evens" system. At all times gardens may only be watered without causing pooling or runoff.	External watering of lawns and plants only permitted using non-potable water.
2. Lawns and plants at parks, sports amenities, golf courses and public gardens	The target of a 10% reduction in water use should be met. At all times lawns and plants may only be watered without causing pooling or runoff.	The target of a 25% reduction in water use should be met. At all times lawns and plants may only be watered without causing pooling or runoff.	The target of a 35% reduction in water use should be met. At all times lawns and plants may only be watered without causing pooling or runoff.	External watering of lawns and plants only permitted using non-potable water.
3. Paved areas	Water must not be used to clean paved areas unless necessary as a result of accident, fire, health hazard or other emergency.	Water must not be used to clean paved areas unless necessary as a result of accident, fire, health hazard or other emergency.	Water must not be used to clean paved areas unless necessary as a result of accident, fire, health hazard or other emergency.	Water must not be used to clean paved areas unless necessary as a result of accident, fire, health hazard or other emergency.
4. Private ponds and fountains	Only fountains that recirculate water may be operated and they may be topped up only by using a hand-held hose fitted with a trigger nozzle, a bucket or a watering can. Ponds may only be topped up using a hand-held hose fitted with a trigger nozzle, a bucket or a watering can.	Fountains must be switched off. Ponds may only be topped up using a hand-held hose fitted with a trigger nozzle, a bucket or a watering can.	Fountains must be switched off. Only ponds that support fish may be topped up, and then only using a hand-held hose fitted with a trigger nozzle, a bucket or a watering can.	Fountains must be switched off. Only ponds that support fish may be topped up, and then only using a hand-held hose fitted with a trigger nozzle, a bucket or a watering can.
5. Public ponds and fountains	Existing ponds must not be filled or topped up other than with non-potable water. Only existing fountains that recirculate water may be operated and they may be topped up only with non-potable water. New ponds and fountains may not be filled with any water or used.	Existing ponds must not be filled or topped up other than with non-potable water. Only existing fountains that recirculate water may be operated and they may be topped up only with non-potable water. New ponds and fountains may not be filled with any water or used.	Existing ponds must not be filled or topped up other than with non-potable water. New ponds may not be filled with any water. No fountains may be operated or filled or topped up with any water	Ponds must not be filled or topped up with any water. No fountains may be operated or filled or topped up with any water.

	Stage 1	Stage 2	Stage 3	Stage 4
Target Annual Reduction Relative to Water Conservation Measures	10%	25%	35%	55%
6. Private swimming pools	Existing pools must not be either emptied or refilled without written exemption. Any pool not previously filled must not be filled without written exemption. Previously filled pools may be topped up using a hand-held hose.	Existing pools must not be either emptied or refilled without written exemption. Previously filled pools must not be topped up without a written exemption unless: (a) the pool is covered when not in use; and (b) topping up is undertaken with a hand-held hose only between 7 am to 10 am or 7 pm to 10 pm on alternate days as per the "odds and evens" system.	Pools must not be emptied, filled or topped up without written exemption.	Pools must not be emptied, filled or topped up without written exemption.
7. Public swimming pools	Existing pools must not be either emptied or refilled without written exemption but may be topped up. Any pool not previously filled must not be filled without written exemption.	Existing pools must not be either emptied or refilled without written exemption but may be topped up. Any pool not previously filled must not be filled without written exemption.	Pools may not be emptied, filled or topped up without written exemption.	Pools may not be emptied, filled or topped up without written exemption.
8. Water storage tanks, dams, and lakes.	Must not be filled or topped up other than with non-potable water.	Must not be filled or topped up other than with non-potable water.	Must not be filled or topped up other than with non-potable water.	Must not be filled or topped up other than with non-potable water.
9. Vehicles	If not washed at a commercial car wash, any vehicle should be washed on a lawn or other porous surface wherever practicable and then may only be washed, not more than once per week, by using: (i) a bucket or watering can; (ii) a high-pressure low-volume cleaner; or (iii) a hand-held hose fitted with a trigger nozzle. No restriction on commercial car wash operations. Boat motors may be flushed or rinsed after use.	If not washed at a commercial car wash, any vehicle should be washed on a lawn or other porous surface wherever practicable and then may only be used, not more than once per month, by using: (i) a bucket or watering can; (ii) a high-pressure low-volume cleaner; or (iii) a hand-held hose fitted with a trigger nozzle. Any vehicle may be washed at a commercial car wash only if it recycles water and holds an exemption allowing use of potable water. Boat motors may be flushed or rinsed after use.	No washing of any vehicle except at a commercial car wash that recycles water and holds an exemption allowing use of potable water. Boat motors may be flushed or rinsed after use.	No vehicle washing. Boat motors may be flushed or rinsed after use.
10. Windows and buildings	Windows and buildings can be washed at any time but only with a bucket and mop, squeegee or brush or with a high-pressure low-volume cleaner. Otherwise, water must not be used unless necessary as a result of accident, fire, health hazard or other emergency. Building Gutters may be cleaned at any time	No washing unless necessary as a result of accident, fire, health hazard or other emergency, provided that building gutters may be cleaned at any time	No washing unless necessary as a result of accident, fire, health hazard or other emergency, provided that building gutters may be cleaned at any time	No washing unless necessary as a result of accident, fire, health hazard or other emergency, provided that building gutters may be cleaned at any time
11. Construction and related activities	Water can only be used for dust or other pollutant suppression by means of a hand-held hose fitted with a flow cut-off device, or a vehicle fitted with sprinklers. Unless impractical, water may only otherwise be used by means of a hose fitted with a flow cut-off device. Wherever practicable non-potable water should be used.	Unless impractical, water may only be used by means of a hose fitted with a flow cut-off device. Wherever practicable non-potable water should be used.	Unless impractical, water may only be used by means of a hose fitted with a flow cut-off device. Wherever practicable non-potable water should be used.	Only non-potable water should be used unless otherwise exempted in writing.

Notes:

1. "Commercial Nurseries" and "Market Gardens" include any land primarily used to propagate, grow or display plants of any description for the purpose of the sale or other distribution for profit of those plants or the produce of them. "Turf growing" means the propagation, growth and harvesting of lawn turf for sale.
2. "Dripper system" means a system that releases water in drips through use of low-pressure drip devices placed on or below the ground in close proximity to the root zones of plants.
3. "High-pressure low-volume cleaner" means a machine which has a pump to increase the pressure and reduce the flow of water delivered from a trigger nozzle.
4. "Pooling or runoff" means water that either puddles on, or runs off, the surface of the soil when it is saturated.
5. "Paved Area" means an outside area with a concrete, asphalt, brick, tile, bitumen, timber or similar impervious surface (whether or not it is covered by a roof, pergola or other structure), such as a courtyard, decking, footpath, driveway or street.
6. "Private" means residential, business and non-Government premises.
7. "Public" means government places and private places operated for public use.
8. "Sprinkler" and "Irrigation System" means a device or system designed to distribute water, whether by sprinkling, spraying, dripping, weeping or otherwise.
9. "Trigger nozzle" means a nozzle, attached to a hand-held hose, which is controlled by (a) a trigger which must be depressed continuously or locked open by hand for water to flow; or (b) a discrete switch or button which can be turned on or off by hand with a single or limited movement.
10. The "odds and evens" system means that, if a street number ends in an odd number (i.e. 1, 3, 5, 7 or 9), water use on days when the date also ends in an odd number. Similarly, if a street number ends in an even number (i.e. 0, 2, 4, 6 or 8) then water can only be used for a restricted use on days when the date also ends in an even number or on the 31st day of any month.

Appendix 2.

Pages from the Actew Corporation web-site :
a) Preparing for Stage 4 Water Restrictions. The signs are one of the tactics.
b) Water Wise Achievements, and
c) The individual water use targets page from the *Save Water for Life* booklet.

Preparing for Stage 4 Water Restrictions

Stage 4 Water Restrictions will be needed if the ACT's water storage levels fall to the low thirties (%). Stage 4 was first foreshadowed in early 2007 due to record low dam levels but were able to be avoided because of the water saving efforts made by the community and ACTEW's extraction of water from the Murrumbidgee River to supplement supply.

ACTEW is urging the community to follow current Stage 3 restrictions and save as much water as possible as low consumption will be a key factor in helping us avoid Stage 4.

For tips on saving water, to find out how much water you are using and how much you should be using click here.

Why we may need Stage 4

Like most of Australia, the ACT has experienced drought conditions over the past six years and inflows into our catchments have been down by 63% from the long-term average, and almost 90% less in 2006.

Stage 3 Water Restrictions currently apply.

ACTEW will continue to monitor dam levels, water consumption, rainfall and forecasts and notify the community of changes to restriction levels as they are required.

Industry consultation

ACTEW has been consulting with industry groups that rely on outside use of water to prepare them should Stage 4 be required. These groups are: car wash, childcare facilities, cleaning industry (windows and buildings), construction industry, golf courses, irrigation, landscaping, motor industry (retail, service, repair), nurseries, pool industry (retail, servicing, construction) and turf industry.

Representatives of peak industry bodies and individual business owners have attended meetings to discuss ways in which they use potable water and potential exemptions ACTEW could put in place to assist them cope with an introduction of Stage 4.

ACTEW has been reviewing industry submissions and has developed exemption policies to help these groups maintain core business activities and preserve jobs while still making significant water savings.

If your business or industry is affected by the restrictions, contact ACTEW's Water Conservation Office to ensure you are aware of what the Stage 4 conditions will mean for you.

Water Restrictions

- Stage 3 now in place
- Exemptions
- Preparing for Stage 4
- Breaking Restrictions and Fines
- The ACT's water restrictions scheme
- Alternate sources of water during restrictions
- FAQ's and Definitions

ACTEW's Water Conservation Office

ACTEW's Water Conservation Office manages water restrictions and conservation measures in the ACT.

> More Info

Permanent Water Conservation Measures

Water Wise Achievements

Over the past several years the entire community has felt the effects of the drought, and has banded together to conserve our precious water supply. This page showcases a handful of organisations that have been doing their part and making significant water savings.

Australian Parliament House

Before water restrictions were implemented Parliament House typically used 150 megalitres of water each year to maintain the grounds. During Stage 3 Water Restrictions, Parliament House has reduced water use by more than 40%. More.

Canberra International Airport

The airport stores over 1.2 million litres of rainwater, uses only non potable water for irrigation has water-efficient cooling towers and waterless urinals and will soon be recycling over 100,000 litres of water every day. More.

Floriade

Australian Capital Tourism have adopted a number of water saving measures to reduce the environmental impacts of hosting Floriade. This includes things like sourcing the main water supply from Lake Burley Griffin a non potable source, as well as using efficient irrigation techniques. More.

The Australian National University

A recycled water trial is helping to keep some of the green giants at The Australian National University alive and well during the drought. The trial involves trucking in 30,000 litre units of a free treated sewage product to water these important trees. More.

THE AUSTRALIAN NATIONAL UNIVERSITY

Saving Water

- How much are you using?
- How much should you be using?
- Water Saving Tips
- FREE Waterwise Gardening Workshops
- Programs and Rebates from the ACT Government
- Grass Roots – the turf and irrigation research project
- Water Wise Achievements
  - **Australian Parliament House**
  - **Canberra International Airport**
  - **Floriade**
  - **Australian National University**
- For Kids
- Using alternate water sources

ACTEW's Water Conservation Office

ACTEW's Water Conservation Office manages water restrictions and conservation measures in the ACT.

> More Info

Permanent Water Conservation Measures

Water use targets and what they mean

Everyone's needs vary. The amount of water you use depends on your family circumstances, the kind of home you live in and even what you do for a living.

That's why ACTEW doesn't allocate a specific amount of water to each home or each person.

We do set targets, though. There's a daily target for Canberra as a whole, which we then break down into a target per person per day.

The targets vary according to the stage of water restrictions we're in. They also vary by season, because we realise you usually need to use more in summer, less in winter.

What do the targets mean for you?

Keeping the per person daily target in mind is a good way to work out whether you're playing your part in looking after this precious resource. It's a figure to aim for, and if you can beat it that's even better.

To do this, we all need to make changes to our daily routine, which is where this guide comes in. Inside you'll find water-saving tips to help you keep under the target usage. You'll also find helpful information on maintaining your garden under water restrictions.

What is my target?

Here's what you should aim for, but remember, less is always better. Use this table as a reference throughout the year.

Permanent Water Conservation Measures are in place when no temporary restrictions are required.

Stage	Spring	Summer	Autumn	Winter
1	280	390	280	210
2	230	300	230	190
3	200	250	200	180
4	150	150	150	150

DAILY TARGET - litres per person

Appendix 3.

The ACT Government press release for the use of the variable message signs as published in *The Canberra Times* of 7 December 2007.

DRIP FEED: ACT Labor MLA Karin MacDonald at a sign on Adelaide Avenue showing Canberra's water consumption figures. Picture: GRAHAM TIDY

ACT Govt takes water message to the road

The ACT Government is going on the road with its water-wise message, using electronic signs to appeal to motorists to stop the drop.

The signs, part of the Government's "Think water, act water" strategy aimed at reducing water usage and increasing dam capacity, will announce daily water consumption targets and dam levels along roads including the Tuggeranong Parkway, the Barton Highway and Adelaide Avenue.

Brindabella MLA Karin McDonald said, "We hope it will motivate Canberrans to think about ways they can further reduce their personal water consumption not only at home but throughout the day to conserve the precious water that remains in our dams.

Despite recent rain boosting dam levels to more than 43 per cent capacity, Ms McDonald said she encouraged Canberrans "not to become complacent with their water use as we have learnt how quickly conditions can change".

Last year, the volume of water flowing into our dams had been far exceeded by the amount the city had used. Such a situation could not be sustained.

Canberra must reduce its water consumption to 139ML a day in order to reach Stage 3 water restrictions targets. The signs will inform residents of the previous day's consumption so as to bring usage in line with this target.

Costing $30,000, the signs will remain for the next three months, with the possibility of becoming a permanent fixture or returning next summer should they succeed at reducing water consumption.

The electronic signage is to be followed by the enlarging of Cotter Dam and the designing of a demonstration purification plant to test water recycling technology.

Dimity Mannering

Appendix 4.

The Canberra Times of 19 March 2008 : A typical article about ACT water consumption using the road signs as the graphic image.

Autumn casts hot spell over thirsty ACT

By Megan Doherty

Canberrans are exceeding autumn water use targets by as much as 73 million litres a day as a run of hot weather continues in the national capital.

Actew says the combined dam storage has been falling by about 0.1 per cent a day in the unseasonable heat.

Canberra has sweltered through eight consecutive days above 30 degrees this month, well above the average top temperature for the month of 24.4 degrees.

Saturday's temperature of 35.2 degrees was almost 11 degrees above the average.

And on Sunday, the city guzzled 185 megalitres of water — 73ML or 73 million litres above the 112ML target.

Yesterday the mercury got to 29.9 degrees, which meant a record set in 1983 when the first nine days of March exceeded 30 degrees was safe.

Nevertheless, summer-like conditions are continuing, exacerbated yesterday by a smoke haze over Canberra coming from hazard-reduction burns interstate.

A 1135ha hazard-reduction burn was being conducted in state forest west of Batemans Bay and could send more smoke over the ACT in the next couple of days with heavy fuel loads being encountered.

In the meantime, the ACT is drying out.

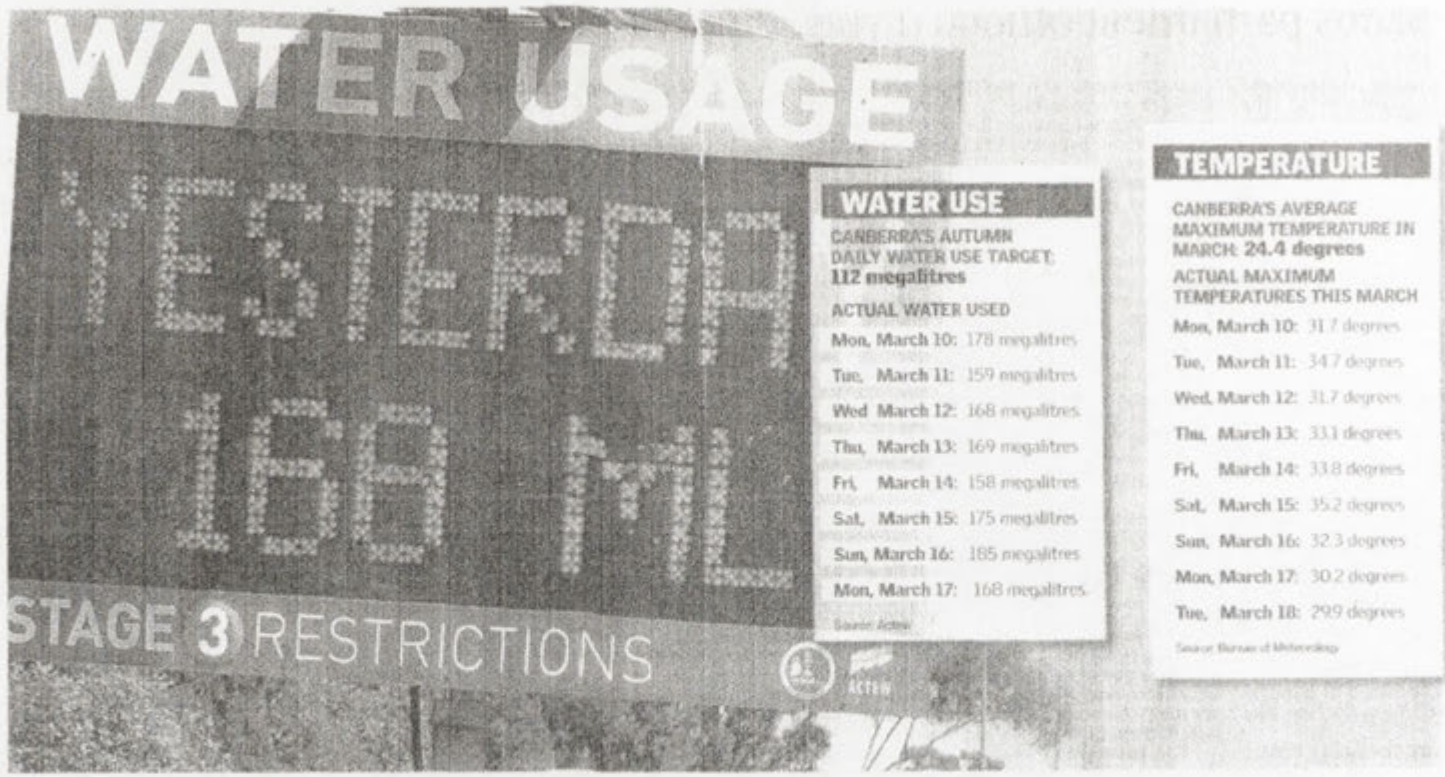
The combined dam storage for the territory had fallen to 47.95 per cent yesterday.

Canberra received above-average rainfall last summer, helping the city to use only 127ML of water a day, below the summer target of 139ML a day.

By contrast, Canberra Airport has so far received only 3.6mm of rain this month, the March average being 51.1mm.

At the beginning of this month Actew changed the daily water-consumption target to the autumn level of 112ML a day, only to see temperatures soar afterwards.

An Actew spokeswoman said the 112ML a day was an overall target for the entire three months.



WATER USE

CANBERRA'S AUTUMN DAILY WATER USE TARGET: **112 megalitres**

ACTUAL WATER USED

Mon, March 10: 178 megalitres
Tue, March 11: 159 megalitres
Wed March 12: 168 megalitres
Thu, March 13: 169 megalitres
Fri, March 14: 158 megalitres
Sat, March 15: 175 megalitres
Sun, March 16: 185 megalitres
Mon, March 17: 168 megalitres

Source: Actew

TEMPERATURE

CANBERRA'S AVERAGE MAXIMUM TEMPERATURE IN MARCH: **24.4 degrees**

ACTUAL MAXIMUM TEMPERATURES THIS MARCH

Mon, March 10: 31.7 degrees
Tue, March 11: 34.7 degrees
Wed, March 12: 31.7 degrees
Thu, March 13: 33.1 degrees
Fri, March 14: 33.8 degrees
Sat, March 15: 35.2 degrees
Sun, March 16: 32.3 degrees
Mon, March 17: 30.2 degrees
Tue, March 18: 29.9 degrees

Source: Bureau of Meteorology

"You can expect that in the beginning of autumn we will be tracking above target and at the end of autumn, we will be tracking below," she said.

But the recent hot weather had seen water consumption rise above expectations.

"Really what we've seen is a flip between February and March. February was really wet and we did have a mild summer and we came in under target for the summer consumption," the spokeswoman said.

Actew has urged people not to become complacent with water use in autumn.

"It will be a challenge to keep consumption down unless we get further rain," the spokeswoman said.

"It's concerning in the sense in that we are repeatedly seeing very dry and warm autumns during this drought."

Bureau of Meteorology Canberra duty forecaster Nick Bright said a high pressure system over the Tasman Sea was bringing hot winds from the centre of the continent over Canberra.

Milder conditions are forecast for the end of the week, with the chance of showers.

The bureau's NSW climate services centre manager, Perry Wiles, said yesterday there was only a 55 per cent chance that the ACT would receive above-average rainfall in autumn. "That's consistent with La Nina which is still present in the Pacific but La Nina is expected to decline over the autumn into winter," he said.

The bureau issues its next seasonal update on March 28.

Appendix 5.

The Canberra Times of 17 November 2008 : Actew Corporation relax Stage Three water restrictions during the last two weeks of the month.

VASHING-WISE: Gwen and Alf Williams at their Torrens home. Using water from their washing machine, they cleaned their driveway yesterday. With the relaxation of water restrictions for two weeks from next Saturday, cleaning of hard surfaces with tap water will be legal. Meanwhile, all Stage 3 restrictions apply. Photo: ANDREW SHEARGOLD

Water relief gives chance to spring clean

y Graham Downie

emporary exemptions to anberra's Stage 3 water restrictions ill give some relief to gardeners, ew swimming pool owners, motor ehicle owners and some sporting nd recreation areas.

The exemptions, announced esterday by Actew managing irector Mark Sullivan, begin next eekend for people wanting to clean indows and other hard surfaces round their dwellings. Known as the anberra spring clean, the xemptions will run from Saturday, ovember 15, to Sunday, November

Under one exemption, vehicles ay be washed using a bucket and ponge and trigger hose. Low-olume, high-pressure cleaners will e permitted on hard surfaces and ehicles.

Under another exemption, use of prinklers will be permitted on weekends from December 13 until February 1. As in previous years, sprinklers may then be used only between 7pm and 10pm – on Saturdays for even-numbered dwellings and on Sundays for odd-numbered dwellings.

Among those pleased by temporary exemptions are Alf and Gwen Williams, who have lived in their Torrens home for 41 years. Mr Williams said the drought had killed his lawn, but he had been able to maintain some vegetables.

Mr Sullivan said the intention of the exemptions was to allow deep watering of gardens, though it was recognised some systems would also water lawns. A condition of this exemption was that there be no run off or pooling of water.

Because people were paying to have water carted to fill swimming pools, Actew had decided a trial until the end of February would allow pools to be filled with potable water but only if specified water-saving devices were fitted in and around the home.

Mr Sullivan said similar provisions applied in about five states. Actew had recognised carting water to fill swimming pools required considerable energy.

During November, managers of large areas could ask Actew for permission to use more water if converting turf areas to water-efficient species such as couch or soft-leaf buffalo.

Mr Sullivan said the exemptions were in part to thank Canberra people for responding well to Stage 3 restrictions, which began on December 16, 2006. Since water restrictions were first imposed in 2002, about 140 gigalitres – about three times the present annual demand – had been saved.

It had also been recognised some hard surfaces needed to be washed to remove contaminants. Where practical, vehicles should be washed on grassed areas.

"All we ask is that people be responsible," he said.

People who breached water restrictions remained subject to a $200 fine. About 130 infringement notices had been issued since Stage 3 restrictions began.

"With some of these exemptions, there is really no excuse to breach the restrictions," Mr Sullivan said.

There had been some criticism of Actew for allowing the exemptions. Mr Sullivan said Actew was being very cautious and was confident it had enough water without risking going to Stage 4 restrictions which would ban all outdoor use of potable water.

The exemptions would be cancelled if there were a rapid decline of storage levels, now at 51.7 per cent. If the levels reached 60 per cent, Actew could consider removing Stage 3 restrictions.

Appendix 6.

The invitation / information sheet and the hard copy questionnaire for respondents preferring this method to the online survey.

THE AUSTRALIAN NATIONAL UNIVERSITY

CPAS at the ANU,
Building 38A,
Canbera 0200.

Water conservation messages in the ACT

We are asking you to fill out this questionnaire because we are trying to find out what residents think about the use, by Actew Corporation and the ACT Government, of the variable message signs to tell us, on a daily basis, about our water situation.

The signs were in use during December 2007 to today in five locations. We are seeking your feedback on whether this has been a worthwhile initiative.

The questionnaire should take no longer than 10 minutes to complete, but you are free to stop whenever you want. In filling out the questionnaire you are consenting to us using the results. All results will be reported in aggregate form. No individuals will be identified, nor identifiable.

Your input will be valuable as it will influence future planning.

If you have any questions or concerns about this research please contact :

1) *Chris Yardley <u4464968@anu.edu.au>*
2) *Project Supervisor Assoc. Prof. Sue Stocklmayer <cpas@anu.edu.au>*
3) *ANU Ethics Unit <Human.Ethics.Officer@anu.edu.au>*

We invite you to keep this introduction sheet as a reminder of the questionnaire.

Thank you very much for filling out this survey, please note it is on both sides of the attached page.

Or if you would prefer you can answer on-line
http://apollo.anu.edu.au/default.asp?pid=3097
Note : There is no www in this Internet address.

THE AUSTRALIAN NATIONAL UNIVERSITY

Questionnaire – Water conservation messages in the ACT

1 - Do you think water will become scarce enough in the next ten years that we shall need to consider alternative ways to provide it?

Yes ☐ No ☐

2 - Have you seen the electronic roadside water usage signs recently telling us about the water usage target and dam levels?

Yes ☐ No ☐

3 - Were you more often the driver or passenger when you saw the signs.

Driver ☐ Passenger ☐

4 - Did you find it personally relevant to be updated daily?

Yes ☐ No ☐

5 - Has this knowledge prompted you to think differently about your own use of water?

Yes ☐ No ☐

6 - Have you changed any of your water use habits as a result of the general publicity regarding the long term possibilities of water shortages?

Yes ☐ No ☐

If yes, which water use habits have you changed?

7 - Do you currently recycle water in your home for any purpose, (so called greywater use)? If so, please tell us about it.

PTO

Appendix 7.

A copy of the online version of the questionnaire.

Christopher Yardley
U4464968

Logout

Area: **CPAS - PG**

Effectiveness of ACT electronic road signs

1

Q1. Do you think water will become scarce enough in the next ten years that we shall need to consider alternative ways to provide it? ○ yes ○ no

Q2. Have you seen the electronic water usage signs on the roadside since December 2007 telling us about the water usage target and dam levels? ○ yes ○ no

Q3. Are you more often the driver or the passenger when you see the signs? ○ yes ○ no

Q4. Do you find it personally relevant there is a daily update? ○ yes ○ no

Q5. Has this knowledge prompted you to think differently about your own use of water? ○ yes ○ no

Q6. Have you changed any of your water use habits as a result of the continuing publicity regarding the long term possibilities of water shortages? ○ yes ○ no

Comments

Please use the comments box above to describe the water habits you have changed

Q7. Do you currently recycle water in your home for any purpose, (so called greywater use)? ○ yes ○ no

Comments

Please tell us in the comments box above about your use of greywater

Q8. Saving hot water run-off at the sink ○ Have invested / do it now ○ Considering?

Q9. Saving shower water ○ Have invested / do it now ○ Considering?

Q10. Saving 'greywater' for the garden ○ Have invested / do it now ○ Considering?

Q11. Installed your own water tank ○ Have invested / do it now ○ Considering?

Q12. Installed solar water heating ○ Have invested / do it now ○ Considering?

Q13. Changed to drought resistant plants ○ Have invested / do it now ○ Considering?

Q14. Installed drip irrigation ○ Have invested / do it now ○ Considering?

Q15. Any others? ○ Have invested / do it now ○ Considering?

Comments

Please use the comments box above to tell us about the other water saving ideas you have

Q16. Is there a prompt to change the ideas you have considered, (as above), into positive action? ○ yes ○ no

Comments

Q17. What is your age group? ○ 18-29 ○ 30-39 ○ 40-49 ○ 50-59 ○ Over 60

Q18. What is your gender? ○ Male ○ Female

Q19. Your home situation ○ Owner ○ You rent ○ Other

Q20. .....and you live in ○ a detached home ○ an apartment ○ a unit

Q21. Your post code?

Q22. What level of study have you completed? ○ Primary school ○ High school ○ Tertiary ○ Post-graduate

Q23. Do you have any comments you would like to make about this questionnaire, or about water/energy conservation in Canberra in general?

○ yes ○ no

Comments

Thank you very much for filling out this survey

« Previous Next »

« Back

Appendix 8.

The pilot survey and development of the coding protocol for the full survey.

The pilot survey.

With the prior approval of the President of the ACT Veterans Athletic Club at the club AGM on 19 May 2008 I formally described what I wanted to achieve and distributed a covering letter and questionnaire to members. I requested completion during the evening but did also have stamped address envelopes available. When I spoke perhaps 35 members were present. Copies were left on the registration table for latecomers.

30 completed questionnaires were received that same evening – none by post. Several members congratulated me on the questionnaire and my interest in water conservation. The return rate was approximately 60%. I cannot tell for sure as there were married couples present and I was told that only one person would complete the form.

The pilot was a success.

1. All the questions were answered essentially by everyone.
2. I have only experienced a difficulty with one question :

   "There are a number of water / energy saving initiatives available. Which have you done? Have you considered?"

Method	*Invested / do it now*		*Considered*	
	Yes	*No*	*Yes*	*No*
Saving hot water run-off at the sink		✓	✓	
plus table with seven other options				

   In this case I have recorded the response as "yes, considered" as this answer implies that it is not done now.

   This question could be rewritten to overcome this difficulty.

3. Four questions invited an unstructured written answer. The response rate to the open questions is high.

Open question	% of total response
Which water use habits have you changed?	*73.3*
Do you currently recycle grey water in your home?	*83.3*
What would prompt additional action?	*63.3*
Any additional comments?	*43.3*

4. The narrative answers allow for further coding as shown on the next four pages.
5. 'Open question' respondents have detailed an average 2.1 changes to their water use habits as a result of the publicity afforded to the 'level three water restrictions'.

Pilot questionnaire / open question :
Which water use habits have you changed?

id	written response	Number of habit changes
2	Shorter showers, compost toilet, grey water absorbsion	3
12	Garden watering less	1
13	Compost toilet, shorter showers	2
14	Saving water in the kitchen and shower for garden use.	1
16	Renewed all tap washers, check the dripping taps.	2
17	Shower saver, dual-flush toilets (ActewAGL service provided).	2
18	Not flush urinal after every use, do not run water while cleaning teeth, less garden watering, install rain water tanks.	4
19	Shorter showers – only flushing occasionally.	2
20	I live on the land and have caught my own water for nearly 34 years. When my large family was younger when we ran out of water we had to purchase water so I have always been aware of the cost.	1
21	Consciously use less water. Redesigned garden for less water use. Gave up washing dishes!	3
22	Toilet flushing frequency. Saving Shower water. Shorter showers.	3
24	Save water from hot tap when first turned on waiting to warm up. Water saved kitchen and shower.	1
27	I use only tank water.	1
28	I bathe with a dish / basin of water in the bath tub.	1
29	Shorter showers. Changing the garden to less lawn and more drought tolerant plants. Front loader washing machine.	4
30	Installed several tanks – use to flush toilet and for garden use, washing cars and outside facing areas.	1
31	Normal ways : Shorter showers. I have purchased two water tanks. Tried a water garden early or late. Given up watering the lawn.	4
32	Greywater saving cold water before hot water kicks in. Obtained tanks. Do not water garden just because it my turn.	3
34	Catching 'warm-up' water. Reduced watering of gardens.	2
36	Watering garden less often. Collecting shower water for use in the garden.	2
37	Water during showers and bath usage is collected in buckets for garden.	1
38	Not allowing excess water to go down the drain. [No] long showers.	2

None of these answers are particularly surprising with most people stating they save 'warming water for the garden and they take shorter showers. The prior installation of water tanks also feature as they do in answers to methods being considered.

Respondents admit to flushing the toilet less frequently. It is a reasonable thing to do.

Compost toilets feature and it is assumed these are a modern equivalent of the septic tank.

Pilot questionnaire / open question :
"*Do you currently recycle water in your home for any purpose, (so called greywater use)? If so, please tell us about it*".

id	written response	purpose	code
1	Bath water and washing-machine water collected and siphoned onto back lawn.	*garden*	*3*
2	Greywater filtration.		
11	Used on the garden.	*garden*	*3*
13	Greywater for trees.	*garden*	*3*
14	Saving water in the kitchen and the shower for garden use.	*garden*	*3*
15	Yes, all rinse water (not soapy) from kitchen, bathroom, washing machine goes on the garden.	*garden*	*3*
16	Washer waste water piped to the back garden area is used for the veggies, fruit trees and plants and small shrubs there-in. Bucket in shower assists to water front garden plants and hedges.	*garden*	*3*
18	Water from clothes washing machine onto garden.	*garden*	*3*
19	Only use rain water tank for outdoors use.	*garden*	*3*
20	Shower with my dogs, greywater for indoor plants – garden etc.	*garden +*	*3*
21	Save cold water from shower warming up for drinking water for dogs.		
22	Use shower water for trees.	*garden*	*3*
23	Yes, washing / clean rinsing water goes on outside pot plants and shrubs.	*garden*	*3*
24	Car washing – watering pot plants.	*garden +*	*3*
25	Greywater (rinse water) from washing machine placed by bucket on shrubs.	*garden*	*3*
27	Greywater goes onto the garden unless into the sceptic tank.	*garden*	*3*
28	For washing floors, watering plants.	*garden +*	*3*
29	Only shower water.		
30	No, plan for future.		
31	Washing machine water to water back yard.	*garden*	*3*
32	Washing machine water is run onto garden.	*garden*	*3*
35	Greywater on the lawn.	*garden*	*3*
36	Yes, water garden.	*garden*	*3*
37	Yes – washing machine water used on garden.	*garden*	*3*
38	Yes – for garden use.	*garden*	*3*

Greywater is predominantly used for the garden.

Pilot questionnaire / open question :
"What would be the prompt to change your ticks above in the 'yes, considered' column to become positive action?

id	written response	action	code
1	Very water use conscious and use sparingly – well under normal consumption. Cost not a consideration – may install in near future, (drip irrigation).	*cost*	*3*
12	Reduced cost for solar water heating, (hot water run-off / saving shower water / grey water own water tank).	*cost*	*3*
13	Overcome inertia, (saving hot water run-off at the sink).	*intent*	*5*
14	In the process of developing a new garden. I am considering a number of water conservation / use measures, (saving grey water / drip irrigation).	*intent*	*5*
15	Some financial incentive to pay for capital items. Change in water pricing to fully reflect cost / litre and encourage saving litres, (own water tank).	*cost*	*3*
17	Practical assistance – live alone, (drought resistant plants).	*intent*	*5*
21	Grant subsidies, (own water tank / drought resistant plants / drip irrigation).	*cost*	*3*
22	Would need financial investment to enact the method without considerable inconvenience, (hot water run-off / grey water / own water tank).	*cost*	*3*
23	A catastrophic prediction of water shortage backed up by formal evidence, (no specifics).	*intent*	*5*
25	If the townhouse was designed to consider change to the building, (no specifics).	*other*	*6*
27	Rebate for solar panels would help! (solar water heating).	*cost*	*3*
30	Not too difficult to install. Cost to set up. (Grey water).	*cost*	*3*
31	(1) Money (2) Time : in that order, (solar water heating / drought resistant plants).	*cost*	*3*
32	Solar water is too expensive to install, (solar water heating).	*cost*	*3*
34	Changes to the "laws" regarding siting of water tanks would be needed, (grey water / own water tank).	*legislation*	*7*
35	Demonstrated that this is an issue instead of a lack of Government planning, action and investment in infrastructure, (all except grey water).	*intent*	*5*
36	S's involved – decrease in $value of initial cost of purchase, increase in Government subsidy, decrease in red tape to install – water tank and solar heating only – plants seeing something I want.	*cost*	*3*
37	Increased Government subsidy to install solar water heating.	*cost*	*3*
38	Government help – solar heating.	*cost*	*3*

Cost is the predominant brake on the installation of solar and water heating.

Pilot questionnaire / open question :
Do you have any comments you would like to make about this questionnaire, or about water / energy conservation in Canberra in general?

id	written response	comment	code
15	It should be mandatory to instal water saving in all new homes. Real support should be given for retrofitting older homes.	*legislation*	*3*
16	I have many times seen regularly, people watering out of their odd+evens dates and out of their allowable times also car washing being done on evenings and weekends by the same 'CULPRITS'.	*legislation*	*3*
17	Build another dam	*legislation*	*3*
18	Government to increase level of restrictions. Once level reduced – population grows to accept reduced usage.	*legislation*	*3*
20	We need to get more serious.	*legislation*	*3*
21	It all helps.	*positive*	*4*
22	1. The extent to which one changes water consuming practices on the basis of publicity / information depends upon the starting position. Those who practice water conservation initially may change little. 2. Not watering the garden is a significant measure that is not explored in this questionnaire.	*legislation*	*3*
23	Thank you.	*positive*	*4*
25	Much too much water was wasted on environmental flows in previous years.	*legislation*	*3*
27	I believe it is ACTEW's responsibility to provide water and all the water saving gimmicks are just that.	*legislation*	*3*
28	With high number of new homes being built / planned it is hoped new storage/dam/pipelines be supplied in the ACT for future water supplies.	*legislation*	*3*
36	Government isn't serious enough about supporting it. If they did they would focus on encouraging wider use of power usage and water conservation providing more reasonable rebates / assistance to those people who would like to install either water or power conservation systems. The rules and regulations governing these conservation systems are archaic and very outdated.	*legislation*	*3*
37	Whilst I have observed the electronic signs they are not on roads I travel on on a daily basis. The information, seen fleetingly, did not impact on my usage of water but it may impact on some people who pass the signs daily.	*positive*	*4*

It is interesting that the final comments are biased towards a greater level of legislation to overcome the perceived problems.

The covering letter for the pilot survey.

Water conservation messages in the ACT

We are asking you to fill out this questionnaire because we are trying to find out what residents think about the use, by Actew Corporation and the ACT Government, of the variable message signs to tell us, on a daily basis, about our water situation.

The signs were in use during December 2007 to today in five locations. We are seeking your feedback on whether this has been a worthwhile initiative.

The questionnaire should take no longer than 10 minutes to complete, but you are free to stop whenever you want. In filling out the questionnaire you are consenting to us using the results. All results will be reported in aggregate form. No individuals will be identified, nor identifiable.

Your input will be valuable as it will influence future planning.

If you have any questions or concerns about this research please contact :

1) *ANU Ethics Committee representative <ethics@anu.edu.au>*
2) *Project Supervisor Assoc. Prof. Sue Stocklmayer <cpas@anu.edu.au>*

We invite you to keep this introduction sheet as a reminder of the questionnaire.

Thank you very much for filling out this survey, please note it is on both sides of the attached page.

Page 1 of the pilot survey.

1 - Do you think water will become scarce enough in the next ten years that we shall need to consider alternative ways to provide it?

Yes ☐ No ☐

2 - Have you seen the electronic roadside water usage signs recently telling us about the water usage target and dam levels?

Yes ☐ No ☐

3 - Were you more often the driver or passenger when you saw the signs.

Driver ☐ Passenger ☐

4 - Did you find it personally relevant to be updated daily?

Yes ☐ No ☐

5 - Has this knowledge prompted you to think differently about your own use of water?

Yes ☐ No ☐

6 - Have you changed any of your water use habits as a result of the general publicity regarding the long term possibilities of water shortages?

Yes ☐ No ☐

If yes, which water use habits have you changed?

7 - Do you currently recycle water in your home for any purpose, (so called greywater use)?

If so, please tell us about it.

PTO

Page 2 of the pilot survey.

8 - There are a number of water / energy saving initiatives available. Which have you done? Have you considered?

Method	Invested / do it now		Considered	
	Yes	No	Yes	No
Saving hot water run-off at the sink				
Saving shower water				
Saving 'grey water' for the garden				
Installed your own water tank				
Installed solar water heating				
Changed to drought resistant plants				
Installed drip irrigation				
Any others?				

9 - What would be the prompt to change your ticks above in the '*yes, considered*' column to become positive action?

To make sure we get a representative set of answers.....

10 - What is your age group?

18-29 ☐ 30-39 ☐ 40-49 ☐ 50-59 ☐ Over 60 ☐

11 - What is your gender? Male ☐ Female ☐

12 - Your home situation? Post code ☐ Owner ☐ You rent ☐ Other ☐

and you live in a detached home ☐ an apartment ☐ a unit ☐

13 -What level of study have you completed?

Primary school ☐ High school ☐ Tertiary ☐ Post-graduate ☐

Do you have any comments you would like to make about this questionnaire, or about water / energy conservation in Canberra in general?

Thank you very much for filling out this survey

Appendix 9.

A copy of the e-message from Marlene Stolt, Communications Manager of Actew Corporation,
advising their latest (November 2008) research findings.
These are included in arguments within this study.

Chris Yardley

From: "Stolt, Marlene" <Marlene.Stolt@actew.com.au>
To: "Chris Yardley" <cannava@alphalink.com.au>
Sent: Monday, 10 November 2008 8:01 AM
Subject: RE: Master's thesis on the effectiveness of the electronic road signs.

Chris,

The research we've done on the signs are below.

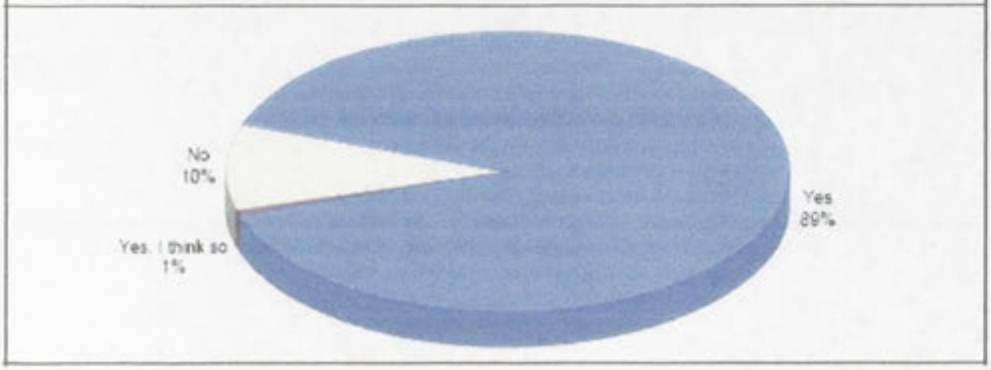
Respondents were then asked about specific components of ACTEW's information campaign – electronic information boards that have been placed alongside Canberra's major roads, and the orange Water Report advertisement notice, placed in Canberra's two main newspapers.

- The vast majority of respondents recalled having seen the roadside information boards (89% were sure they had noticed them, while 1% thought they had – see Figure 2).
    - Awareness of the information boards was considerably lower in South Canberra (67%) than elsewhere, and highest in Tuggeranong (98% – see Figure 10).
- One-quarter as many residents recalled having seen the Water Report advertisement notice (22% – see Figure 3).
    - Awareness of the advertisement was uniform across most districts but particularly low in Gungahlin-Hall (12%) and high in Weston Creek (32%).
    - More than two-thirds of those who had not seen the advertisement indicated that this was because they never or rarely read either of Canberra's newspapers.

It's likely that the different media have an impact on different demographic groups – in particular:

- **Age groups.** Information boards were less frequently noticed by older residents (from 96% of residents aged under 35, to 82% of residents aged 55 and over – see Figure 18), while the newspaper notice was more frequently noticed (from 5% of residents aged under 35, to 37% of residents aged 55 and over – see Figure 21).
- **Income brackets.** Households earning under $40,000 per annum were more likely than higher-income households to have seen the newspaper notice (31%, compared to 17-25% for higher income brackets – see Figure 31), and less likely to have noticed the information boards (63%, compared to 89-99% of – see Figure 28).

Figure 2: Have you noticed these electronic information boards?
Base: All respondents (n=360)



Perceived value of ACTEW's information

Respondents were asked to rate the *usefulness as an information source* of both the electronic information boards and the Water Report. By and large both sources were found useful by the people who recalled seeing them, with 53-62% saying these notices were useful either 'always' or 'most of the time', and only 6-8% indicating that they were 'never' useful (see Figure 4).

- Older respondents, who are progressively less likely to have noticed the electronic information boards in the first place, are also progressively less likely to find them useful if they do notice them – with 33% of respondents aged 55 and over indicating they are 'rarely' or 'never' useful (compared to 9% of respondents aged under 35 – see Figure 19).
- Females were much more likely than males to find ACTEW's newspaper Water Report useful (72% of females indicating it was useful 'most of the time' or 'always', compared to 33% of males – see Figure 26).

Figure 4: Usefulness of information from ACTEW

Base: Respondents who saw the notice boards / Water Report advertisement

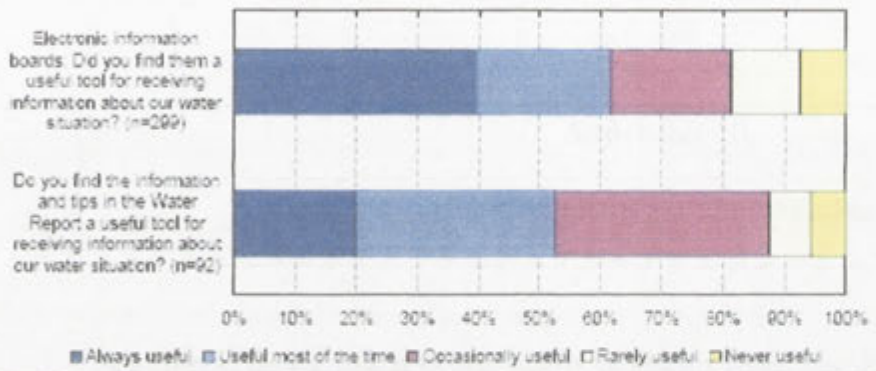
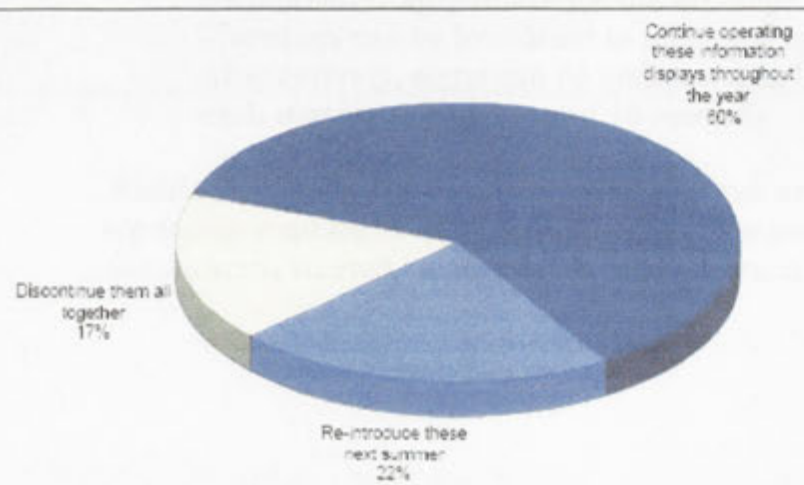


Figure 5 shows that most respondents (83%) believe that ACTEW should continue using its roadside information boards – with a majority of all respondents indicating that these displays should continue throughout the year, rather than just in summer.

- Respondents aged 55 and over were more likely than younger respondents to say that use of the signs should be discontinued altogether (32%, compared to 11-14% of younger age groups – see Figure 20).
- Households on incomes of under $40,000 per year were also the least likely to find the signs useful, and to wish to see ACTEW continue using them (see Figure 29 and Figure 30).

Figure 5: Thinking about what ACTEW should do with these signs, would you like to see ACTEW...

Base: Respondents who noticed the electronic signs



Appendix 10.

A simple specification sheet for the variable message sign.

A general description of the signs is taken from the New South Wales, Road Transport Authority, RTA, Standards Manual, Autumn 2002, page 57 :

> ### Variable message signs
> Variable message signs are electronic programmable signs generally used as a traffic management tools. These signs could be programmed with warning messages and simple instructions in the event of a flood. These signs generally use flashing lights to catch people's attention. Signs can either use mains power or if not available, solar power.
> Variable message signs allow messages to be updated. Messages can be scrolled, but not for moving traffic as this is considered too distracting and would probably not be allowed by the RTA.
> In general, a library of messages is stored in the sign and remote commands simply reference the message identification number. Warnings can be broadcast to all signs, taking about 30 seconds. Alternatively, signs can be addressed individually or in groups, with each contact taking around 15 seconds.

Within this study the variable message signs are also referred to as electronic road signs and / or road signs. Towards the end of 2008 Actew Corporation started to refer to them as electronic information boards.

Placement of the signs determines its visual impact and conspicuity. To be fully effective the sign must stand out from the surrounding background. Actew Corporation have a freedom of choice of placement of the study signs as their requirements are to gain maximum exposure to road users and they have placed the signs on five major roads where drivers are not under traffic strain and able to see and read the signs in a relaxed way, although one or two study respondents complained that the signs might divert driver attention.

The diagram below is taken from Austroads – Guide to Traffic Engineering Practice Part 8 – Traffic Control Devices. (page 8).

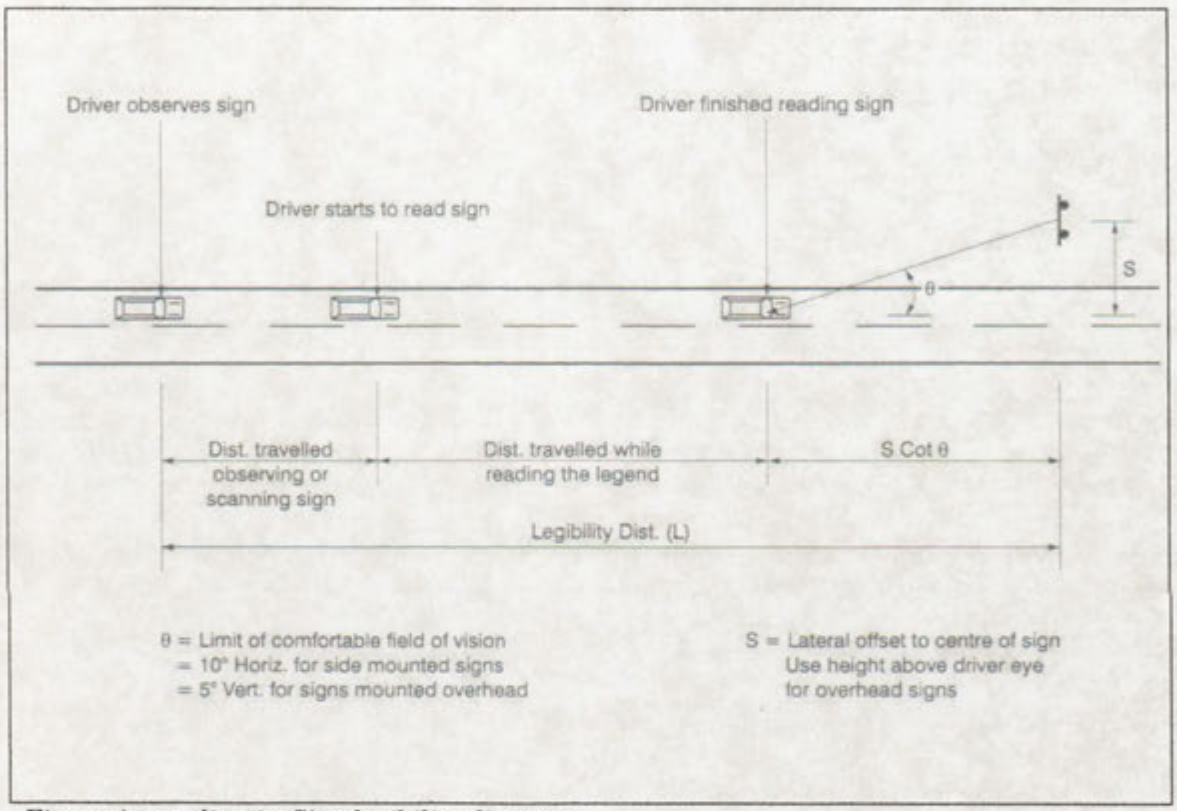


Figure Appendix 10 : Sign legibility distance

The web-site description of the signs hired by the ACT Government and Actew Corporation is shown as the next page.

RTT HIRE

SPECIALIST TRAFFIC CONTROL AND COMPACTION EQUIPMENT

EQUIPMENT | RTT | CONTACT

VARIABLE MESSAGE SIGNS (VMS)

VARIABLE MESSAGE SIGNS (VMS)

Variable Message Signs offer the greatest flexibility in communicating latest traffic and site information to road users. All our units are equipped with on board computer and modem, enabling instant remote message changing capacity.

Numerous features include:

- Robust, heavy duty construction
- Solar powered, continuous recharging
- Auto-start diesel generator backup, ensures continuous operation in adverse conditions
- Hydraulic raising/lowering of screen
- Full graphics capability, in addition to text and numeric
- On board computer and modem enabling instant remote message changing capability
- Automatic LED intensity adjustment to ambient light conditions

Appendix 11.

A copy of the ANU Ethics Committee protocol [2008/282} approval for this study.

Subject: Human Ethics Protocol 2008/282
From: aries@anu.edu.au
Date: Tue, July 8, 2008 7:57 am
To: u4464968@anu.edu.au
Cc: Sue.Stocklmayer@anu.edu.au (more)
Priority: Normal
Options: View Full Header | View Printable Version | Download this as a file | View Message details

ar Mr Christopher Yardley,

otocol: 2008/282
ectronic road signs advising ACT residents of the Stage Three water
trictions - is the medium effective?

m pleased to advise you that your protocol received approval by the
uty Chair of the HREC on 7 July 2008 subject to the following
ditions being met:

he research can commence only after a copy of the Information Sheet has
n sent to the Ethics Office for review and clearance by the Ethics
icer (e.g. how the participants have been selected, and contact
ails, must be included).'

outstanding matters need to be addressed and provided to the Human
ics Officer as soon as possible.

d regards,

Kim Tiffen
ics Manager
ice of Research Integrity
earch Office
ncelry 10B
Australian National University
ON ACT 0200

.Tiffen@anu.edu.au

ephone: 61 2 6125 3427
: 61 2 6125 4807

CRICOS Provider Code: 00120C

Appendix 12.

A copy of the ANU Ethics Committee approval to make the questionnaire available through the Apollo online system.

4968@anu.edu.a
ox
afts
nt
ash
nage Folders

Subject	Human Ethics Protocol 2008/282
From	aries@anu.edu.au
Date	Tuesday, August 26, 2008 9:07 am
To	u4464968@anu.edu.au
Cc	Sue.Stocklmayer@anu.edu.au , human.ethics.officer@anu.edu.au

THIS IS A SYSTEM-GENERATED E-MAIL. PLEASE DO NOT REPLY. SEE BELOW FOR E-MAIL CONTACT DETAILS

Dear Mr Christopher Yardley,

Protocol: 2008/282
Electronic road signs advising ACT residents of the Stage Three water restrictions - is the medium effective?

I am pleased to advise that the Chair of the Human Research Ethics Committee has approved the variation you submitted on 25/08/2008 requesting:

"I had expected to be able to distribute hard-copy questionnaires to fellow-members of a closed group - The ACT Master Athletics Club - from or in the monthly newsletter "Vetrunner".

The president of the club had told me he saw no difficulty with this scheme.

However, when he put it to the club committee, they decided not to allow distribution via the official club newsletter :
1. It is a vehicle for athletic pursuit and record.
2. It carries a few advertisements. It was felt that advertisers would object to a member getting free space in the magazine for an 'outside' venture.

The compromise has been ;
a) to convert the questionnaire to an on-line format using the ANU "Apollo" facility.
b) I shall personally place an advertisement in "Vetrunner" asking members (friends) to complete the questionnaire on line.
c) My letter to the editor also requesting attention to the questionnaire will be published in the September issue of "Vetrunner".

I do not believe this change prejudices the project in any way."

You may now commence your research as per your modified protocol.

All the best with your research,

Yolanda

Appendix 13.

Post study continuing use for the road signs

a) Orwellian overtures
b) The signs recognised as an element of the Canberra 'psyche'

Post study continuing use for the road signs

a) Orwellian overtures

Without any notice, of which I was aware, during January 2009, the road signs showed a quite different sequence of messages. These are shown below as Figure 27.

Figure Appendix 13 : The sequence of messages shown on the electronic road signs on Monday 5 January and Tuesday 6 January 2009.
The sequence reads from left to right and into the second line of messages. Every alternate message was "Take Care". The sequence was quite rapid, perhaps just 3 seconds for each message meaning that the driver was unlikely to have read the entire sequence before passing the sign.

This sequence is quite different, and might be considered threatening, (*you're being watched*), when compared with the affirmative action messages the road user has come to expect.

Someone made the decision to change the style and sequence. I can only infer, with lack of any proof, that Actew Corporation was worried about a sudden jump in the use of water during the start of January and did not want to publicise / recognize the increase.
With the summer target use of 139ML per day, the use of water for the two relevant weeks is shown in Table 44.

Date	December 2008						January 2009						
	26	27	28	29	30	31	1	2	3	4	5	6	7
Daily consumption ML	121	122	82	96	114	104	117	126	135	160	160	171	161

Table Appendix 13 : Daily water consumption the last week of December 2008 and the first week of January 2009.

Another change was noted personally, on 16 February 2009. The sequence was reduced to two screens. The *Yesterday* water usage was omitted. Once

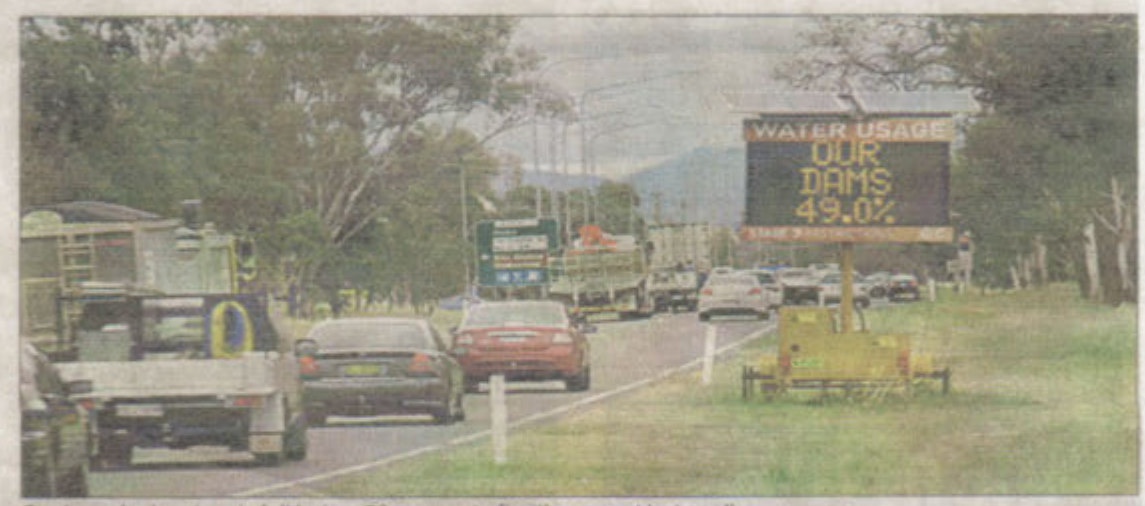
again, I wonder if it was deemed not appropriate to 'advertise' usage figures that are significantly above the *target*. And who makes that decision?

b) The signs recognised as an element of the Canberra 'psyche'

The advertisement reproduced on the following page has appeared during January 2009 in the weekly Community Newspaper, *The Chronicle*, since 13 January. The advertisement and the images shown are sponsored by the ACT Government (again) and the *Australian Broadcasting Company, ABC*, local Canberra Station *666 ABC*.

This renewal of the electronic road sign message and image and a further article in *The Canberra Chronicle* of 17 February 2009, shown below, confirm my description of these devices as having entered the ACT psyche.

community news
email: news@chronicle.com.au



Canberra's dam levels fell below 50 per cent after the recent hot spell.

Make every drop count

By Jessica Cumming

DAM levels have been declining over the summer with ACT residents using more than their daily consumption targets.

Marlene Stolt, from the ACTEW Corporation said dam levels last week were sitting at 49.0 per cent and going down by 0.1 of a percentage point per day.

"Dam levels have been declining," Ms Stolt said.

"Ten days ago they were at 50 (per cent) and today they are at 49 (per cent)."

On December 1 last year the ACT's combined dam levels were at 51.0 per cent and because of the holiday season Canberrans were given some exemptions to the stage three water restrictions, for some sprinkler use.

While Ms Stolt said there was no immediate threat of stage four water restrictions, Canberrans were still using an average of 38 megalitres above the 139 megalitre daily consumption target.

"Despite the cooler weather this year, our consumption has been tracking above target," Ms Stolt said.

"Canberrans used an average of 177 megalitres per day, however that's still above the summer daily target. "The high consumption means the faster our dam levels will decline."

Ms Stolt said Canberrans should use the current relief from the very hot weather to try and decrease their water usage.

She said Canberrans should also try to hold off watering their gardens when rain was forecast.

Overall, Ms Stolt said Canberra was still in a "reasonable position" in terms of dam levels.

She said the levels would need to reach the low 30s for Canberra to be moved to the next stage of water restrictions.


DON'T DRIVE WHEN YOU'RE TIRED
DON'T DRINK AND DRIVE
DON'T SPEED
READ THE SIGNS
Identify the signs of fatigue and take a break at one of the many picturesque townships or driver reviver stations when you head off to the South Coast this holiday season. Obey the speed limit, don't drink and drive and adjust your speed to the road conditions as they can change dramatically in peak holiday seasons.
ACT GOVERNMENT
666 ABC Canberra
Make your holiday a memorable one—for all the right reasons.