Community Acceptability of the Indirect Potable Use of Purified Recycled Water in South East Queensland: Final Report of Monitoring Surveys

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The Urban Water Security Research Alliance (UWSRA) is a $50 million partnership over five years between the Queensland Government, CSIRO's Water for a Healthy Country Flagship, Griffith University and The University of Queensland. The Alliance has been formed to address South East Queensland's emerging urban water issues with a focus on water security and recycling. The program will bring new research capacity to South East Queensland tailored to tackling existing and anticipated future issues to inform the implementation of the Water Strategy.

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FOREWORD

Water is fundamental to our quality of life, to economic growth and to the environment. With its booming economy and growing population, Australia's South East Queensland (SEQ) region faces increasing pressure on its water resources. These pressures are compounded by the impact of climate variability and accelerating climate change.

The Urban Water Security Research Alliance, through targeted, multidisciplinary research initiatives, has been formed to address the region's emerging urban water issues.

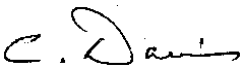
As the largest regionally focused urban water research program in Australia, the Alliance is focused on water security and recycling, but will align research where appropriate with other water research programs such as those of other SEQ water agencies, CSIRO's Water for a Healthy Country National Research Flagship, Water Quality Research Australia, eWater CRC and the Water Services Association of Australia (WSAA).

The Alliance is a partnership between the Queensland Government, CSIRO's Water for a Healthy Country National Research Flagship, The University of Queensland and Griffith University. It brings new research capacity to SEQ, tailored to tackling existing and anticipated future risks, assumptions and uncertainties facing water supply strategy. It is a $50 million partnership over five years.

Alliance research is examining fundamental issues necessary to deliver the region's water needs, including:

- ensuring the reliability and safety of recycled water systems.
- advising on infrastructure and technology for the recycling of wastewater and stormwater.
- building scientific knowledge into the management of health and safety risks in the water supply system.
- increasing community confidence in the future of water supply.

This report is part of a series summarising the output from the Urban Water Security Research Alliance. All reports and additional information about the Alliance can be found at http://www.urbanwateralliance.org.au/about.html.



Chris Davis
Chair, Urban Water Security Research Alliance

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EXECUTIVE SUMMARY

As part of the ongoing systematic social analysis research activities of the Urban Water Security Research Alliance, four telephone surveys of people's attitudes toward the proposed Purified Recycled Water (PRW) scheme have been conducted. The first survey (Baseline Behavioural) was conducted in November 2007 and its results can be found in Nancarrow, et al. (2007). The second survey (Time 1 monitoring) was conducted in May 2008 and sampled 150 new respondents and 151 retest respondents who had also participated in the baseline behavioural survey. The third survey (Time 2 monitoring) was conducted in July 2008 and sampled 147 new respondents and 205 previous respondents who had been involved in one or both of the previous surveys.

The final monitoring survey, Time 3, was conducted in December, after the Queensland Government announced the decision to add PRW to Wivenhoe Dam only when the combined levels of Wivenhoe, Somerset and North Pine dams fall below a critical point of 40% (in this report this will be referred to as the Government's decision). The final survey involved 203 respondents who had responded to at least one survey prior to the announcement and 200 new respondents. This report details the outcomes of the monitoring program and suggests strategies that may help to increase the acceptance of indirect potable reuse schemes.

Overall, across the four surveys, support for the proposed PRW scheme was relatively high. Despite the expressed levels of support, it was also clear that, given a choice, the majority of respondents would prefer not to drink water that contained PRW. Results of the baseline survey also suggest that support would drop if a viable alternative to PRW were available. For example, respondents in the baseline survey who supported adding purified recycled water to Wivenhoe Dam (80% of the total sample) were asked if they would still be supportive if three future alternatives occurred: 1) if it rained and filled the dams to pre-drought levels; 2) if they thought there might be some negative impacts on the environment; and 3) if enough water could be provided by alternative water management options. Potential negative impacts on the environment had the greatest potential to reduce support for the PRW (only 26% would still support the scheme in this event). Support would also drop to less than half of the total sample if people thought there were viable alternative water supply options. The possibility of rain would drop support to less than two-thirds of the total sample.

To assess the relative support for PRW, respondents in the baseline survey were also asked to rank their five most favourable new sources of water to meet demand in SEQ from a list of ten sources. The option of rainwater tanks was judged to be significantly more favourable than the other options. Stormwater irrigation, dual pipe system, state transfers, PRW and grey water garden irrigation were rated as next most favourable. Wastewater irrigation was rated as next most favourable, followed by more desalination plants and more dams. Bore water was rated significantly less favourably than any of the other options (Nancarrow, et al., 2007).

In the monitoring surveys, a decrease in support for the PRW scheme was evident after the Government's announcement, but the observed shift in support was only evident among those respondents who had initially supported the scheme. This may reflect a naturally occurring phenomenon, termed regression to the mean, where, over time, observations trend towards the mean, or average. Alternatively, the decreased support could represent reduced confidence in the authorities to provide recycled water, resulting from amendments to the original plan.

Respondents in the surveys were categorised as 'supporters', 'opponents' and those who were 'uncertain', on the basis of their overall support for the PRW scheme. Results showed clear differences between the three groups in terms of their attitudes towards the PRW scheme. The marked differences observed between the supporters, opponents and those who were uncertain were consistent across each measurement time.

Supporters of the scheme can be characterised as:

- Trusting government and science to provide safe and healthy PRW;
- Having positive emotions toward drinking PRW;
- Thinking that the distribution and decision-making processes associated with PRW have been fair;
- Thinking that the PRW scheme does not represent a health risk;
- Strongly thinking that the scheme is not risky relative to other risks;
- Thinking that it is unlikely that something could go wrong with the operation of the scheme, that it would be moderately serious if it did, and that government would be able to control such incidents;
- Being moderately concerned about climate impacts in SEQ; and
- Thinking that the PRW scheme does not violate a natural order, or laws of nature.

Those who are **uncertain** about the scheme can be characterised as:

- Having mildly negative emotions associated with the scheme;
- Thinking that the scheme is mildly unfair in terms of distribution of PRW across SEQ;
- Displaying moderate levels of distrust towards science and government;
- Thinking that the scheme is not risky relative to other risks;
- Feeling unclear as to whether the scheme represents a health risk, violates a natural order or laws of nature and whether the process associated with the scheme had been fair;
- Feeling unclear as to whether something could go wrong with the operation of the scheme and as to whether government would be able to control such incidents;
- Thinking that it would be very serious if something were to go wrong with the scheme; and
- Being moderately concerned about climate impacts in SEQ.

Those who **oppose** the scheme can be characterised as:

- Thinking that the scheme is risky relative to other risks and represents a high health risk;
- Demonstrating strong distrust towards government and science;
- Thinking that both the distribution of PRW across SEQ and decision-making processes regarding the scheme have been unfair;
- Displaying strong negative emotions toward drinking PRW;
- Thinking that it is very likely that something could go wrong with the operation of the scheme, that it would be very serious if it did, and that government would not be able to control such incidents;
- Being unclear as to whether there may be climate impacts in SEQ;
- Thinking that the PRW scheme violates a natural order, or laws of nature; and
- Demonstrating some ambivalence in terms of their emotional reactions to drinking PRW.

Overall, results from the research programme suggest that it is possible to build a support base for the introduction of a PRW scheme: however, a major challenge is maintaining the support base. Strategies that help to build trust in government to deliver a healthy and safe water supply, lower risk perceptions associated with PRW, establish supportive community norms in relation to PRW, and ensure that the implementation of the scheme is perceived to be fair, may help to build and maintain support in the community for the introduction of potable reuse schemes. Moreover, it is also proposed that a focus on the long-term water security needs of a region may help to ensure that this type of scheme is perceived as a necessary part of the overall approach to water management.

1. INTRODUCTION

The planning and management of water resources in the face of uncertain futures are major issues for governments at national, state and local levels. In South East Queensland (SEQ) the longest drought in recorded history, coupled with increased consumption associated with high population growth, recently combined to deplete dams to historically low levels. A map of the SEQ Region is presented below in Figure 1.

Figure 1: Map of South East Queensland Region.
Source: http://www.seqcatchments.com.au/about.html#region

In January 2007, the Premier of Queensland announced that the Government had made the decision to develop a Purified Recycled Water (PRW) scheme – forgoing a previously announced plebiscite on the matter. It was expected that this scheme would come on line by late 2008. The scheme plans involved piping treated wastewater to Wivenhoe Dam to be mixed with fresh water and then treated again as part of the standard drinking water treatment. Market research commissioned by the Queensland Water Commission (QWC) in 2007 showed that, at the time, over 70% of the community in SEQ supported an indirect potable reuse scheme (UMR, 2007). In December 2008, the Queensland Government announced that Purified Recycled Water would be introduced into Wivenhoe Dam only

as an emergency supply source once the combined levels of Wivenhoe, Somerset and North Pine dams fell below a critical level of below 40%.

At the time of the announcement opposition to the scheme had been gaining greater exposure and popular polls suggested that public support had shifted. In addition, increased rainfall and dam levels were reported widely in the media around this time and may also have influenced public perceptions of the necessity of water recycling schemes in SEQ. As Figure 2 shows, there was a gradual increase in the combined levels of Wivenhoe, Somerset and North Pine dams during the period of the research (i.e. November 2007 to December 2008); however, the major increases came in the first half of 2009.

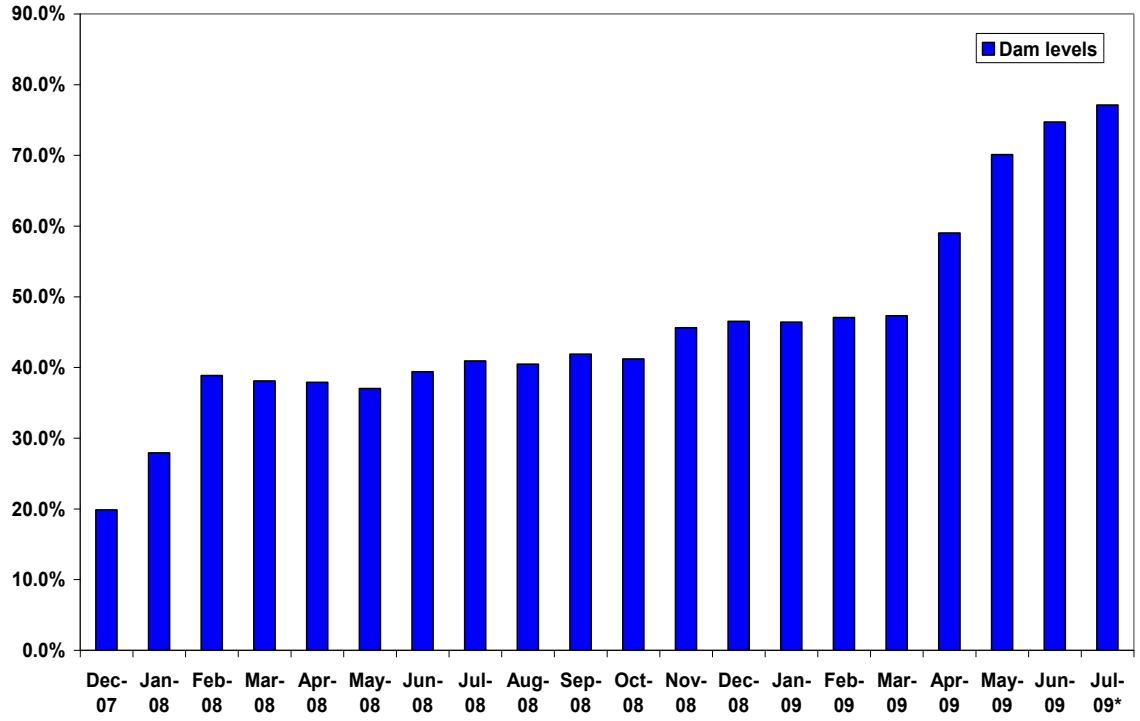

Figure 2: Wivenhoe, Somerset and North Pine dam records: Dec 07 - Jul 09 (Sourced from Queensland Water Commission 2009).

International experiences over almost fifty years have shown that what is sometimes referred to as the *DAD approach* (*Decide-Announce-Defend*) has consistently led to failure in implementing water recycling schemes (e.g. the San Diego water purification project; San Gabriel Valley groundwater recharge project) and demonstrated that social marketing and persuasion are ineffective for gaining community support for potable reuse of water (see Po, Kaercher and Nancarrow, 2004). Queensland itself has had difficulties in the past with gaining community support to augment drinking water supplies with recycled wastewater, both on the Sunshine Coast during the 1990s and, more recently, in Toowoomba.

A plebiscite was held in Toowoomba in July 2006 for community members to vote on whether to introduce PRW to town water supplies for indirect potable use. Leading up to the referendum on PRW in Toowoomba, polling suggested majority support for the introduction of the scheme; however the community voted in opposition. The results suggest a change of heart by many people who might initially have intended to vote yes. The Toowoomba example clearly indicates that attitudes towards and support for PRW can change as its introduction becomes more real and immediate and as emotions heighten in responses to political campaigns and media coverage.

Clearly, gaining and maintaining community support for reuse schemes is a critical part of successful implementation. This raises an important question: What are the key factors that underpin community support and acceptance of a potable reuse scheme? Community support for recycled wastewater schemes can be thought of as a combination of attitudes and behavioural intentions (Po et al. 2005). Previous research indicates that people's stated level of support for recycled wastewater schemes in Australia is often underpinned by, or dependent on, a number of factors or qualifiers (Leviston et al, 2006, Marks et al 2006, Po et al, 2006). For instance, an individual's stated support may change

considerably in response to a range of contextual factors, such as governance of a proposed scheme and other institutional arrangements. Caution is required when accepting the community's stated level of support for recycled water schemes at face value.

There is a growing body of research investigating community attitudes towards a variety of recycled water schemes (Dolnicar and Schafer, 2006; Hurlimann, 2007; Hurlimann, Hemphill, McKay, and Geursin, 2008; Hurlimann and McKay, 2006; ; Leviston et al., 2006; Marks, 2004; Marks, Martin and Zadoroznyj, 2006; Marks and Zadoroznyj, 2005; Nancarrow et al., 2007; Po et al., 2004; Po et al, 2005). Key findings from this literature suggest that acceptance of recycling schemes reduces when the use of the water is more personal and that emotion, risk, trust and fairness are important determinants of public acceptance. Research by Leviston et al. (2006) shows that emotion and subjective norms were found to have the strongest direct influence on intended behaviour in response to a proposed recycled water scheme. Interestingly, knowledge of the scheme failed to contribute significantly to the prediction of intended behaviour. These findings are consistent with previous research highlighting the importance of emotion, norms trust, risk, and fairness as predictors of recycled water acceptance (Hurlimann et al. 2008).

Emotional reactions to recycled water, such as disgust (commonly termed the 'yuk factor') are used as a primary explanation for why many people are unwilling to adopt recycled water for potable use (Dolnicar and Schafer, 2006; Po, Kaercher and Nancarrow, 2004; Po et al, 2005; Marks, 2003) and as a rationale for disregarding proposed water recycling schemes (Russell and Lux, 2009). Loewenstein et al (2001) suggest that people might rely on emotional appraisals as a primary cue when assessing potential risks and benefits. People's evaluations of environmental risk may be influenced by both their cognitions and emotion, which highlights the important role of 'intuitive thinking about risk' (Nerb and Spada, 2001). Emotions have been shown to play a key role in the way people rate environmental risks, demonstrating a relationship with perceived acceptability and potential damage (McDaniels et al. 1995). Emotion plays a central role in the literature on attitudes to recycled water; however Russell and Lux warn that too much emphasis is placed on the role of emotion in predicting support for PRW.

Fairness has been found to be a major predictor of community reactions, including acceptance and compliance, to a wide range of urban and rural water management and policy issues (Syme, Nancarrow and McCreddin 1999). Research on recycled water use in an urban Australian context has demonstrated that processes that are perceived as fair are positively related to satisfaction (Hurliman, Hemphill, McKay and Geursen, 2008) and negatively related to risk perceptions (Hurlimann, 2007). Two basic types of fairness are discussed in the literature (see Tyler and Blader, 2000 for a review): the perceived fairness of the *distribution* of resources, risks or burdens - known as distributive fairness - and the fairness of the decision-making *process* used to determine such distribution - procedural fairness. Research has demonstrated that individuals' reactions to decisions made by another person or an authority are influenced by how fairly they perceive the decision-making process to be, independent of how desirable the outcomes of that process may be (Thibaut and Walker, 1975). This phenomenon may be of particular interest in the SEQ recycled water context, as the community was not consulted about introduction of the scheme.

Research on community attitudes to PRW for indirect potable use in SEQ (Alexander et al, 2008) indicated that the perceived risks associated with the scheme were informed by assessments of: a) potential associated health risks; and b) potential risks related to the operation of the scheme, including accidents and malpractice. Australian research has demonstrated that risk perceptions associated with PRW are mainly related to public health issues related to potable use of the water.

More specifically, people's main concerns about PRW are related to the potential lethality of pathogens in the water and the unknown impact of chemicals used in the treatment process (Kaercher et al., 2003; Melbourne Water, 1998; Sydney Water, 2002). Concerns about decrements in children's health due to drinking PRW are particularly pronounced. For instance, 92% of respondents in the Sydney Water study agreed or strongly agreed with the statement "people will worry about the safety of recycled water for their children."

There are two main risk characteristics that may be associated with the operation of technical systems like those used in the PRW treatment process. These are the perceived *likelihood* of threats and *severity* of consequences. These two risk characteristics have been shown to be important to people's appraisal of threat (see Protection Motivation Theory as posited by Rogers, 1983) and risk perceptions (Neuwrith, Dunwoody and Griffin, 2000). Perceived level of control over the threat, or *controllability*, appears to be another important factor in people's risk perceptions, particularly in relation to a new technology.

Technical experts and the general community often have different attitudes towards and understandings of the risks and benefits associated with hazards (Sjöberg, 1998; Browne et al, 2007). The general community tends to have less detailed knowledge than technical experts about hazards and must therefore rely on the judgement of experts and authorities when making risk assessments. Risk assessments made by the general community in the absence of specific knowledge may be primarily informed by cues regarding the trustworthiness of the responsible authority and sources of information (Siegrist and Cvetkovitch, 2000).

Overall, the relationship between trust in authorities and attitudes towards policies has been consistent in empirical investigations; however, the relationship was often found to be either weak or moderate (Bord and O'Connor, 1992; Biel and Dahlstrand, 1995). Trust in government authorities and scientific investigations to provide safe recycled water has been found to play a crucial role in determining public acceptance of water reuse (e.g. Kaercher et al., 2003; Nancarrow, 2007; Hurlimann et al, 2008; Hurlimann and McKay, 2004). Trust in the water authorities has been found to be the main indicator of how acceptable people perceived the quality of their drinking water to be (Syme and Williams, 1993; Porter et al., 2000, 2002).

The main focus of past research has been on recycled water for non-potable use and, moreover, longitudinal research tracking changes in acceptance and associated psycho-sociological variables is rare (see Hurlimann, 2008, for an exception). Thus, the current research which tracks acceptance and associated drivers of acceptance of an indirect potable recycled water scheme can make an important contribution to our understanding of this type of scheme.

This report details findings from four surveys of community attitudes to PRW that were conducted by the Systematic Social Analysis component of the Urban Water Security Research Alliance (UWSRA). A baseline survey was undertaken in order to better understand the determinants of community acceptance of recycled water in SEQ. This was followed by three monitoring surveys conducted in order to understand how these determinants may change over time. These activities were undertaken in line with the primary objective of the Systematic Social Analysis project:

> *to identify and provide a baseline measurement of the psychological drivers of the community's intended behaviour in relation to drinking PRW to provide for the informed design of community engagement and education, and the monitoring of any shifts in community attitudes, values and intended behaviours over time and with increased experience*.

This report builds on previous research activities undertaken as part of the Systematic Social Analysis project which have been detailed elsewhere in technical reports for the UWSRA. These research activities are described as follows:

- A **Baseline behavioural survey** was conducted in SEQ in November 2007 with 583 respondents indentified as living in areas that would receive water containing PRW once the scheme was operational (Nancarrow et al., 2007).
- **Qualitative scoping workshops** (Alexander et al., 2008) and **Q-method workshops** (Browne et al., 2008) were conducted within SEQ to explore in greater depth key factors identified by the Baseline survey. In addition, **Toowoomba retrospective workshops** were conducted with Toowoomba residents who had voted in the recycled water plebiscite.

Findings from the Baseline survey (Nancarrow et al., 2007) suggest that the key determinants of support for PRW are normative support (i.e. perception that important others support the scheme), perceived fairness, perceived risk and the emotions associated with the PRW scheme. Perceptions of the risks associated with the PRW system were also heightened by distrust in government, and negative emotional reactions. Perceived system risks were in turn heightened by perceived health risks associated with PRW. Higher levels of health risk were associated with lower levels of acceptance.

2. METHODOLOGY AND SAMPLING

The three monitoring surveys detailed in this report were conducted in order to track levels of acceptance of PRW as well as key determinants identified by the Baseline survey.

- A Time 1 monitoring survey was conducted in May 2008 with 151 respondents who had been involved in the Baseline behavioural survey and 150 randomly selected new respondents;
- A Time 2 monitoring survey was conducted in July 2008 with 205 respondents who had participated in one or both of the previous surveys and 147 randomly selected new respondents; and
- The final monitoring survey, Time 3, was conducted in December 2008, after the Queensland Government announced the decision to add PRW to Wivenhoe Dam only when water levels fall below a critical point of 40%. The survey involved 203 respondents who had responded to at least one survey prior to the announcement, and 200 randomly selected new respondents.

2.1. Study Area and Respondents

For the purposes of the research, four 'sectors' of SEQ were identified that were comprised of one or a number of adjacent Local Government Areas (LGA) that received their water supply from Wivenhoe dam.[1] The principal aim of the monitoring surveys was to track changes in attitudes towards PRW over time. As such, each survey involved recontacting people who had previously participated in the Baseline survey or one of the earlier monitoring surveys. In order to confirm that those who participated in more than one survey were representative of the SEQ population, new respondents were randomly selected to participate in each survey, from computer generated telephone lists of selected suburbs. It was hoped that the inclusion of new respondents at each time would provide a comparison point and minimise potential sampling bias that may arise from only including respondents who agreed to be surveyed across time. Table 1 provides a summary of levels of participation in each survey. A total of 331 people, or 30.7% of the total sample, were involved in more than one survey.

Those respondents who participated in more than one survey will be referred to as *retest respondents* throughout this report, as their initial attitudes to PRW have been retested at a later stage of the research. Those people who only participated in one survey will be referred to as *new respondents.*

The suburbs selected for sampling new respondents in the monitoring surveys were stratified socio-economically (into lower, medium and higher socio-economic groups) for each sector based on average weekly family income figures from the 2006 ABS census. Target numbers of new respondents from each of these sectors were determined in relation to relative population, while ensuring sufficient numbers to allow valid statistical comparisons. Details of the suburbs selected for sampling new respondents across the four sectors and different socio-economic groups are provided in Appendix 2. Table 2 provides an overview of the socio-economic composition of the sample from each sector.

For each survey, respondents were eighteen years or older and from separate households. Efforts were made to recruit an equal number of males and females. Interviewers were instructed to call each household a minimum of five times (at different times of the day and on different days) before they could dismiss it as a "no contact" household. The refusal rates for each survey are listed in Table 3, and the reasons people gave for refusal to participate in the surveys are listed in Table 4.

The socio-economic composition of each sector was roughly comparable with the other sectors that were sampled in the survey, with the exception of Laidley, which recorded proportionally more respondents residing in higher socio-economic suburbs (36.4% of the sector sample).

[1] While Redcliffe, Pine Rivers and Caboolture Shires are normally supplied by North Pine Dam, at the time of the Baseline behavioural survey North Pine Dam levels had dropped below 20% - at which point supply to these areas defaults to Wivenhoe Dam.

Table 1: Summary of participation in surveys.

Participation	Surveys	N	%
Four surveys	Time 3, Time 2, Time 1 and Baseline	67	6.2
Three surveys	Time 3, Time 2 and Time 1	32	3
	Time 3, Time 2 and Baseline	28	2.6
	Time 3, Time1 and Baseline	9	0.8
	Time 2, Time1 and Baseline	27	2.5
	Sub-total	*96*	*8.9*
Two surveys	Time 3 and Time 2	64	5.9
	Time 2 and Time 1	31	2.9
	Time 2 and Baseline	20	1.9
	Time 1 and Baseline	50	4.6
	Time 3 and Time 1	3	0.3
	Sub-total	*168*	*15.6*
One survey	Time 3	200	18.6
	Time 2	83	7.7
	Time 1	82	7.6
	Baseline	382	35.4
	Sub-total	*747*	*69.3*
Total		***1078***	***100***

Table 2: Socio-economic composition of sample for each sector2.

	Brisbane		Ipswich		Laidley		Caboolture		Total	
Sector	**(N = 510)**	**%**	**(N = 172)**	**%**	**(N = 129)**	**%**	**(N = 227)**	**%**	**(N = 1038)**	**%**
Lower	125	24.5	37	21.5	18	14.0	51	22.5	231	22.3
Medium	224	43.9	74	43.0	64	49.6	120	52.9	482	46.4
Higher	161	31.6	61	35.5	47	36.4	56	24.7	325	31.3

Table 3: Refusal rates[3].

	Baseline	Time 1	Time 2	Time 3
Refusals	1502	426	347	301
Total people contacted	2085	727	699	704
Refusal rate	72%	58.6%	49.6%	42.8%

Table 4: Reasons for refusal.

Reason	N
Not Interested	1005
Too Busy	921
Survey Too Long	198
Hung up before commencing questionnaire	152
Elderly	122
Unwell	65
Limited English	62
Aborted questionnaire part-way	13
Total	***2538***

[2] Forty two respondents' suburb of residence were not recorded.

[3] The questionnaire in the Baseline behavioural survey took longer to complete due to inclusion of open-ended questions designed to elicit detailed information from respondents. The interviewers were instructed to inform potential respondents of the estimated time to complete each questionnaire in the survey before commencing. The response rate may have been lower in the Baseline survey due to the a dditional time required to participate.

2.2. Sample Characteristics

A number of socio-demographic questions were asked of respondents at the end of the questionnaire. New and retest respondents demonstrated similar demographic characteristics at each survey time, with some slight exceptions. Retest respondents were slightly older than new respondents, with a lower proportion of people aged less than 40 years. New respondents in the Time 3 monitoring survey tended to be sampled from suburbs which recorded higher socio-economic levels in the 2006 census; however there were no significant differences ($p > .01$) between new and retest respondents on any of the key variables measured at any of the survey times. The key variables measured are detailed in Table 9 and include: support for the scheme; emotion; health risk; system risk; relative risk; procedural fairness; distributive fairness; trust in government and trust in science.

Furthermore, there were no significant differences ($p > .01$) between the different socio-economic status (SES) levels, or age brackets for any of the key variables at any measurement time point. This means that age and socio-economic status did not influence the results of the surveys. There were only minor differences observed between the attitudes of men and women. For instance, women were significantly ($p < .10$) more concerned about system risks in the baseline survey than men, and demonstrated more negative emotions towards PRW in the Time 3, Time 1 and Baseline surveys. Details of demographic characteristics of new and retest respondents in the Baseline survey and Times 1, 2 and 3 monitoring surveys are provided in Appendix 3.

A summary of respondents' age and gender is provided in Table 5. Women comprised 53.3% of the sample. Male and female respondents demonstrated comparable age structures, with approximately 56.7% of the whole sample aged between 40 to 65 years.

Table 5: Age by gender: respondents overall.

Age Bracket	Female		Male		Total	
	N	%	N	%	N	%
Less than 24yrs	15	2.6	21	4.2	36	3.3
24 to 39yrs	140	24.3	102	20.3	242	22.4
40 to 55yrs	215	37.4	182	36.2	397	36.8
56 to 65yrs	107	18.6	108	21.5	215	19.9
66 to 75yrs	73	12.7	70	13.9	143	13.3
More than 75yrs	25	4.3	20	4.0	45	4.2
Total	***575***	***53.3***	***503***	***46.7***	***1078***	***100.0***

In Table 6, the details of the household structure for the whole sample are shown. The most common household unit was comprised of two adults with the eldest child aged less than 18 years (25.1% of the sample), followed by two-adult households with the older person aged less than 65 years (20.7% of the sample).

Table 6: Household unit: respondents overall.

Household unit	(N = 1075)	%
Single adult less than 65 years	82	7.6
Single adult more than 65 years	55	5.1
Two adults- older person less than 65 years	222	20.7
Two adults- older person more than 65 years	140	13.0
Single adult- eldest child less than 18 years	38	3.5
Single adult- eldest child more than 18 years	23	2.1
Two adults- eldest child less than 18 years	270	25.1
Two adults- eldest child more than 18 years	117	10.9
More than two adults- no children	58	5.4
More than two adults- eldest child less than 18 years	45	4.2
More than two adults- eldest child more than 18 years	25	2.3

2.2.1. Demographic Comparisons

To assess whether the survey sample was representative of the SEQ population, the sample demographics were compared with 2006 ABS Census data where appropriate.

Table 7 compares the gender composition of each sector sampled in the survey with census data from the Local Government and Statistical Areas that comprise each sector. The gender composition of the survey sample for each sector approximates the relevant census data.

Table 7: Gender composition of sectors: comparison of survey data and 2006 ABS census.

Gender - Survey	Brisbane (N = 510)	Ipswich (N = 172)	Laidley (N= 129)	Caboolture (N=227)
Male	46.5	47.1	48.1	47.6
Female	53.5	52.9	51.9	52.4
Gender - 2006 ABS Census	**Brisbane City and Logan City (N = 792, 869)**	**Ipswich City (N = 78, 655)**	**Laidley, Gatton and Esk LGAs (N = 28, 353)**	**Caboolture, Pine Rivers and Redcliffe City (N = 191, 530)**
Male	48.0	48.8	49.9	48.4
Female	52.0	51.2	50.1	51.6

The age structure of each sector sampled in the survey and census data from the Local Government and Statistical Areas that comprise each sector are compared in Table 8. The youngest and oldest age brackets were under-represented in the survey sample compared to ABS data; however, as previously mentioned, there were no differences between the different age brackets for any of the key variables at any survey time point. Approximately 32.5% of the Brisbane sector sample was aged less than 40 years compared to 46.6% of the adult population (aged 18 years or older) in the combined Brisbane and Logan City Statistical Areas that comprise that sector (according to ABS data).

Table 8: Age composition of sectors: comparison of survey data and 2006 ABS census.

Age bracket - survey	Brisbane (N = 510)	Ipswich (N = 172)	Laidley (N= 129)	Caboolture (N=227)
18-23	4.5	1.7	1.6	3.5
24-39	28.0	19.2	12.4	18.1
40-55	37.1	34.3	38.8	37.9
56-65	16.7	26.2	23.3	20.7
66-75	10.0	14.5	17.8	16.3
75+	3.7	4.1	6.2	3.5
Age bracket - 2006 ABS Census	**Brisbane City and Logan City (N = 792, 869)**	**Ipswich City (N = 78, 655)**	**Laidley, Gatton and Esk (N = 28, 353)**	**Caboolture, Pine Rivers and Redcliffe City (N = 191, 530)**
18-23	13.3	12.4	10.5	10.8
24-39	33.3	33.7	25.7	27.6
40-55	28.8	30.1	33.9	33.5
56-65	10.7	11.0	15.3	12.9
66-75	6.7	6.5	8.1	8.0
75+	7.2	6.2	6.4	7.2

3. DEVELOPMENT OF SURVEY MEASURES

The measures used in the monitoring and baseline surveys were informed by wastewater reuse literature (Hurlimann, Hemphill, McKay and Geursen, 2008; Hurlimann et al, 2008; Hurlimann, 2007; Hurlimann and McKay, 2004; Marks et al., 2006; Marks, 2003; Marks, Martin and Zadoroznyj, 2006; Marks and Zadoroznyj, 2005; Dolnicar and Schafer, 2006; Russell and Lux, 2009; Melbourne Water, 1998; Sydney Water, 2002), the qualitative research conducted in the Systematic Social Analysis project (Alexanders et al., 2009; Browne et al., 2009) and CSIRO research into the drivers of people's behavioural decisions regarding wastewater reuse (Leviston et al, 2006; Nancarrow et al., 2007; Po et. al 2005, Po, Kaercher and Nancarrow 2004; Po and Nancarrow 2004). A review of the relevant literature is presented in Section 1 of this report and additional details are provided in Appendix 4.

In addition, focus groups held with Toowoomba residents who had voted for or against the introduction of an indirect potable reuse scheme suggested other factors relevant to acceptance of potable recycled water schemes (see Appendix 5 for a detailed qualitative analysis). These include:

- the perceived risk of PRW relative to other risks;
- the distinctions people make between their own attitudes and the perceived attitudes of others in their community;
- concerns about climate change and water availability; and
- concerns about PRW contravening or violating a natural process, or law or nature.

3.1. Description of the Scales Used

Table 9 lists the scales used to measure each key concept measured in the monitoring surveys, the items included in each scale and the associated Cronbach's alpha. After recoding of reverse-worded items, a single score was calculated for each respondent on each variable by averaging the respondent's scores across the items comprising the scale. The Cronbach's alpha provides a measure of the reliability of the scales; scores range from 0 to 1 with scores closer to 1 indicating higher reliability. With the exception of the scale measuring distributive fairness, all the scales had satisfactory to high levels of reliability.

Section 1 of this report provides details of the literature that informed development of survey measures. Additional details about the literature and measurement of the concepts used in the surveys can be found in Appendix 6. Appendix 7 provides the summary statistics for each of the scales measured in the Baseline survey and Times 1, 2 and 3 monitoring surveys.

The key concepts measured in the monitoring surveys showed a high level of intercorrelation, as shown in Appendix 8.

Table 9: Description of the key concepts used in the analysis of attitudes towards Purified Recycled Water measured longitudinally.

Scale	Items	Cronbach α
Overall Support for Scheme The degree of support people have for the Purified Recycled Water scheme. Scores on this scale were used to group people into categories which were used in further analysis: • supporters of the scheme; • uncertain or ambivalent about the scheme; and • opponents of the scheme	I support adding Purified Recycled Water to our water supply in Wivenhoe Dam I do not want Purified Recycled Water to be mixed with my drinking water I will drink the water that will be provided by this recycling scheme I will protest against Purified Recycled Water being added to my drinking water Given the choice, I will not drink water that contained Purified Recycled Water I will complain to the Government if Purified Recycled Water was added to our drinking water at Wivenhoe Dam I believe that this recycling scheme will be safe to use	Baseline= 0.95 Time 1= 0.94 Time 2= 0.96 Time 3= 0.96
*Measured on a 6 point scale ranging from 1= strongly disagree through to 6 = strongly agree		
Emotion The extent to which people feel negative or positive emotions about drinking Purified Recycled Water	Thinking about how you would *feel* when drinking Purified Recycled Water, how would you describe it on the following scales: repulsive - attractive disgusting- appealing contaminating - purifying revolting - refreshing tense - calm	Baseline = .97 Time1= .97 Time 2 = .97 Time 3= .97
*Measured on a 7 point scale ranging from 1= strong negative emotion through to 7 = strong positive emotion		
Trust in Government The extent of trust people have in government to provide recycled water	I have complete trust in the government authorities to ensure that I have healthy and safe water I have complete trust in any information about the safety of our water given to me by the various government authorities	Baseline= 0.89 Time 1= 0.87 Time 2= 0.91 Time 3= 0.92
*Measured on a 5 point scale ranging from 1= strongly disagree through to 5 = strongly agree		
Trust in Science The extent of trust people have in scientists to provide recycled water	I have complete trust in scientists to ensure that I have healthy and safe water Science has been wrong before, it can be wrong again	Time1= 0.64 Time 2= 0.69 Time 3= 0.69
*Measured on a 5 point scale ranging from 1= strongly disagree through to 5 = strongly agree		
Health Risks The extent to which people feel that Purified Recycled Water from the scheme will be a health risk	Drinking water from this scheme will pose a health risk to me Drinking water from this scheme will not lead to health problems in the community*	Baseline= 0.83 Time 1= 0.80 Time 2= 0.66 Time 3= 0.83
*Measured on a 5 point scale ranging from 1= strongly disagree through to 5 = strongly agree		
Relative Risks The extent to which people feel that Purified Recycled Water from the scheme is risky compared to other risks	I believe that the Purified Recycled Water will be better than the current drinking water* People are exposed to so many risks everyday that the risk of Purified Recycled Water is too small to worry about*	Time 1= 0.63 Time 2= 0.74 Time 3= 0.74
*Measured on a 5 point scale ranging from 1= strongly disagree through to 5 = strongly agree		
System Risks The extent to which people are concerned about the operation of the Purified Recycled Water system	How likely do you think it is that something could go wrong with the operation of this water supply scheme? How serious do you think it would be if something went wrong with this water supply scheme? What level of control do you think the government authorities would have to stop something going wrong with this water supply scheme?	
*Measured on three different 5 point scales ranging respectively from: 1= highly unlikely through to 5 = highly likely; 1= not at all serious through to 5= extremely serious; 1= no control at all to 5= high level of control		

Scale	Items	Cronbach α
Procedural Fairness The extent to which people feel that the decision-making process associated with the Purified Recycled Water scheme has been fair	I have received enough information about the Purified Recycled Water scheme	Time1= 0.74 Time 2= 0.81 Time 3= 0.74
	I am unhappy that I have not been consulted about the Purified Recycled Water scheme	
	People in South East Queensland are unhappy that they have not been consulted about the purified recycled water scheme	
	I think the information present about purified Recycled water has been accurate	
	We don't have time to wait until the entire community is happy with the safety of drinking Purified Recycled Water before it proceeds	
Measured on a 5 point scale ranging from 1= strongly disagree through to 5 = strongly agree		
Distributive Fairness The extent to which people feel that the distribution of Purified Recycled Water in South East Queensland will be fair	It is not fair that some in South East Queensland will get Purified Recycled Water when others will not	Time 1= 0.53 Time 2= 0.62 Time 3= 0.54
	Its not fair that some people will be forced to drink Purified Recycled Water because they can't afford water tanks or bottled water	
Measured on a 5 point scale ranging from 1= strongly disagree through to 5 = strongly agree		
Climate Concerns The extent to which people are concerned about climate impacting on South East Queensland's water supplies	I'm afraid that SEQ will run out of water	Time 2 = 0.67
	I believe that climate change will have a significant impact on how much water we have in SEQ	
	I'm sure that there will be enough rainfall in SEQ for future water supplies*	
Measured on a 5 point scale ranging from 1= strongly disagree through to 5 = strongly agree		
Natural Order Concerns The extent to which people are concerned about PRW violating a natural order	I'm afraid about the long-term health impacts of PRW	Time 2 = 0.82
	I can't get the thought of sewage out of my mind when I think about PRW	
	I feel uneasy about human interference in the natural water cycle	
	The PRW treatment just speeds up the natural water recycling process*	
Measured on a 5 point scale ranging from 1= strongly disagree through to 5 = strongly agree		
Self-other perceptions The degree to which people differentiate their own views and attitudes from those that they perceive others in the community as having	People in SEQ are influenced by the negative messages about PRW in the media	
	My family is influenced by the negative messages about PRW in the media	
	I am influenced by the negative messages about PRW in the media	
Measured on a 5 point scale ranging from 1= strongly disagree through to 5 = strongly agree		

4. RESULTS

The data collected in the Baseline and Monitoring surveys were analysed in a number of ways.

1. Overall responses for each of the four surveys are reported.
2. As some respondents completed more than one survey, it was possible to analyse changes in respondents' responses across time. The retest respondents involved in this type of longitudinal analysis will be referred to as a *matched sample*, because their scores recorded in one survey are matched with those recorded in another. In the current report, analyses were conducted for the group of respondents who were involved in all four surveys.
3. Analyses were conducted for the group of respondents who had completed a survey both prior to the Government's announcement and after the announcement. Pre- and post-announcement responses were compared.

The data were primarily analysed using independent groups[4] and repeated measures Analysis of Variance and t-tests. Differences between time points or groups are denoted by adopting the standard statistical probability level of 5% ($p < .05$), although significance levels of 1% ($p < .01$) and 0.1% ($p < .001$) are also commonly reported. Significant differences in the current report can be thought of in two ways: 1) differences in the scores recorded by different groups of respondents on survey items; or 2) changes in the scores recorded on survey items within the same group of respondents over time.

4.1. PRW Attitudes Over Time: Whole and Matched Sample

A combined total of 1078 people participated in the Baseline survey and Times 1, 2 and 3 monitoring surveys. Of these, 67 people participated in all four surveys. (A breakdown of participation is presented in Table 1).

The following section presents analyses completed on the whole survey sample at each measurement time, as well as analyses that compare the responses of the 67 respondents who completed all four surveys. The latter analyses allow us to investigate whether responses changed across time.

4.1.1. How Aware are Respondents of the PRW Scheme?

In each of the monitoring surveys, respondents were asked whether they had heard anything about the recycled water scheme and, if yes, what they had heard. Table 10 shows that the overwhelming majority of respondents reported that they had heard about the PRW scheme.

Table 10: Respondents who had heard about the PRW scheme[5].

	Time 1		Time 2		Time 3	
	N	%	N	%	N	%
Yes	290	96.3	342	97.2	369	91.6
Not sure	5	1.7	4	1.1	11	2.7
No	6	2.0	6	1.7	23	5.7

[4] It should be noted that independent groups significance testing on whole survey samples violates the assumption of non-independence of data, as there were individuals in each sample who participated in multiple surveys. However, the likely outcome of this is that statistically significant differences will be *underestimated*, therefore it was felt that a whole survey sample analysis warranted inclusion. For an analysis of independent groups, see Appendix 9.

[5] The percentage of respondents indicating that they had not heard about the PRW scheme, or that they were not sure if they had heard about it, increased in the Time 3 survey which seems counter-intuitive. At each survey time point, new respondents were recruited and the noted increases at Time 3 are related to the *new respondents'* lack of knowledge about the scheme, rather than retest respondents forgetting information about the scheme.

4.1.2. How much do Respondents Agree with the Decision to Add PRW to Dams at a Critical Level?

When the 91.6% of respondents at Time 3 who had heard about the PRW scheme were asked for specific details about what they had heard about the scheme, only 39% of the responses they provided were about the decision to introduce PRW to Wivenhoe Dam when dam levels dropped to the 40% trigger point. Respondents at Time 3 who had heard information about the scheme were also asked whether this information had made any difference to how much they supported the PRW scheme. Approximately 78% of these respondents claimed that it had made no difference, 17% said it had made a difference, and 5% were unsure.

All respondents at Time 3 were provided with information about the Government's decisions after they had been initially probed about what they had heard about the scheme. They were then asked about their agreement with the Government's decision to introduce PRW to Wivenhoe Dam only when dam levels dropped below 40% (Table 11).

Table 11: Levels of support with the Government's decision.

	N	%
Strongly Agree	78	19.5
Agree	128	32.0
Neither	28	7.0
Disagree	76	19.0
Strongly Disagree	90	22.5

As Table 11 shows, just over half of the respondents (51.5%) supported (i.e. strongly agreed or agreed with) the Government's decision to add purified recycled water to the dams only when dam levels fall below a critical point. Responses showed strong polarity, with 41.5% disagreeing or strongly disagreeing with the decision and only 7% of respondents who were neutral. It is worth noting that many people disagreed with the Government's decision regardless of their level of support for the scheme.

Table 12 shows a breakdown of stated levels of support for the Government's decision for different groups of respondents based on their overall level of support for the scheme (see section 4.3 for a description of how respondents were categorised into support categories). Approximately 58.3% of supporters agreed with the decision whereas 67.8% of opponents disagreed with the decision. One interpretation of these results is that they reflect ambivalence on the part of supporters and continued opposition on the part of opponents. These figures suggest that the Government's decision was unpopular with many but may have only had a small role in influencing levels of support for the scheme.

Table 12: Levels of support with the Government's decision based on attitude towards the scheme at Time 3 monitoring survey.

	Strongly Disagree %	Disagree %	Neither %	Agree %	Strongly Agree %
Support Scheme (n=283)	14.5	19.8	7.4	36.7	21.6
Uncertain (n=24)	12.5	12.5	8.3	37.5	29.2
Oppose Scheme (n=93)	49.5	18.3	5.4	16.1	10.8

4.1.3. How much do Respondents Support the PRW Scheme?

On average, there was support for the PRW scheme at each time point of the survey. As shown in Figure 3, support for the PRW scheme decreased slightly but significantly ($p < .01$) between the Baseline testing period and the Time 1 testing period. Support then stabilised until another small significant ($p < .01$) drop in support between the Time 2 testing period and the Time 3 testing period.

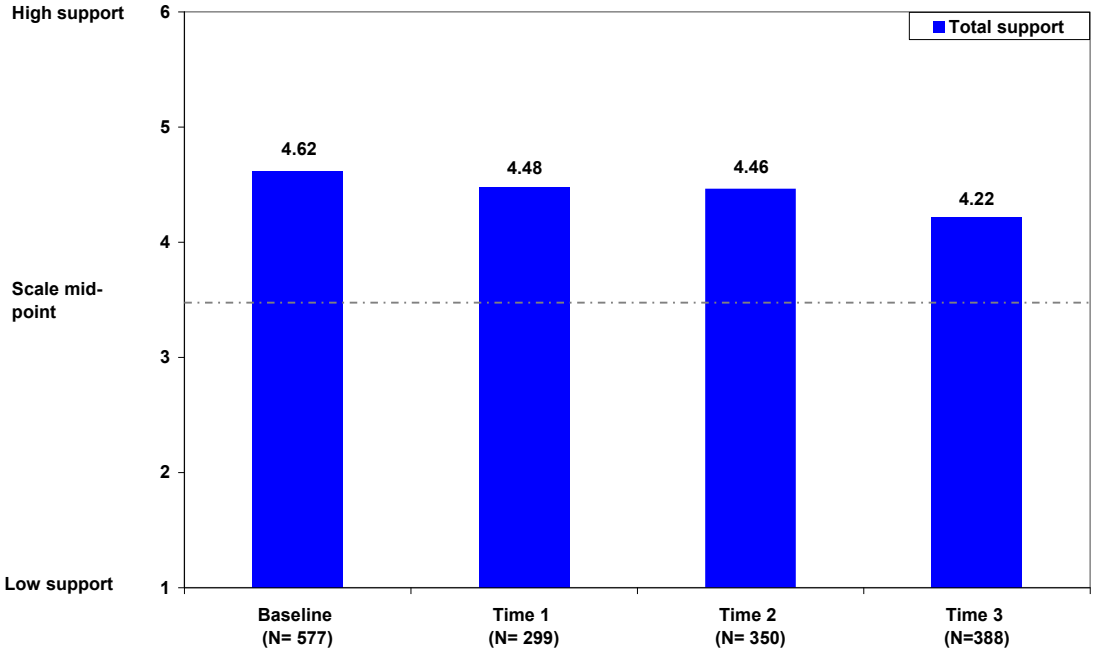

Figure 3: Average total support for PRW scheme over time: whole sample means for Baseline survey and Times 1, 2 and 3 monitoring surveys.

The majority (70.2%) of respondents in the Time 3 Monitoring survey were willing to drink water containing PRW. This represents a small decline in support compared to the three previous surveys (see Figure 4 below) and suggests increased polarisation in opinion about the scheme with decreases in the proportion of people who are not sure about the scheme (down to 6.5%).

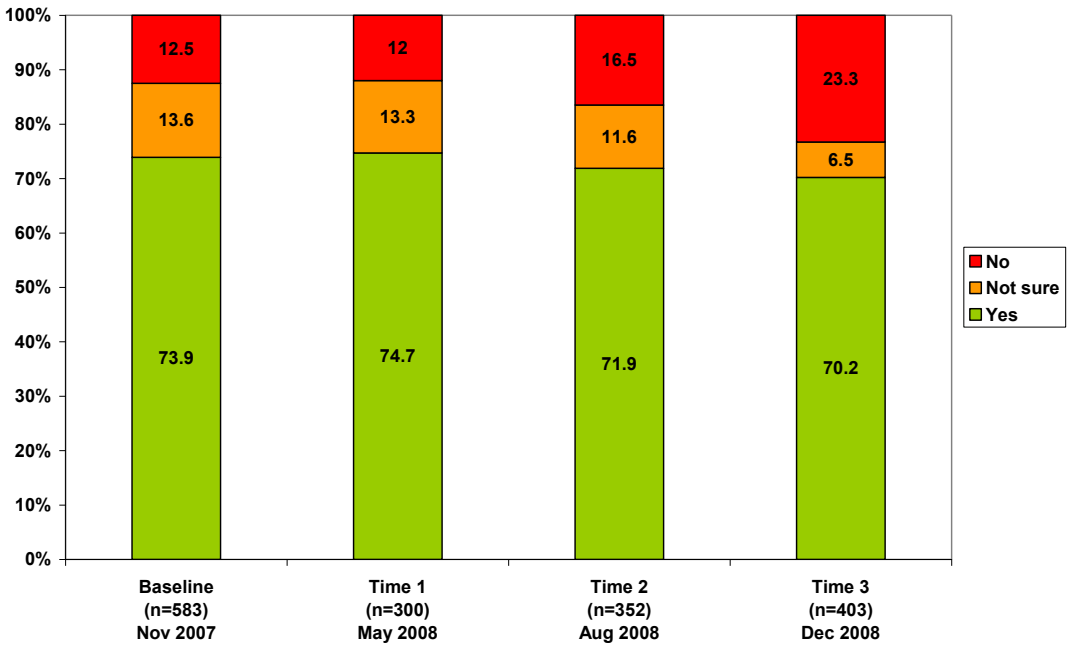

Figure 4: Will you drink the purified recycled water provided by this scheme? Total respondents in all surveys.

Although these results indicate relatively high levels of support for the PRW scheme, an examination of responses to one of the questions in the PRW support scale suggests that the support is not unqualified. As Figure 5 shows, from Time 1 to Time 3, a majority of respondents agreed or strongly agreed that, given the *choice*, they would *not* drink water that contained PRW.

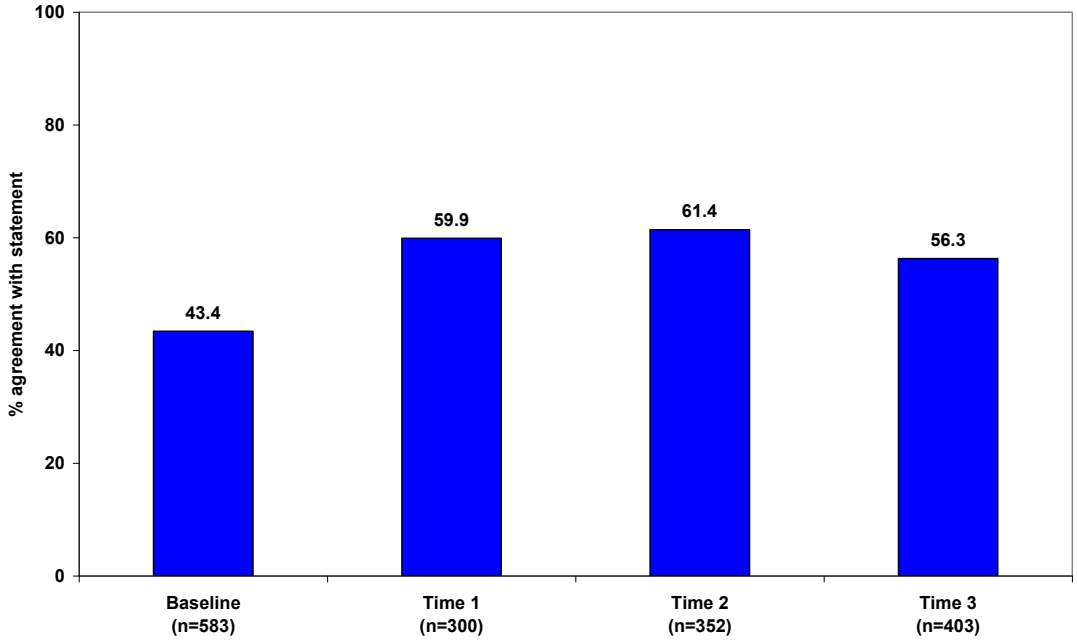

Figure 5: Levels of agreement with the statement: Given the choice, I would not drink water that contained PRW.

4.1.4. How do Respondents 'Feel' about PRW?

As Figure 6 illustrates, there was a slight but significant ($p < .05$) drop in positive emotions from the Baseline testing period to the Time 1 testing period. Emotion ratings then stabilised until a more moderate and significant ($p < .05$) drop in positive emotions between the Time 2 testing period and the Time 3 testing period.

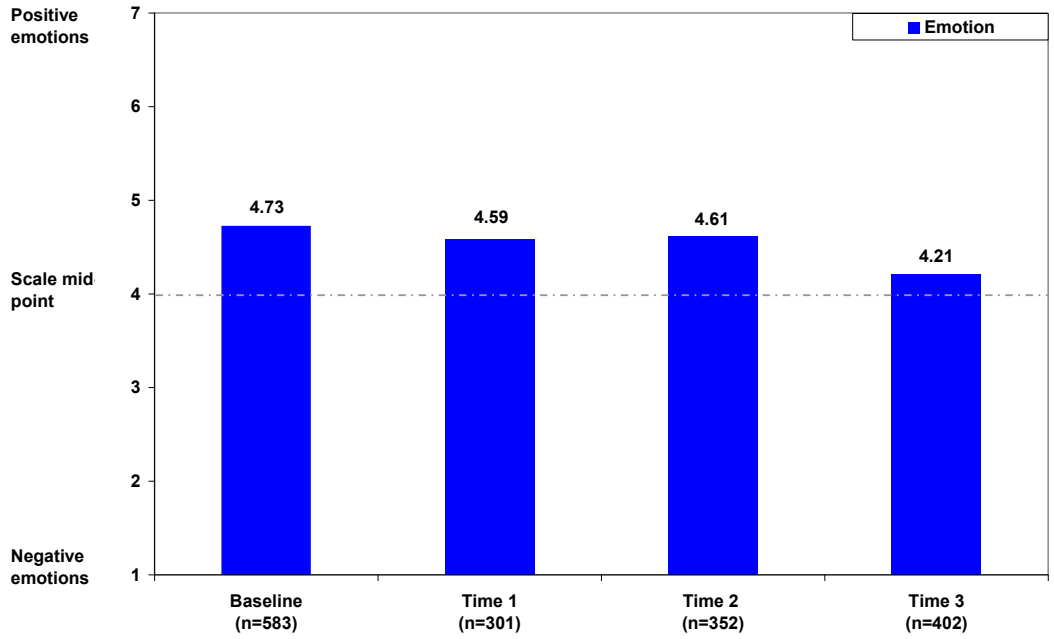

Figure 6: Average emotion score over time: whole sample means for Baseline survey and Times 1, 2 and 3 monitoring surveys.

4.1.5. How Fair do Respondents Think the PRW Scheme Is?

With regards to perceptions of fairness of the scheme, it can be seen in Figure 7 that average ratings of distributive fairness were significantly ($p < .05$) less positive at the Time 3 testing period than the previous testing periods. Procedural fairness did not change significantly over time. Overall, it is clear that responses to the fairness scales were relatively neutral.

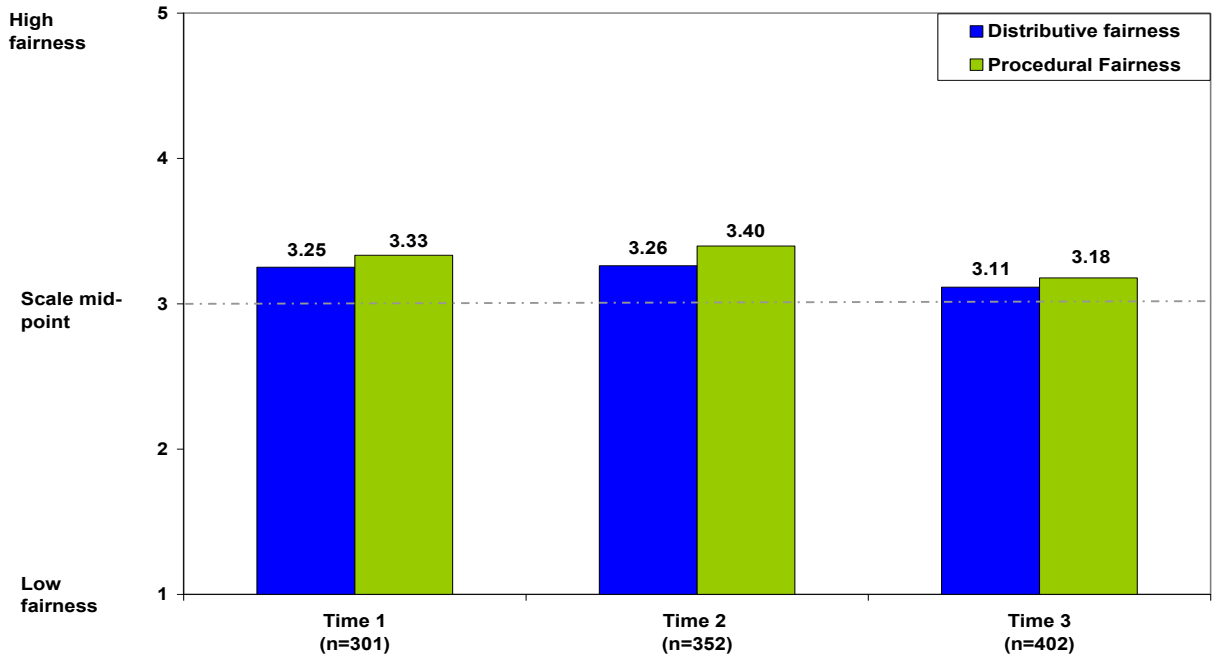

Figure 7: Average distributive and procedural fairness over time: whole sample means for Times 1, 2 and 3 monitoring surveys.

4.1.6. How much do Respondents Trust Government and Scientists?

The levels of trust in government and science were each assessed with two items (as described in Table 9). For comparative purposes only, those items that are similarly worded for both government and scientists are presented together. Direct comparisons of the two-item scales for trust in scientists and government are not possible, because they are comprised of different items. For comparison, respondents were asked whether they had trust in both scientists and government authorities to ensure healthy and safe water.

As can be seen in Figure 8, average levels of trust in scientists remained consistent throughout the testing periods, indicating some level of trust in scientists in relation to PRW. Figure 8 also shows there was a significant ($p < .05$) lowering of levels of trust in government authorities from the Baseline survey to the Time 3 testing period suggesting that by Time 3, respondents, on average, did not trust government to ensure healthy and safe water.

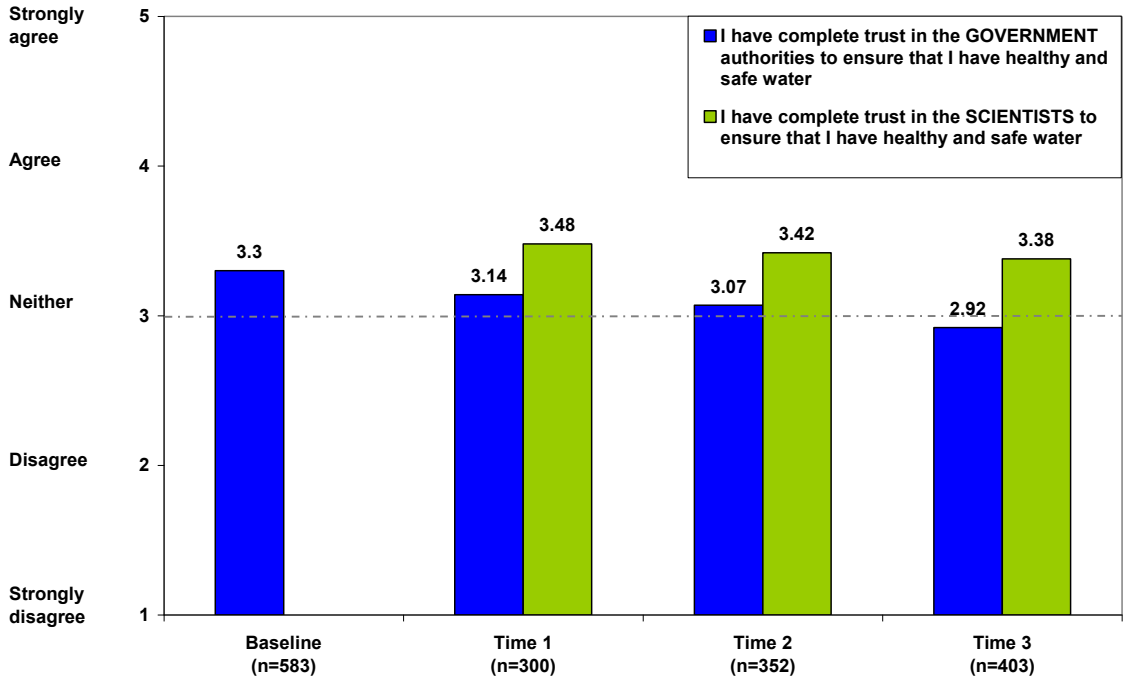

Figure 8: Trust in government and science to ensure healthy and safe water: whole sample means for Baseline survey and Times 1, 2 and 3 monitoring surveys.

For the Time 3 monitoring survey respondents were also asked to rate their level of trust in a number of groups to provide information on the recycled water scheme, along with the perceived level of influence these groups had over their decisions about the recycled water scheme. Responses are illustrated in Figure 9.

Figure 9 shows that scientists were rated most highly, ahead of family and government. The media was rated least favourably in terms of trust and influence. It is worth noting that on average, only scientists and family were rated above the mid-point of the trust measure suggesting some trust in the information that comes from these sources. Moreover, the means displayed in Figure 9 also indicate that respondents' decisions about PRW are most influenced by scientists.

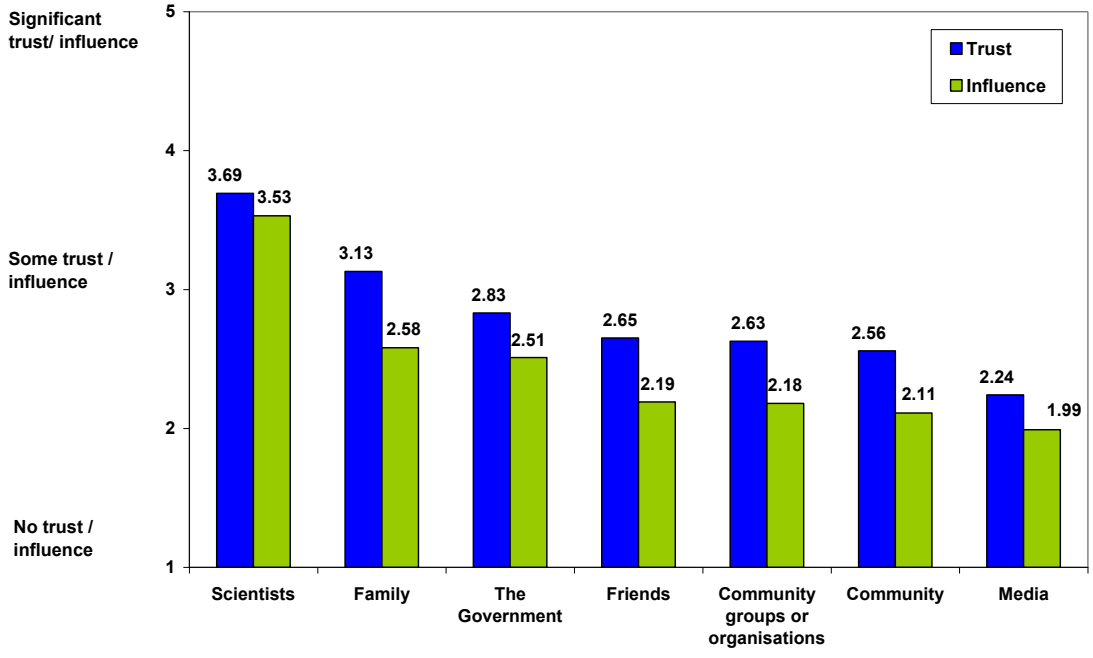

Figure 9: Respondents' mean ratings of trust and influence in a range of groups: Time 3 monitoring survey, n=403.

4.1.7. How Risky is PRW Perceived to be?

In terms of the perceived health risks of the scheme, there was a slight but significant ($p < .05$) increase in mean ratings of health risks from the Baseline survey through to the Time 2 monitoring survey, after which ratings stabilised (see Figure 10). In terms of the perceived risks of the scheme relative to other risks, mean ratings increased significantly ($p < .05$) but moderately between the Time 2 and Time 3 testing period.

Overall, the total respondents (N = 390) in the Time 3 monitoring survey did not perceive the scheme to represent a health risk (mean below scale mid-point) but did perceive the scheme to be risky relative to other risks (mean slightly above scale mid-point), as demonstrated in Figure 10. It should be noted that the mean level of perceived relative risk of the scheme in the Time 3 monitoring survey was only just above the mid-point of the scale, indicating that overall the scheme was not considered a high risk.

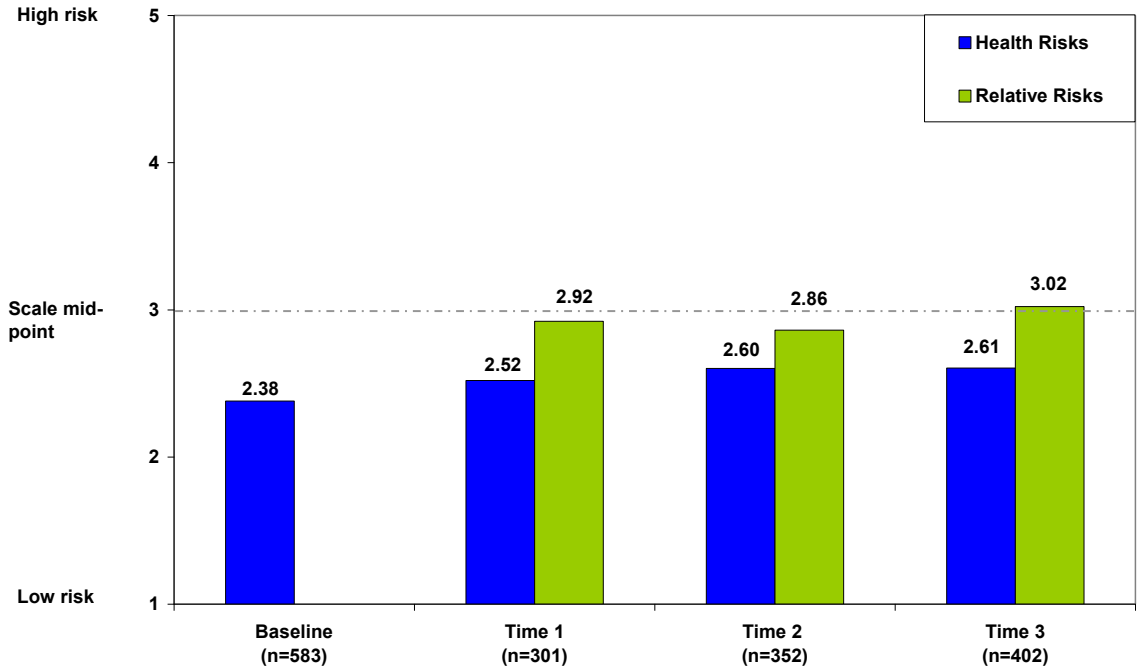

Figure 10: Average health and relative risk of PRW: whole sample means for Baseline survey and Times 1, 2 and 3 monitoring surveys.

The scale measuring the perceived risk of the system (likelihood, seriousness and government control over something going wrong with the scheme) delivering PRW showed that there was a significant ($p < .05$) decrease in perceptions of system risk from the Baseline testing period to the Time 1 testing period (see Figure 11), after which, ratings of system risk stabilised (there was a small but statistically non-significant increase in perceived system risk from Time 2 to Time 3).

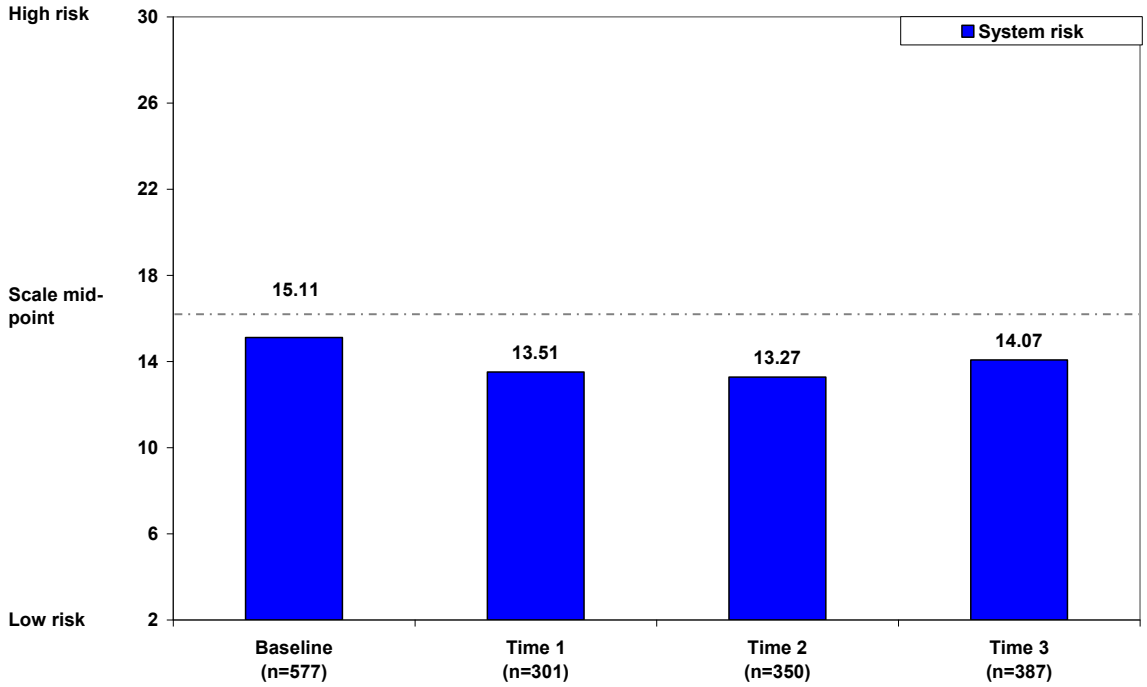

Figure 11: Perceived system risk of PRW: whole sample means for Baseline survey and Times 1, 2 and 3 monitoring surveys.

A breakdown of the items measuring perceptions of system risk reveals that ratings of the likelihood of something going wrong with the PRW scheme remained stable over time. Ratings of the seriousness of an incident occurring reduced significantly ($p < .05$) from the Baseline testing period to the Time 1 testing period, but increased significantly ($p < .05$) again from the Time 2 testing period to the Time 3 testing period. Ratings of government control over any incidents occurring reduced significantly ($p < .05$) from the Baseline testing period to the Time 1 testing period, after which time ratings stabilised (Figure 12). Overall, the figure suggests that, while the likelihood of an incident occurring is perceived as only moderately likely, and government control over such incidents is perceived as relatively high, the seriousness of an incident occurring is perceived as relatively high.

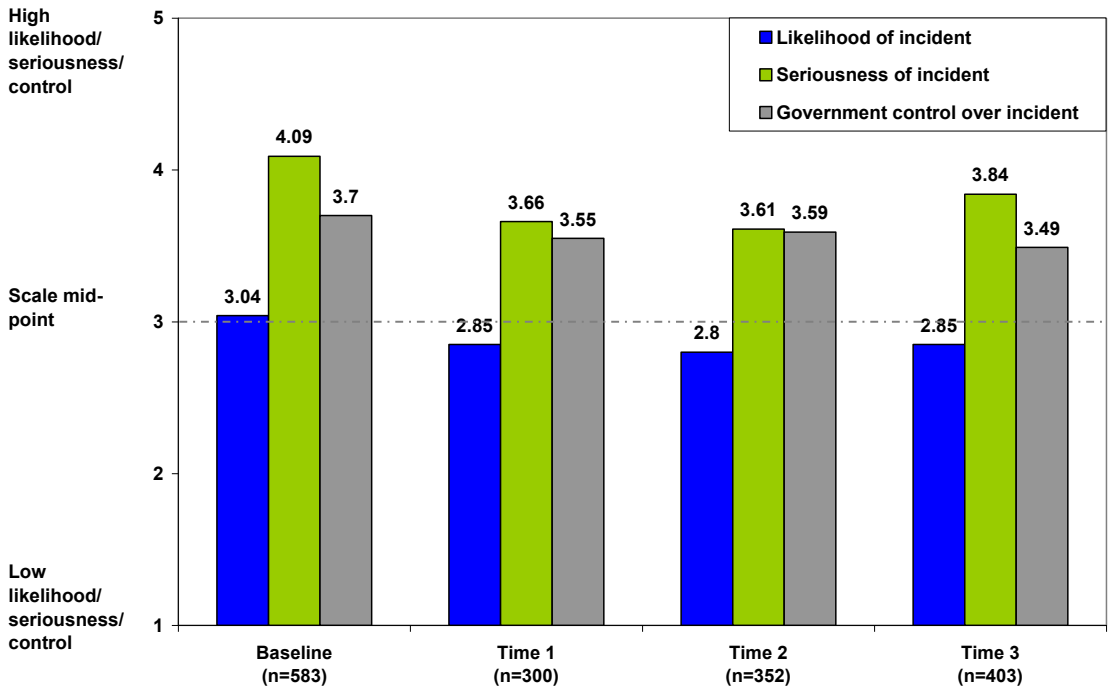

Figure 12: Perceived system risk of PRW – likelihood, seriousness and government control over potential incidents: whole sample means for Baseline survey and Times 1, 2 and 3 monitoring surveys.

It is worth noting that respondents' ratings of risk are similar to those found in other studies (e.g., Leviston, Nancarrow, Tucker and Porter, 2006). On average, respondents felt that it was somewhat likely that something could go wrong with the scheme (e.g. the mean perceived likelihood of potential incidents was close to the scale mid-point). This indicates that the scheme is perceived by respondents as being riskier than the science suggests (e.g. scientific estimates of risk suggest that it would be highly unlikely that anything would go wrong with the scheme).

4.1.8. Summary of Whole Sample Means Over Time

Results from this section suggest that although there was a high level of awareness about the PRW scheme, only just over a third of respondents at the Time 3 survey said that they had heard about the Government's decision to add recycled water to the dam once the dam levels fell below a critical level. Although a slight majority of respondents agreed with this decision, a large proportion (41.5%) disagreed, although the reasons for disagreement are likely to be varied.

Relatively high levels of support for the PRW scheme were shown across all the survey time points, with intentions to drink the water containing PRW not dropping below 70%. Nevertheless, the results demonstrated some softening of support after the Government announcement. The decline in support for PRW by the Time 3 monitoring survey was accompanied by an increase in negative emotion, reduced trust in government, and increased risk perceptions. Moreover, it is clear that support for the scheme was not unequivocal and that, given a choice, most respondents would prefer not to drink water that contained PRW.

4.1.9. Tracking the Same Respondents Across Time

The following section presents results from the 67 respondents who completed all four surveys. The benefit of examining responses of this group of respondents is that it allows a more rigorous examination of whether respondents' attitudes to PRW changed across time as analyses include the same individuals at each time point. A one-way repeated measures ANOVA was conducted on each of the key variables to ascertain whether there was a significant effect for time (see Table 13 for details). Planned comparisons were also conducted to determine whether key variables changed significantly over sequential time periods (e.g., contrast baseline with Time 1; Time 1 with Time 2 etc) as shown in Table 14.

Significant differences were observed over time for a number of the scales measured. These differences may be related to changing community attitudes to the PRW scheme. Alternatively, these differences could be related to testing effects. Some of the retest respondents may have become sensitised to the PRW issue because they were involved in a survey and knew that researchers would contact them again. This may have meant that they paid more attention to PRW debates.

Table 13 provides a summary of the mean scores obtained by this sample of respondents on the survey measures at each time point. The analyses indicate that overall, trust in government decreased over time, and perceptions of health risk increased along with perceived relative risk. In contrast, perceived system risk (i.e. likelihood of something going wrong with the system, seriousness if something did go wrong, government control over the system breakdown) decreased across time. Emotional responses to the PRW scheme became more negative over time and overall support dropped. Although the differences between means may seem relatively small, the partial eta square, a measure of the size of the statistical effect, suggests that these changes can be considered large.[6]

[6] The strength of eta squared values can be interpreted as follows: .01=small effect; .06=moderate effect; .14=large effect (Cohen, 1988).

Table 13: Summary statistics for matched sample over time: significant differences of key variables.

Variables	Baseline Mean	Baseline Std. dev	Time 1 Mean	Time 1 Std. dev	Time 2 Mean	Time 2 Std. dev	Time 3 Mean	Time 3 Std. dev	Significant difference	Partial Eta Square	Effect Size
Trust Science (n=98)			2.82	0.87	2.90	1.05	2.86	0.96			
Trust in Government (n= 70)	3.25	1.10	2.86	1.09	2.85	1.14	2.93	1.27	**	0.16	Large
Health Risks (n=67)	2.22	1.06	2.62	1.04	2.63	1.07	2.43	1.20	**	0.3	Large
Relative Risks (n= 96)			2.89	1.01	2.82	1.15	2.97	1.17		0.04	Small
Likelihood of incident (n=66)	3.36	1.31	3.26	1.42	2.71	1.47	2.97	1.48	**	0.26	Large
Seriousness of incident (n=64)	4.14	1.18	3.61	1.30	3.61	1.33	3.70	1.24	**	0.19	Large
Government control over incident (n=66)	3.73	1.38	3.30	1.46	3.44	1.40	3.41	1.37			
Procedural Fairness (n=92)			3.36	0.79	3.40	0.87	3.32	0.88			
Distributive Fairness (n= 94)			3.27	0.99	3.36	1.10	3.13	0.96			
Emotion (n=65)	4.78	1.71	4.34	1.93	4.34	2.04	4.16	1.88	**	0.18	Large
Total Support (n= 65)	4.68	1.37	4.32	1.36	4.46	1.64	4.20	1.63	**	0.26	Large

* Indicates statistically significant difference over time at p<.05 / ** Indicates statistically significant difference over time at p<.01

As demonstrated in Table 14, the most significant changes in the key variables occurred between the baseline survey and Time 1. Total support for the scheme demonstrated the most significant change ($p< .01$) of all variables over the period between Time 2 and Time 3.

Table 14: Contrasts of matched sample: significant differences between survey time points[7].

Variables	Contrasts		
	Baseline and Time 1	Time 1 and Time 2	Time 2 and Time 3
Trust Science (n=98)			
Trust in Government (n= 70)	***		
Health Risks (n=67)	***		*
Relative Risks (n= 96)			*
Likelihood of incident (n=66)		***	*
Seriousness of incident (n=64)	**		
Government control over incident (n=66)	*		
Procedural Fairness (n=92)			
Distributive Fairness (n= 94)			*
Emotion (n=65)	*		
Total Support (n= 65)	**		**

* Indicates statistically significant difference over time at *p*<.05 / ** Indicates statistically significant difference over time at *p*<.01

[7] The different number of respondents used in matched sample analyses for different variables can be explained by the fact that some variables were measured for the first time in the Baseline behavioural survey (e.g. were measured at four time points) and others in the Time 1 survey (measured at three time points). A greater number of participants were involved in three surveys than those involved in four surveys, hence the different 'n' values in the table.

4.2. Did Attitudes Change Following the Government's Announcement?

The following section presents results from the 203 respondents who responded to at least one survey before and after the Government's announcement to introduce PRW to Wivenhoe Dam as an emergency supply source only once the dam levels drop below a critical level of 40%. The matched sample of respondents provides an opportunity to investigate attitudes before and after the Government's announcement for participants who supported the scheme before the announcement, compared to those who were uncertain/ambivalent and those who opposed the scheme.

4.2.1. Did Support for the Scheme Change?

A comparison of the respondents who had participated in at least one survey before and after the announcement showed statistically significant ($p < .01$) lower mean levels of support for the PRW scheme after the announcement compared to before, indicating a decline in support for the scheme post-announcement (see Figure 13). The reduction in support represents a moderate change statistically (i.e. a medium effect size).

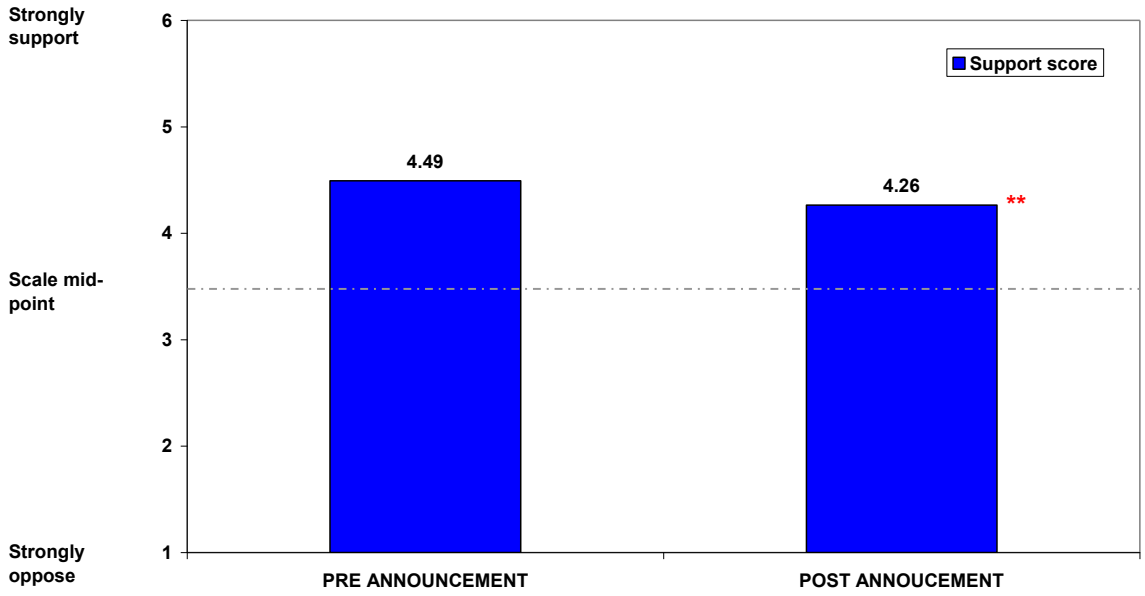

Figure 13: Average support for the scheme pre and post-announcement: mean PRW behavioural score for retest respondents, n=200.

Respondents were also asked whether they would be willing to drink water containing PRW. The most significant change in respondents' intention to drink water containing PRW was observed in the group who indicated prior to the announcement that they were not sure whether they would drink PRW. Approximately 45% indicated that they would not drink PRW after the announcement (as shown in Figure 14). Of those respondents who indicated that they would be prepared to drink water containing PRW before the Government announcement, 11.3% changed their mind post-announcement, compared to 18.8% of those who indicated that they would not drink PRW before the announcement was made. Interestingly, the vast majority (85%) of those who were undecided pre-announcement had made a decision as to whether they would be prepared to drink water containing PRW post-announcement, either in the affirmative (55%) or the negative (30%). This shift may reflect attitudes towards the Government announcement, or conversely, it may be an effect of participating in the surveys, with participation prompting respondents to further consider water recycling.

To investigate whether changes in attitudes post the announcement differed according to initial level of support for the scheme, respondents were categorised on the basis of their average responses to the

PRW support scale prior to the announcement (See Table 9 for the individual items in this scale). Normally respondents would be classified into 3 groups statistically on the basis of a tertile split of scores (i.e. highest 3rd, mid 3rd, and lowest 3rd of scores); however scores on this scale were heavily skewed due to a high proportion of respondents supporting the scheme (approximately 60-70% of the sample at each time point). This skewness prevented a tertile split from creating meaningful categories.

Hence, respondents were grouped into categories on the basis of where their average support score fell in terms of meaningful cut-off points. For example, when asked to respond to positive attitude statements about the scheme, those who predominantly used strongly disagree and disagree on the Likert scale (as evidenced by their mean score) were classified as opponents. Likewise, those who predominantly used strongly agree and agree on the Likert scale were classified as supporters. Respondents were classified as uncertain because they gave neutral responses to the scale items; however they may have been ambivalent about the scheme because their responses to questions varied resulting in a neutral mean score. For ease of reporting, this group will be referred to as 'uncertain' in the report, whilst recognising that some people within this group are in fact ambivalent or neutral to PRW rather than uncertain.

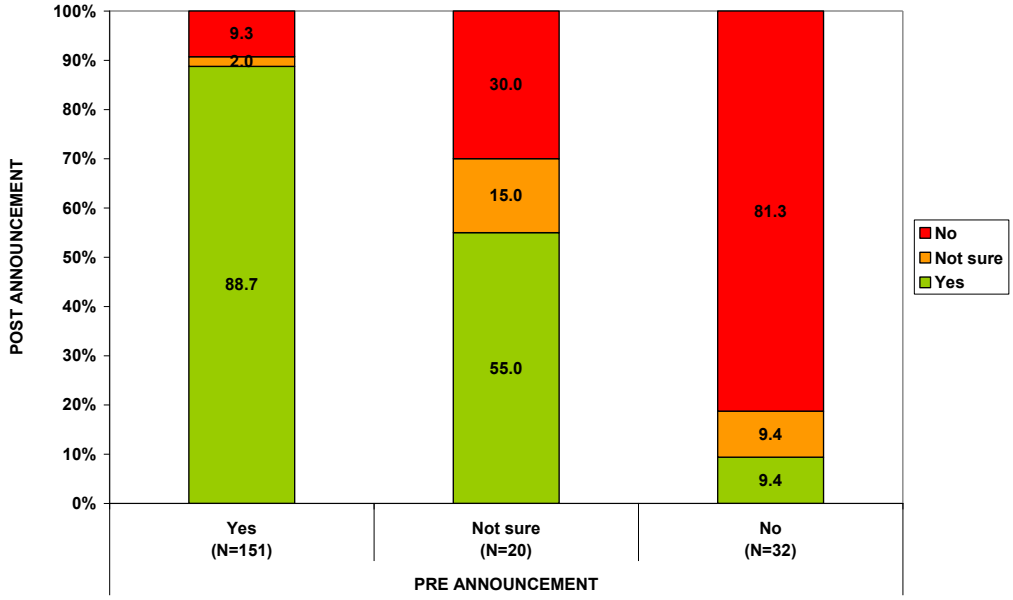

Figure 14: Will you drink the PRW provided by this scheme? Changes pre and post-announcement, n=200.

Mixed between-within subjects ANOVAs (or Split-plot ANOVA) were conducted to ascertain whether attitudes changed following the Government announcement supporters, opponents and those who were uncertain. Total support for the scheme was the only scale to record a significant main effect for time and an interaction between time and groups (e.g. supporters, opponents and those who are uncertain). The results suggest that those who were supporters of the scheme before the announcement were the only group to record a statistically significant change in support for the scheme post-announcement. This change represents a small decline in support for the PRW scheme. Opponents demonstrated higher mean support for the scheme after the announcement; however this change was not significant.

Figure 15 shows the marginal means for support obtained by those who were supporters, opponents and uncertain about the scheme pre and post-announcements. These observed changes may be related to the Government announcement; however they could simply be a function of regression to the mean, which is a naturally occurring phenomenon in which scores naturally trend toward the mean over time.

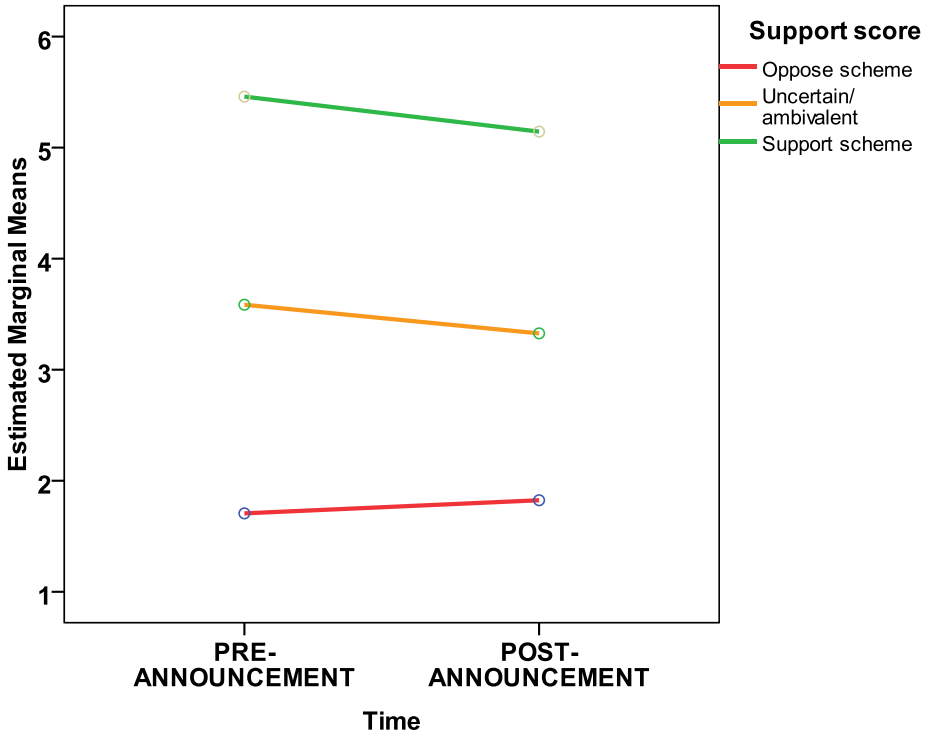

Figure 15: Marginal means for support scores pre and post-announcement: supporters, opponents and those who are uncertain about the scheme, n=200.

4.3. Profiles of Supporters and Opponents

The differential changes in support for the PRW scheme that was recorded post-announcement for the supporters of the scheme compared to those who were uncertain and those who opposed the scheme, suggests a need to examine how supporters, opponents and those who are uncertain differ on the key factors associated with PRW. This section provides an overview of the profiles of the supporters of the scheme, those who are uncertain or ambivalent, and those who oppose the scheme.

Figure 16 demonstrates the different proportions of supporters, those who are uncertain, and those who oppose the scheme, who would drink water containing PRW. In a large part, responses to this question align with respondents' level of support, although not all of those people who oppose the scheme stated that they would not drink water containing PRW, with up to 20.8% (Time 1) indicating that they would drink PRW. These responses may reflect the reality that most people are obliged to drink the water delivered via mains supply. Over time, those people who were uncertain about the scheme have become increasingly certain about their intentions to drink water containing PRW. For instance, at the time of the Baseline survey, 55.1% of those who were uncertain about the scheme were also uncertain about their intentions to drink PRW, which reduced to only 16.4% at Time 3.

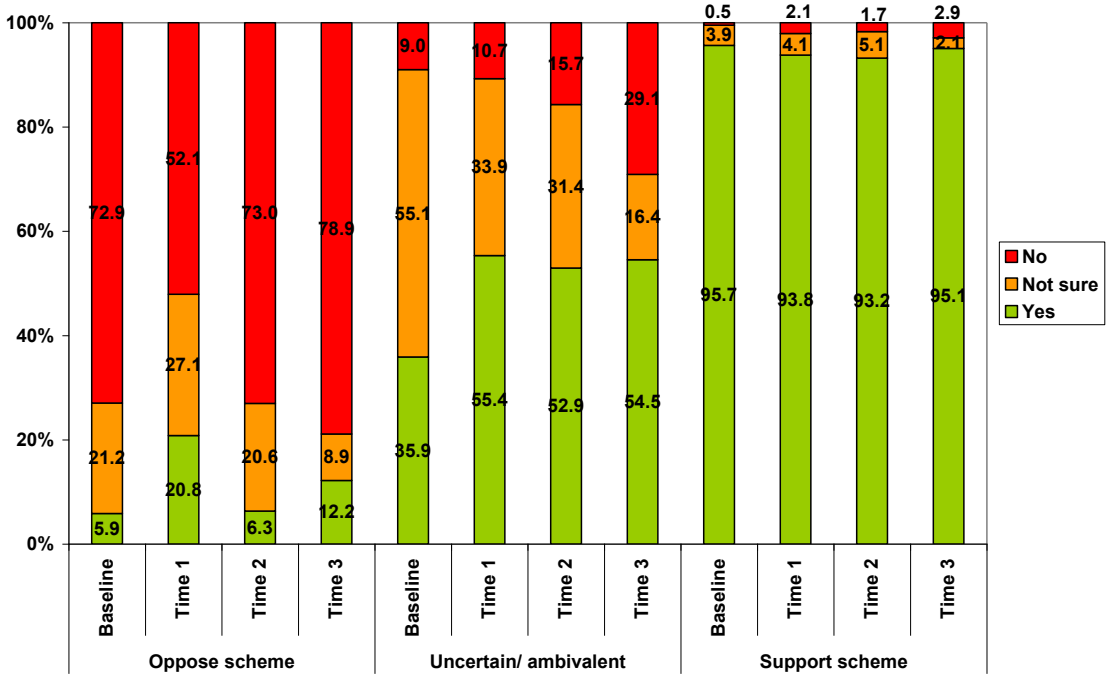

Figure 16: Proportion of opponents, supporters and those who are uncertain about the scheme that would drink water containing PRW over time.

The supporters were the only group to consistently and significantly ($p<.01$) differentiate between the individual components that comprised the emotion scale over time (see Figure 17). As such they made a distinction between the different emotions that they experienced when thinking about PRW whereas opponents did not. For instance, the supporters were significantly more likely to state that they felt calm about drinking recycled water than they were to feel that drinking recycled water was appealing. The pattern of responses varied for those who were uncertain over time; however they tended to state that they felt drinking recycled water was more repulsive and disgusting than it was contaminating or a tense experience.

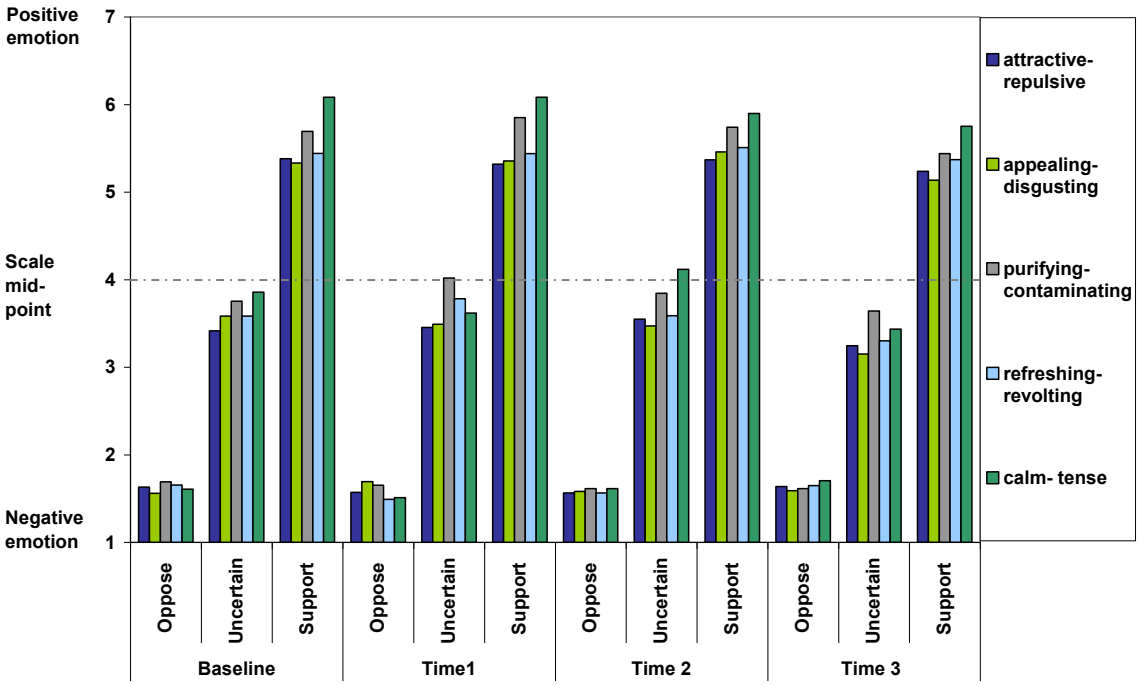

Figure 17: Average scores for components of emotion scale individually at Time 3: supporters, opponents and those who are uncertain.

One-way ANOVAs with post-hoc multiple comparisons (with Bonferroni adjustments) were conducted on all of the key scales, at all time points, to assess whether the supporters, opponents and those who were uncertain about the scheme demonstrated significantly different mean scores (see Appendix 10 for details).

This analysis indicated *that there were marked differences* between supporters, those who are uncertain, and opponents on *all* of the focal survey measures at every time point. These differences were also observed on scales that were only measured at Time 2, which assessed respondents' concerns about climate impacts in SEQ as well as those related to PRW violating some natural order, or laws of nature. Each group was significantly different ($p < .01$) to the others on every variable at every time. This suggests that the different groups have distinct attitudes towards PRW. It may also suggest that respondents are responding in a uniform manner to all the key determinants based on their level of support.

4.3.1. Summary of Mean Scores Obtained by Supporters, Opponents and those who are Uncertain on Key Scales

In summary the **supporters** of the scheme can be characterised as:

- Trusting government and science to provide safe and healthy PRW;
- Having positive emotions towards drinking PRW;
- Thinking that the distribution and decision-making processes associated with PRW have been fair;
- Thinking that the PRW scheme does not represent a health risk;
- Strongly thinking that the scheme is not risky relative to other risks;
- Thinking that it is unlikely that something could go wrong with the operation of the scheme, that it would be moderately serious if it did and that Government would be able to control such incidents;
- Being moderately concerned about climate impacts in SEQ;
- Thinking that the PRW scheme does not violate a natural order, or laws of nature; and
- Demonstrating some ambivalence in terms of emotional reactions to drinking PRW, evidenced by differential responses to individual components of the emotion scale.

Those who are **uncertain** about the scheme can be characterised as:

- Having mildly negative emotions associated with the scheme;
- Thinking that the scheme is mildly unfair in terms of distribution of PRW across SEQ;
- Displaying moderate levels of distrust towards science and government;
- Thinking that the scheme is not risky relative to other risks;
- Feeling unclear as to whether the scheme represents a health risk, violates a natural order or some law of nature and whether the process associated with the scheme had been fair;
- Feeling unclear as to whether something could go wrong with the operation of the scheme and as to whether government would be able to control such incidents;
- Thinking that it would be very serious something was to go wrong with the scheme; and
- Being moderately concerned about climate impacts in SEQ.

Those who **oppose** the scheme can be characterised as:

- Thinking that the scheme is risky relative to other risks and represents a high health risk;
- Demonstrating strong distrust towards government and science;
- Thinking that both the distribution of PRW across SEQ and decision-making processes regarding the scheme have been unfair;
- Displaying strong negative emotions towards drinking PRW;
- Thinking that it is very likely that something could go wrong with the operation of the scheme, that it would be very serious if it did and that government would not be able to control such incidents;
- Being unclear as to whether there may be climate impacts in SEQ; and
- Thinking that the PRW scheme violates a natural order, or laws of nature.

4.3.2. Did Respondents Perceive Differences between Themselves and Others in Relation to PRW?

Although most questions in the surveys asked respondents to report their own attitudes to PRW, in the Time 2 monitoring survey there were also questions that assessed the perceived attitudes of others to PRW. The importance of including these types of items was suggested by qualitative research conducted with Toowoomba residents who made clear distinctions between those who supported and those who opposed the introduction of PRW (see Appendix 5). In addition, the finding that people distinguish their own responses from others on a number of dimensions is pervasive in the social psychology literature (Duck and Mullin, 1995; Duck, Hogg, and Terry, 1998; Marks and Miller, 1987). The following sections describe the results of the Time 2 survey items that compare respondents' own attitudes with their perceptions of the attitudes of others in the SEQ community. All measures described in this section were on 5-point scales with higher means indicating higher levels of agreement.

4.3.3. How much do Respondents Think Others in the Community Support PRW?

Figure 18 shows how the perceptions of others' willingness to drink water containing PRW is influenced by respondents' own level of support. Respondents who are supportive of the scheme perceived significantly greater positive emotions associated with drinking PRW from the community and their family for PRW than those who are uncertain or those who disagree.

It is also evident that respondents differentiate between family and the SEQ community depending on their own level of support ($p < .01$). Supporters of PRW perceive significantly greater positive emotions associated with drinking PRW from family than the SEQ community for the scheme.

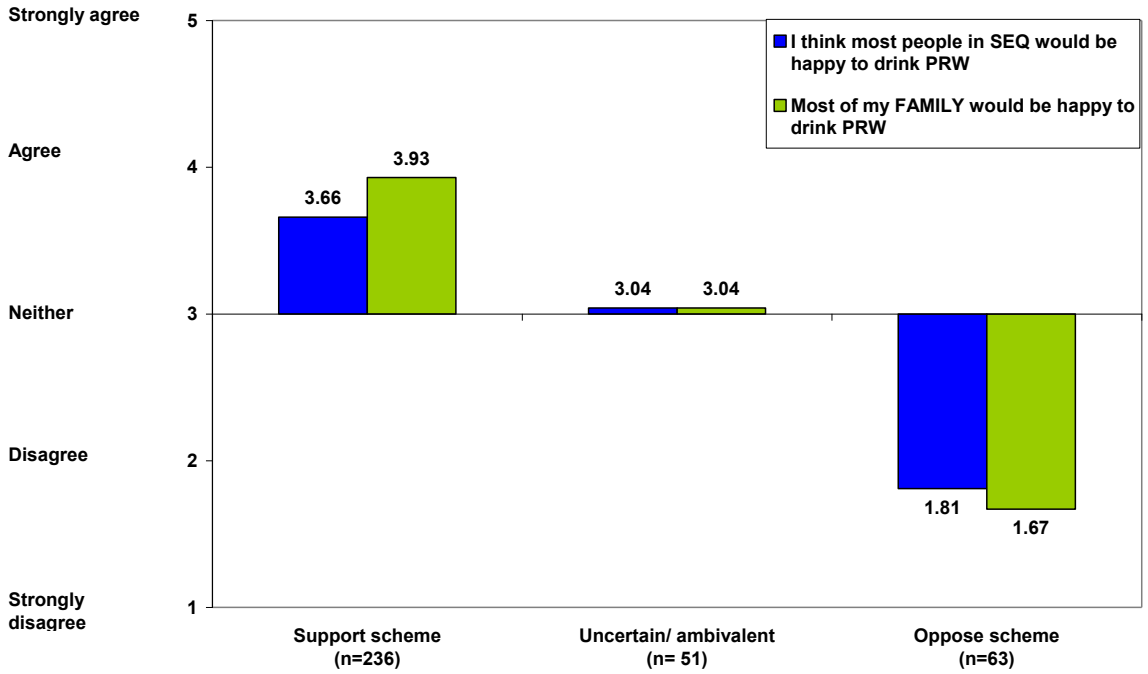

Figure 18: Mean perceptions of SEQ community and family support for PRW by behaviour category.

4.3.4. How Happy are Respondents and Others about the Consultation Process Relating to PRW?

As demonstrated by the means in Figure 19, respondents' level of support for PRW significantly influenced their beliefs about the necessity for consultation about PRW ($p < .01$).

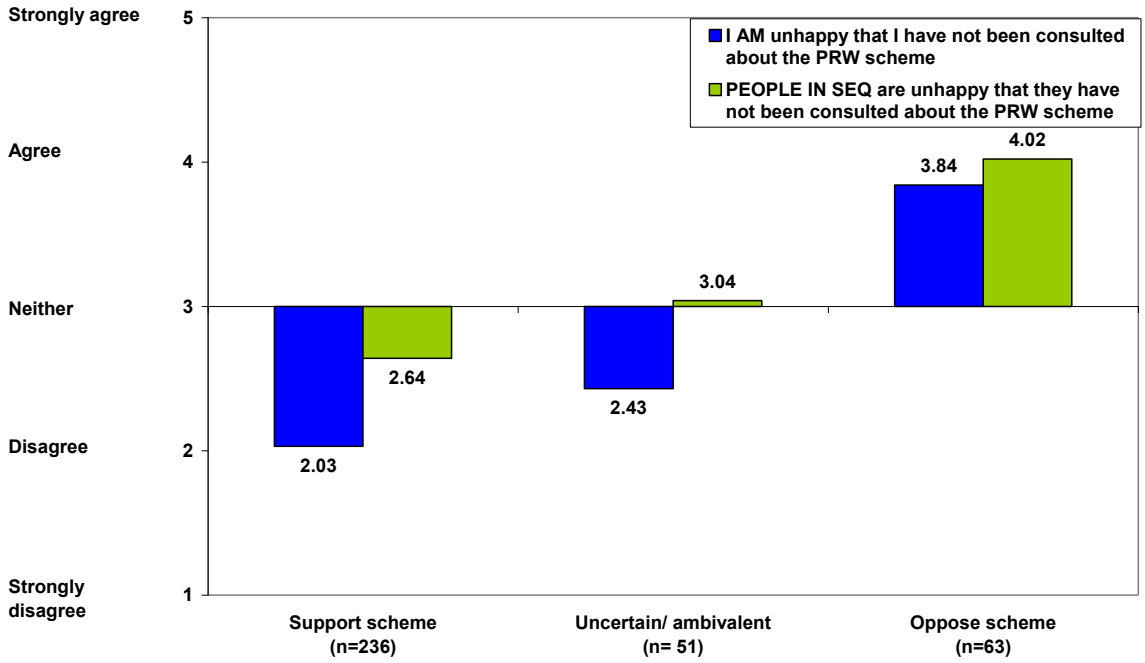

Figure 19: Dissatisfaction with the lack of consultation about PRW: supporters of scheme, those who are uncertain and those who oppose.

Opponents were unhappy that they had not been consulted and felt that others in SEQ were also unhappy, whereas uncertain respondents and supporters on average were not unhappy that they had not been consulted. Overall, respondents agreed that people in SEQ were unhappy that they had not been consulted more than they agreed that they were unhappy themselves; however those who oppose the scheme did not differentiate between their own level of dissatisfaction and the perceived dissatisfaction of people in SEQ.

4.3.5. How much do Respondents Perceive that They and Others are Influenced by Negative Messages about PRW?

The means in Figure 20 reflect significant differences ($p < .01$) in how much negative messages in the media are perceived to influence oneself and others. Overall, respondents perceived negative messages about PRW in the media to have had significantly more influence on the SEQ community in general than their family or themselves. This pattern is consistent regardless of level of support for the scheme, although it is attenuated for the opponents.

Respondents who supported the PRW scheme were significantly less likely ($p < .01$) to feel that negative messages about PRW affected themselves or their family than those in opposition or those who were uncertain about the scheme; however they demonstrated no difference in perceived influence of negative messages on the SEQ community more broadly.

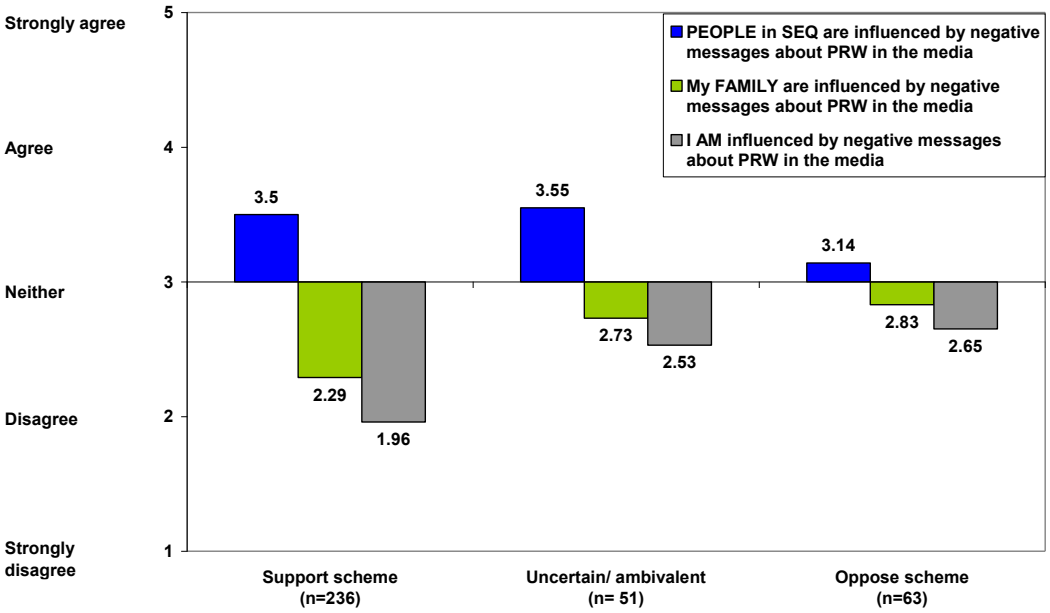

Figure 20: Perceived media influences on people in SEQ, family and self by behaviour category.

4.3.6. How do Respondents Perceive the Role of Emotion in Decision Making for Themselves and Others?

To assess respondents' beliefs about whether others' decisions are driven by emotion, they were asked to indicate what extent they thought: "people who *support* the scheme are driven by emotion" and "people who oppose the scheme are driven by emotion". Responses were influenced by respondents' support for the scheme ($p < .01$) (see Figure 21).

- Opponents had a significantly greater belief than supporters that people who support the scheme are driven by emotion.
- Supporters had a significantly greater belief than opponents and uncertain respondents that people who oppose the scheme are driven by emotion.

Taken together, these results suggest participants attribute emotion to those with the opposing view. More specifically, supporters of the scheme reported that those who oppose the scheme are driven by emotion. Conversely, opponents of the scheme reported that those who support the scheme are driven by emotion, and by implication, they were not (i.e. they are being reasonable and rational).

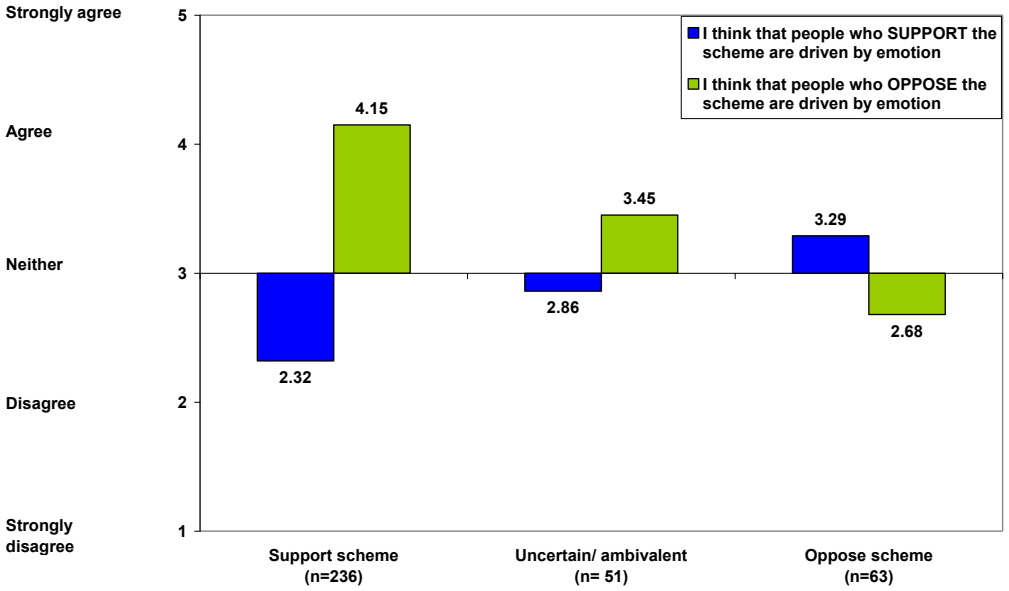

Figure 21: Mean perceived emotional motivations for PRW attitude: Supporters of scheme; those who are uncertain and those who oppose.

4.3.7. Summary of Perceived Differences between Oneself and Others: Supporters, Opponents and Those who are Uncertain about the Scheme

Results in the above sections demonstrate that respondents' overall perceptions of others' attitudes toward PRW are biased in the direction of their own attitudes, suggesting that there is a type of false consensus effect emerging (Marks and Miller, 1987). A greater belief in the similarities of one's own opinions and the opinions of close others may reflect reality: we are more likely to share the beliefs and opinions of those close to us. However, the current research clearly shows that opponents' perception that others in the SEQ share their lack of support for the PRW scheme is inaccurate. In contrast, respondents distinguish themselves from others when reporting on how much they are influenced by negative media messages about PRW, with others more influenced than the self. This finding most likely reflects a self-enhancement bias. It is interesting to note, however, that this pattern is less pronounced for opponents than supporters. Furthermore, both supporters and opponents tend to think that the other side is reacting more emotionally to the scheme than they themselves are.

4.4. What are the Key Drivers of Support for the PRW Scheme Over Time?

In order to assess the relative impact of the key predictive variables on people's support for the scheme over time, a standard multiple regression was conducted whilst controlling for demographic variables (see Figure 22, Table 15 and Appendix 11 for an overview). This analysis was conducted in order to assess whether the *relationship between support scores and the key predictive variables changed over time after the potential effect of demographics were controlled (e.g. are the models for the Time, Time 2 and Time 3 different?).*

Demographic variables such as age, gender, household unit and SES were entered simultaneously as a block in the first stage. The key predictive variables (emotion, trust in government, trust in science, health risk, relative risk, system risk, procedural fairness, and distributive fairness) were entered in the second stage simultaneously (see Table 15).

It should be noted that hierarchical multiple regression does not assess inter-relationships among predictive variables, and as such does not consider mediated relationships like those found in the structural equation model detailed in Nancarrow et al. (2007). The hierarchical multiple regressions that were conducted only account for the direct contributions of each predictive variable to support for the scheme. This analysis permits an assessment of the direct contribution of the predictive variables to support for the scheme whilst controlling for demographic variables.

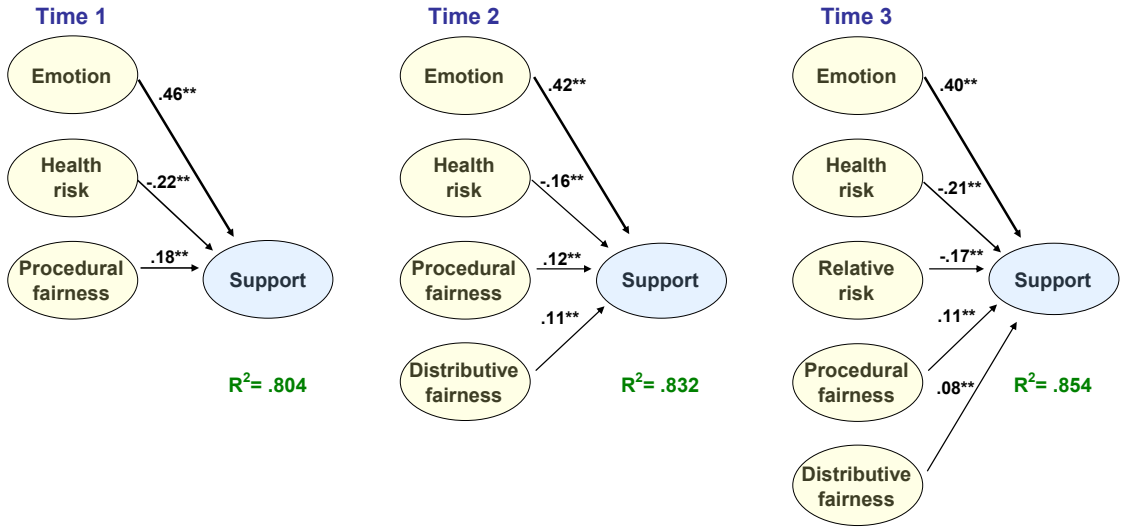

Figure 22: Hierarchical multiple regressions: predicting support for the scheme over time when controlling for demographics.

The hierarchical multiple regressions indicated that different variables were significantly related to support for the scheme at different time points. For instance, at monitoring survey Time 1, only three predictive variables (emotion, perceived health risks and procedural fairness) were significantly ($p< .01$) correlated with support when the key predictive variables were entered in the second stage. This may be a case of respondents asking themselves three fundamental questions:

1. How do I feel about this?
2. Is it safe?
3. Is it fair?

Interestingly, over time, more predictive variables demonstrate statistically significant ($p< .01$) relationships to support. This may be a case of attitudes related to distributive fairness and relative risk crystallising over time and becoming more important for respondents when making decisions.

A structural equation model was developed for the Baseline behavioural survey which demonstrates relationships among psychosocial predictors of support for the scheme, which has been operationalised as intended behaviour (Nancarrow et al., 2007). The predictive model showed that four variables had significant direct relationships with intended behaviour: emotion, subjective norm, fairness and health risk. Trust and system risk had an indirect relationship with behaviour, as they mediate the relationship between behaviour and health risk. Emotion made the biggest direct contribution to intended behaviour as well as having a strong influence through mediated variables.

Table 15: Coefficient summary: Time 1, 2 and 3.

		Time 1		Time 2		Time 3	
Model	**Variables**	**Beta**	**Sig.**	**Beta**	**Sig.**	**Beta**	**Sig.**
1	Household unit	-0.112		-0.083		0.014	
	Age	-0.157	*	-0.119	*	-0.099	
	Gender	0.148	*	0.056		0.077	
	SES	0.086		0.052		0.042	
2	Household unit	-0.004		-0.001		-0.01	
	Age	-0.069	*	-0.019		-0.018	
	Gender	-0.005		0.008		-0.021	
	SES	0.012		0.037		0.017	
	Trust in govt'	0.009		0.095	*	0.021	
	Trust in science	0.043		0.028		-0.012	
	Health risks	-0.217	**	-0.163	**	-0.209	**
	Relative risks	-0.05		-0.08		-0.172	**
	System risks	-0.007		-0.05		-0.083	*
	Distributive fairness	0.066	*	0.111	**	0.082	**
	Procedural fairness	0.182	**	0.12	**	0.108	**
	Emotion	0.46	**	0.423	**	0.398	**

5. SUMMARY AND IMPLICATIONS

Overall, the respondents to each of the surveys expressed a relatively high level of support for the PRW scheme, with over 70% of respondents indicating that they would drink water containing PRW. This finding must be seen against the backdrop of record low dam levels in SEQ; it is possible that the level of support reflected the feeling that the introduction of PRW was a necessity. Certainly, the majority of respondents in the monitoring surveys indicated that they would not drink the water containing PRW if they had a choice. Similarly, in the Baseline survey (Nancarrow et al., 2007), when respondents were presented with a scenario in which there was an alternative to PRW, only a minority of respondents said they would continue to support the scheme.

It was also evident that support for the PRW scheme dropped over time and associated attitudes (i.e. trust, emotion, etc) became more negative. Analyses also indicate that there was a change in attitudes and support, especially amongst supporters, following the announcement by the Government that PRW would only be added to the dam when dam levels reached a critical level. This finding is interesting given that most respondents reported that the Government's decision had not changed their support for the PRW scheme. Previous research has shown that people are not always aware of the influence of certain types of information on their behaviour and decision-making (e.g. Nolan, Schultz, Cialdini, Goldstein, and Griskevicius, 2008). The drop in support over time is consistent with literature that posits that risk (a major determinant of support or rejection) increases the more immediate a threat becomes (in this case, the closer the time comes for the scheme to go online) (Slovic, 1987). Consistent with this, supporters of the scheme perceived the relative risk of the scheme to be higher post-announcement, along with increases in perceived likelihood of a system failure.

Another pattern to emerge was the polarisation of support as time went on (that is, a reduction in the proportion of people who were unsure about the scheme), probably reflecting the high level of media attention the scheme received during the twelve months that the research was conducted. As people become more familiar with a subject, they are more likely to form and firm their views in relation to it. Indeed, the role of the media in shaping public attitudes to water supply options is an important consideration for policy makers.

A prime example is the rejection of a proposed indirect potable recycled water scheme by Toowoomba residents in a referendum in 2006, that gained international media attention (Hurlimann and Dolincar, 2009; van Vuuren, 2009). At the time of the Toowoomba referendum, dam levels were at record lows (23%) and late polling indicated majority support for the scheme; however on the day of the referendum the majority of citizens, 62%, voted to oppose the scheme (Water Futures Toowoomba, 2006). Hurlimann and Dolincar (2009) identified the vested interests of public opinion leaders in Toowoomba and subsequent misrepresentation of recycled water in the media as reasons for the referendum outcome. Van Vuuren (2009) also identified the role of opinion leaders in the Toowoomba referendum and concluded that press coverage of all sides of the debate lent weight to 'irrational' arguments that resonated with the public. As such, journalistic norms of balanced reporting were thought to bias the referendum result, as marginal and non-expert opinions were given equal air-time despite lacking credibility. The Toowoomba example clearly indicates that support for potable recycling schemes can change as its introduction becomes more real and immediate and as emotions heighten in response to political campaigns and media coverage (van Vuuren, 2009).

Overall, results from both the quantitative surveys reported here and elsewhere (Nancarrow et al., 2007), and the qualitative research conducted as part of the Systematic Social Analysis project (Alexander et al., 2008; Browne et al., 2008), suggest that emotional responses, trust, risk, perceptions of fairness, and perceived normative support are important determinants of support for the introduction of the PRW scheme. These factors were shown to be predictors of support for PRW in the structural equation modelling in the Baseline survey (Nancarrow et al., 2007). In the current report, supporters and opponents could be differentiated on the basis of their emotional responses to PRW, their trust in government to deliver a safe water supply, their judgements of the risks associated with PRW, and the extent to which they perceived the scheme to be fair. Similarly, research by Hurlimann (2007) has shown that trust, fairness, and risk are key factors underpinning perceptions and acceptance of recycled water schemes for non-potable use. Although trust was not a significant determinant of intended behaviour or support for PRW in the Time 3 monitoring survey (see pp. 44-45), this does not

necessarily undermine the importance of this factor. Other research (Ross, 2009) has shown that there are complex interrelationships between trust, risk and fairness that may mask the effect of this determinant.

5.1. Perceptions of Risk

Whilst the likelihood of an incident occurring was rated as only moderate, the seriousness of something occurring was consistently rated highly. 'Risk severity' has long been shown to be an important dimension to people when forming risk perceptions (Fischhoff et al., 1978), as has perceived lack of control over the negation or early remediation of incidents (Slovic, 1987). As such, it is not only important that the public is made aware of the safeguards in place against the threat of an incident occurring, but also of contingency measures set in place to ensure that potential incidents, no matter how unlikely, are dealt with quickly and effectively. 'Seriousness' seems to fluctuate over time, indicating that it is sensitive to contextual events. It is possible that extraneous but related events such as the introduction of fluoride to potable water supplies may have impacted on responses to system risk questions.

The respondents that participated in all four surveys demonstrated significantly higher levels of perceived health risk in the Time 3 survey, but surprisingly, demonstrated lower levels of perceived likelihood and seriousness of incidents occurring in the operation of the PRW treatment system. The improved perceptions of these components of system risk over time may be related to improved awareness and understanding of the treatment processes. The noted disconnect between these different aspects of risk perception may indicate that community concern about health impacts are not directly related to concerns about accidents occurring in the treatment process. Perceived health risks may instead be related to concerns that the PRW system is unable to detect and treat contaminants in the water. Conversely it may be related to beliefs that chemicals in the water and the treatment process could have unintended and dangerous interactions.

5.2. Trust

It was evident that trust in government (in relation to the PRW scheme) declined over time and was significantly lower post-announcement compared to before. One explanation for this loss of trust is the change of approach by the Government. It is possible that this undermined peoples' confidence in the scheme and, in turn, the Government's credibility. The same pattern did not emerge for scientists, suggesting that there was not a generalised loss of trust. Importantly, results show that scientists were the most trusted and influential source of information about the PRW scheme. Results also indicated that supporters expressed relatively high levels of support in scientists as well as in government.

Trust in government and science was not significantly related to support for the scheme at any time point when entered into hierarchical multiple regressions. Trust in government was only indirectly related to support as a mediator of perceived risk in the structural equation model developed for the baseline survey.

5.3. Distinctions between Self and Others

Results that explored how respondents differentiated between themselves and others showed that respondents aligned others' attitudes with their own attitudes. Thus, supporters believed that their family and others in SEQ supported the PRW scheme, whereas opponents believed the opposite. Although it is likely that there are similarities between our own attitudes and those of important others, such as our family, the belief of opponents that others in SEQ oppose the scheme was an inaccurate impression. In the literature, this finding is often referred to as a false consensus effect (e.g., Marks and Miller, 1987). An outcome of this effect is that our own stance on important issues can go unchallenged. Alternatively, these results could be interpreted as respondents' stated support for the scheme reflecting compliance with subjective norms. That is, their level of support is related to the levels of support demonstrated by their family and friends. Despite the potential role of subjective norms however, the false consensus effect is still operating to a certain extent as opponents felt that the SEQ community more broadly is also opposed to the scheme (research indicates majority support - 60-70% of the sample).

In contrast, respondents reported that others were more influenced by negative messages about PRW than they were themselves. The belief that others are more influenced by persuasive campaigns than we ourselves are is termed the Third Person Effect (e.g. Duck and and Mullin, 1995). Past research has also shown that we tend to differentiate less between ourselves and people like us (e.g. family), although people who hold very strong or certain opinions, for example the supporters of PRW, tend to see themselves as less influenced than all others (e.g. Duck, Hogg, and Terry, 1998).

This belief is usually interpreted as a self-serving bias whereby we judge that others are less rational and more susceptible to persuasion attempts than we are. Importantly, past research in this area has highlighted the tendency for these differential perceptions to underpin greater support for restrictive measures such as censorship. In the current context, where supporters show the most marked differentiation between themselves and others, this could translate into a lack of support for consultative processes on PRW because supporters may believe that others are less rational and more persuaded by the bad press on PRW than they are.

5.4. Research Limitations

One possible limitation of the current research is the use of survey measures to assess all key concepts. The use of a 'common method' may inflate relationships among variables, although recently this view has been called into question (Spector, 2006). It should be noted, however, that the quantitative data reported here were consistent with the outcomes of the qualitative research findings (Alexander et al., 2008; Browne et al., 2008), lending support to the current findings.

This research is not able to account for the array of contextual and environmental factors that may have had bearing on responses to the questionnaires. Such factors may include exposure to media coverage, weather, dam levels and so on. With regard to dam levels, natural variation in rainfall makes comparison with testing times difficult; however as can be seen in Figure 2, dam levels gradually increased during the time of the research. It may be that this attenuated people's support of the PRW scheme, as an increase in dam levels may have contributed to a perceived decrease in necessity for alternative water supply systems. These factors can be considered as a whole but it is not possible to tease out the individual influences that each of these may have had. Future research can explore this issue further through controlled experimental studies that test for the influence of individual factors on support for PRW.

Finally, all efforts were made to sample across regions and socio-demographic groups and analyses did not show any demographic differences in attitudes to PRW. Nevertheless, there is always the possibility that the results may be biased because people who were particularly interested in the issue (i.e. PRW or water more generally) are over-represented in the sample. This concern is most relevant when looking at overall levels of support for the scheme rather than investigations of relationships among factors or changes in factors over time. It is interesting to note, however, that initial findings of the research were consistent with market research about the issue conducted at the same time (UMR, 2007). This suggests that sampling bias was unlikely to be a significant issue for the current research.

5.5. Recommendations and Further Research

The findings of the current report suggest a number of conclusions and recommendations. Firstly, it is important to note that there is potentially a strong support base for the introduction of a PRW scheme in SEQ. Opponents' stance on PRW may be relatively intractable, however by addressing issues of perceived risk and by highlighting the extent of community support for the scheme, some of their concerns about PRW may be allayed.

Maintaining support for the scheme may also be difficult and special attention by water authorities may be required to ensure that those who are supportive or uncertain remain relatively comfortable with the scheme. For those who are ambivalent, past research suggests that there may be an increased acceptance of the recycled water use once the scheme has commenced and people become familiar with it (Hurlimann, 2008). The results of the current research suggest that support may be underpinned by:

- Trust in the Government to administer a safe water supply:
  - Community support is likely to be influenced by the belief that the Government have the best interests of the community at heart. Putting in place system checks and balances such as scientists being on an oversight board with the power to influence government decisions may also contribute to building trust.
- Low risk perceptions associated with recycled water and operation of the scheme. This may necessitate:
  - Communication of accurate information about health risks and the processes that mitigate against system failure from trusted sources (e.g. scientists); and
  - That the risk is put into perspective. Community members are prepared to support a recycled water scheme if they believe that it is necessary, which may indicate the need for water authorities to highlight long-term water security needs and frame discussions with reference to holistic solutions.
- The scheme and the associated decision-making processes being perceived as fair:
  - What is considered fair will vary, with an emphasis on action or consultation depending on the situation and the individual;
  - A 'whole of community' approach to water management may be appropriate, with particular emphasis on the benefits for all from a secure water supply.
- Normative support for recycled water from family, friends and community members:
  - As support may be reinforced by knowing that others are also supportive, there are opportunities for water authorities to establish new norms or to clearly communicate current norms.

Strategies for increasing public support for recycled water may be best directed towards challenging assumptions, discussing issues and developing new meanings rather than affecting behaviour change or influencing emotions (Russell and Lux, 2009). Russell and Lux (2006) advocate a participatory approach to recycled water planning which involves the community in deliberations though a range of public engagement strategies. Effective community consultation may have an educative component and can "allow people's understanding and views to develop" (Russell and Lux, 2009, p.31).

A range of communication and engagement strategies from political and social sciences are available and it is recommended that these techniques be investigated and tested for efficacy in assisting water authorities to: develop solutions; address community concerns; and counter the potential negative effects of the mass-media on public attitudes. These techniques include, amongst others: citizen juries and panels; planning cells; concensus conferences; deliberative polling; world cafes; visioning; public hearings and displays and citizen advisory committees (Abelson et al, 2003). An overview of these techniques is included as Appendix 12. It is likely that the proposed strategies could have diffuse effects. For example, the communication of accurate and transparent information not only helps to address risk perceptions but also helps to build trust (e.g. Tyler and DeGoey, 1996; Ross, 2009).

Effective communication of science and risk is a complex process that is subject to challenges associated with ever changing contexts, the distinct needs of varied audiences, and disciplinary boundaries. Despite this, general criteria have been developed to inform science communication across contexts. Moser (2010) has developed an overarching framework that can be applied to authorities communicating risks in a variety of contexts, including water management. The following points highlight considerations that authorities may need to take into account when developing communication strategies to address water management strategies.

- What are the goals (scope and purpose) of the communication?
- Who is the audience (individuals, specific sub-populations, particular interest groups or socioeconomic sectors, etc.)?
- How is the issue framed? What language, metaphors, images, etc. are used?

- What are the messages? What information is conveyed and is it useful and accessible? Content also raises questions about sources of information and their credibility.
- Who are the messengers (e.g. politicians, scientists, planners, industry, celebrities, people of different ethnic or socioeconomic background and of different ages)?
- Through which channels does the communication occur?
- How do we know the communication had the intended effect?

A large literature addresses the question of how to engage the public in policy planning and decisions. One of the key lessons from Arnstein's (1969) seminal analysis of citizen participation in planning programs is that tokenistic involvement of citizens in planning processes may inadvertently have negative impacts, including deteriorated trust between the public and relevant authorities. Therefore, community engagement strategies must be perceived as genuine and not tokenistic.

In conclusion, the current research indicates that the concept of an indirect potable scheme would gain support from the majority of the SEQ community. However, there are a number of key barriers to social acceptance that must be overcome to ensure its successful implementation. The roles of emotion and subjective norms, along with issues of fairness, institutional trust, and perceived health and system risks associated with the scheme, are all significant determinants of how a scheme will be received by the broader community. To address these issues, it is suggested that, rather than pursuing a one-size-fits-all approach to public engagement, different communication and engagement techniques are utilised for resolving different issues relating to the public acceptance of recycled water, and that by using a variety of strategies concurrently, outcomes for both the community and future water security will be optimised.

APPENDIX 1 - PRW Information Read to Respondents

South-East Queensland has experienced a significant reduction in rainfall over the past 30 years, with a recent record drought. This may continue with the onset of climate change and there is a need to provide reliable sources of water for the future of the region. Most of the water supply now is from dams, such as Wivenhoe Dam, North Pine Dam and Somerset Dam and despite some rain, the dams' levels continue to be low.

The Government is investing in new sources of water, including a desalination plant to provide water from the sea. Another major source is to reuse water. Currently, the water used in our kitchens, laundries, bathrooms and toilets goes to wastewater treatment plants, where it is treated and disposed into rivers and Moreton Bay. The Government has now decided to treat this water to a very high standard and reuse it in power-stations and to replenish Wivenhoe Dam.

The treatment plants will be part of a seven barrier process to treat the wastewater to drinking-quality. The scientists believe that everything that could possibly be harmful to health will be removed in this process. The treated wastewater will be piped to Wivenhoe Dam where it will mix with fresh water. It will later be taken out, treated again in the normal drinking water treatment processes, and the purified recycled water will be piped to houses and businesses for drinking, washing, cooking and all other uses.

The Queensland Government will appoint a special body to oversee the whole scheme. Veolia Water, a private company with world-wide experience, will be responsible for operating the scheme and treating the wastewater. Queensland Health will be responsible for setting the treatment standards and the Department of Natural Resources and Water will ensure Veolia Water meets these standards.

We would now like to know what your thoughts are about using purified recycled water to top up Wivenhoe Dam and then be supplied to your household for all uses, including for drinking.

APPENDIX 2 - Details of Sector Sampling

Sector	LGA	SES	Suburb
Brisbane	Brisbane City	High	Bardon, Bulimba, Graceville, Graceville, Grange, Gumdale, Kenmore, Paddington, The Gap, Wakerley, West Lake, Wilston
		Med	Alderley, Algester, Balmoral, Boondall, Calamvale, Cannon Hill, Carina, Clayfield, Fairfield, Herston, Highgate Hill, Holland Park, Kedron, Kedron, Lutwyche, Newmarket, Sherwood, St Lucia, Taigum, Tingalpa, Windsor
		Low	Banyo, Darra, Inala, Manly, Northgate, Rochedale, Sandgate, Shorncliffe, Shorncliffe, Stafford, Stafford, Wynnum
	Logan City	High	Cornubia, Forestdale
		Medium	Greenbank, Heritage Park, Hillcrest, Loganholme, Shailer Park, Tanah Merah
		Low	Boronia Heights, Crestmead, Kingston, Logan Central
Ipswich	Ipswich City	High	Flinders View, Springfield Lakes, Walloon, Walloon, Yamanto
		Medium	Bellbird Park, Camira, Churchill, Grandchester, Raceview, Raceview, Redbank Plains A, Sadlier's Crossing, Woodend
		Low	Booval, Gailes, Goodna, Leichhardt
Laidley	Laidley Shire	Medium	Plainland
		Low	Laidley
	Esk Shire	High	Fernvale, Minden
		Medium	Coominya, Lowood
		Low	Toogoolawah
	Gatton Shire	High	Placid Hills
		Medium	Gatton, Grantham, Helidon
Caboolture	Caboolture Shire	Medium	Burpengary, Elimbah, Lawnton, Morayfield, Narangba, Ningi
		Low	Beachmere, Bongaree, Woodford
	Pine Rivers Shire	High	Draper, Eatons Hill, Griffin, Highvale, Joyner, Warner
		Medium	Dakabin, Dayboro, Kallangur, Kurwongbah, Murrumba Downs, Petrie, Strathpine, Samford
		Low	Brendale
	Redcliffe City	Medium	Rothwell, Scarborough
		Low	Kippa-ring, Margate

Suburb	Brisbane (n=510)		
	Lower	Medium	Higher
Shorncliffe	12		
Stafford	11		
Banyo	10		
Boronia Heights	10		
Crestmead	10		
Kingston	10		
Sandgate	10		
Inala	9		
Rochedale	9		
Northgate	9		
Darra	9		
Wynnum	8		
Logan Central	7		
Manly	1		
Fairfield		22	
Calamvale		14	
Newmarket		13	
Sherwood		13	
St Lucia		12	
Heritage Park		11	
Kedron		11	
Windsor		11	
Algester		10	
Clayfield		10	
Greenbank		10	
Highgate Hill		10	
Tanah Merah		10	
Taigum		10	
Carina		9	
Shailer Park		9	
Hillcrest		8	
Loganholme		8	
Boondall		8	
Cannon Hill		6	
Alderley		3	
Balmoral		1	
Holland Park		1	
Lutwyche		1	
Sunnybank Hills		1	
Tingalpa		1	
Herston		1	
Grange			1
Gumdale			7
West Lake			8
The Gap			8
Bardon			9
Cornubia			10
Forestdale			10
Kenmore			10
Paddington			10
Bulimba			11
Graceville			11
Wakerley			29
Wilston			37
Total N	125	224	161
%	24.5	43.9	31.6

Suburb	Ipswich (n=172)		
	Lower	Medium	Higher
Booval	10		
Leichhardt	10		
Goodna	9		
Gailes	8		
Sadlier's Crossing		14	
Churchill		10	
Bellbird Park		9	
Camira		9	
Raceview		9	
Redbank Plains A		9	
Woodend		7	
Grandchester		6	
Calvert		1	
Walloon			32
Flinders View			10
Springfield Lakes			10
Yamanto			9
Total N	37	74	61
%	21.5	43.0	35.5

Suburb	Laidley (n=129)		
	Lower	Medium	Higher
Laidley	9		
Toolgoolawah	9		
Lowood		17	
Gatton		11	
Coominya		11	
Helidon		10	
Plainland		9	
Grantham		6	
Placid Hills			33
Minden			9
Fernvale			5
Total N	18	64	47
%	14.0	49.6	36.4

Suburb	Caboolture (n=227)		
	Lower	Medium	Higher
Beachmere	10		
Margate	10		
Brendale	9		
Kippa-ring	9		
Bongaree	7		
Woodford	6		
Dakabin		22	
Petrie		12	
Ningi		11	
Scarborough		11	
Elimbah		10	
Lawnton		10	
Narangba		10	
Rothwell		10	
Morayfield		9	
Dayboro		7	
Kallangur		2	
Murrumba Downs		2	
Kurwongbah		1	
Samford		1	
Strathpine		1	
Burpengary		1	
Draper			13
Eatons Hill			10
Griffin			10
Joyner			10
Warner			8
Highvale			5
Total N	51	120	56
%	22.5	52.9	24.7

APPENDIX 3 - Characteristics of New and Retest Respondents: Baseline and Times 1, 2 and 3 Monitoring Surveys

Table 16: New and retest respondents' SES and sector: Baseline survey and Times 1, 2 and 3 monitoring survey.

		Baseline		Time 1				Time 2				Time 3			
				New Respondent		Retest Respondent		New Respondent		Retest Respondent		New Respondent		Retest Respondent	
		N	%	N	%	N	%	N	%	N	%	N	%	N	%
SES	Lower	153	*26.3*	37	*25.0*	41	*27.2*	38	*25.9*	44	*21.7*	3	*1.9*	44	*21.8*
	Medium	285	*49.0*	76	*51.4*	68	*45.0*	74	*50.3*	103	*50.7*	48	*29.6*	106	*52.5*
	Higher	144	*24.7*	35	*23.6*	42	*27.8*	35	*23.8*	56	*27.6*	111	*68.5*	52	*25.7*
	Total	582	*100.0*	148	*100.0*	151	*100.0*	147	*100.0*	203	*100.0*	162	*100.0*	202	*100.0*
Sector	Brisbane	289	*49.7*	70	*47.3*	70	*46.4*	70	*47.6*	81	*39.9*	81	*50.0*	89	*44.1*
	Ipswich	87	*14.9*	31	*20.9*	29	*19.2*	30	*20.4*	43	*21.2*	24	*14.8*	44	*21.8*
	Laidley	57	*9.8*	23	*15.5*	26	*17.2*	22	*15.0*	33	*16.3*	28	*17.3*	25	*12.4*
	Caboolture	149	*25.6*	24	*16.2*	26	*17.2*	25	*17.0*	46	*22.7*	29	*17.9*	44	*21.8*
	Total	582	*100.0*	148	*100.0*	151	*100.0*	147	*100.0*	203	*100.0*	162	*100.0*	202	*100.0*

Table 17: Household unit for new and retest respondents: Baseline survey and Times 1, 2 and 3 monitoring survey.

Household Unit	Baseline		Time 1				Time 2				Time 3			
			New Respondent		Retest Respondent		New Respondent		Retest Respondent		New Respondent		Retest Respondent	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Single adult less than 65 years	42	7.2	14	9.5	10	6.6	14	9.5	17	8.3	12	6.0	19	9.4
Single adult more than 65 years	36	6.2	7	4.7	9	6.0	6	4.1	15	7.3	6	3.0	15	7.4
Two adults- older person less than 65 years	122	21.0	31	20.9	43	28.5	24	16.3	50	24.4	45	22.5	44	21.7
Two adults- older person more than 65 years	74	12.7	31	20.9	27	17.9	14	9.5	44	21.5	21	10.5	39	19.2
Single adult- eldest child less than 18 years	24	4.1	3	2.0	5	3.3	7	4.8	2	1.0	4	2.0	2	1.0
Single adult- eldest child more than 18 years	11	1.9	2	1.4	3	2.0	6	4.1	3	1.5	4	2.0	5	2.5
Two adults- eldest child less than 18 years	138	23.8	26	17.6	30	19.9	48	32.7	34	16.6	58	29.0	40	19.7
Two adults- eldest child more than 18 years	70	12.0	12	8.1	8	5.3	18	12.2	15	7.3	18	9.0	16	7.9
More than two adults- no children	27	4.6	11	7.4	7	4.6	4	2.7	9	4.4	16	8.0	7	3.4
More than two adults- eldest child less than 18 years	22	3.8	9	6.1	3	2.0	6	4.1	6	2.9	8	4.0	9	4.4
More than two adults- eldest child more than 18 years	15	2.6	2	1.4	6	4.0	0		10	4.9	8	4.0	7	3.4
Total	581	100.0	148	100.0	151	100.0	147	100.0	205	100.0	200	100.0	203	100.0

Table 18: Age bracket of new and retest respondents: Baseline survey and Times 1, 2 and 3 monitoring survey.

Age bracket	Baseline		Time 1				Time 2				Time 3			
			New Respondent		Retest Respondent		New Respondent		Retest Respondent		New Respondent		Retest Respondent	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Less-than-24yrs	21	3.6	7	4.7	3	2.0	5	3.4	3	1.5	3	1.5	4	2.0
24-to-39yrs	129	22.1	29	19.5	24	15.9	31	21.1	25	12.2	53	26.5	25	12.3
40-to-55yrs	203	34.8	49	32.9	59	39.1	70	47.6	67	32.7	76	38.0	75	36.9
56-to-65yrs	129	22.1	28	18.8	34	22.5	21	14.3	52	25.4	37	18.5	46	22.7
66-to-75yrs	80	13.7	28	18.8	22	14.6	13	8.8	44	21.5	22	11.0	38	18.7
More-than-75yrs	21	3.6	8	5.4	9	6.0	7	4.8	14	6.8	9	4.5	15	7.4
Total	583	100.0	149	100.0	151	100.0	147	100.0	205	100.0	200	100.0	203	100.0

Table 19: Gender of new and retest respondents: Baseline survey and Times 1, 2 and 3 monitoring survey.

Gender	Baseline		Time 1				Time 2				Time 3			
			New Respondent		Retest Respondent		New Respondent		Retest Respondent		New Respondent		Retest Respondent	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Female	316	54.2	78	52.3	77	51.0	80	54.4	103	50.2	102	51.0	104	51.2
Male	267	45.8	71	47.7	74	49.0	67	45.6	102	49.8	98	49.0	99	48.8
Total	583	100.0	149	100.0	151	100.0	147	100.0	205	100.0	200	100.0	203	100.0

APPENDIX 4 - Theoretical Background

The following section provides additional details about the relevant literature and theory that also informed the development of survey measures and items.

Behavioural Intentions/ Support for PRW

Community support for recycled wastewater schemes can be thought of as a combination of attitudes and behavioural intentions. The validity of measures of behavioural intentions regarding PRW is essential to the success of predictive behavioural modelling. In a study of predictors of support for PRW schemes Po et al (2005) and Leviston et al (2006) found that participants frequently made unprompted comments that qualified or justified their responses. Similar response qualifications have also occurred in other studies (eg. Marks et al., 2006). This indicates that caution is required when accepting stated community support for recycled water schemes at face value. The developmental stages detailed in Po et al. (2005) resulted in PRW attitudes being the only variable to have a significant direct relationship with Intended Behaviour. A re-examination of the measurements revealed close conceptual and semantic similarities between the Attitudes variables and Intended Behaviour variables. The high correlation of these variables and their ability to together form a single, reliable scale implied that, in effect, Attitudes was acting as a second measure of Intended Behaviour.

Emotion

The disgust emotion is particularly significant in reuse research as it relates to the idea of drinking "disgusting" materials (Charash and McKay, 2002; Browne et al., 2007). Five semantic differential scales were used in the current research to measure people's emotion when drinking recycled water. These scales were constructed and tested in past reuse research (Nancarrow et al., 2007; Leviston et al., 2006; Po et al., 2005).

Fairness

Theoretical models (Lind and Tyler, 1988) suggest that fair procedures are important because they indicate to community members that they are valued by the authority, and are therefore more likely to lead to acceptable outcomes. Social justice research also indicates that people pay more attention to fairness when they are uncertain, as explained by fairness heuristic theory (Van den Bos, 2001). For example, fairness appraisals are often used by people as an analytical tool to help them make a decision when they are uncertain.

Fairness is difficult to conceptualise and measure, (e.g. Folger 1996; Kals 1996; Syme et al. 2000; Syme and Nancarrow 2001) particularly in a questionnaire format. The measurement of fairness in the current survey drew from Leventhal (1980) who identified six procedural justice rules that people use to evaluate the fairness of allocation decisions: consistency, bias suppression, accuracy, correctability, representativeness, and ethicality. These principles were adapted to apply to a recycled water context as there is some indication that resource specific scales are more valid than their replicated counter-parts (Smith and Propst 2001).

Trust in Government and Science

Many studies in the US have shown that lack of trust in the US Department of Energy is an important predictor of perceived risk and risk acceptability. However, the relationship between trust and attitudes towards policies was often found to be either weak or moderate (Bord and O'Connor, 1992; Biel and Dahlstrand, 1995). The characteristics of institutions that people trust to communicate food-related hazards include: truthfulness, responsibility, accurateness, concern for public welfare, factual and having a good track record (Frewer et al, 1996).

APPENDIX 5 - Thematic Analysis of Toowoomba Retrospective Workshop Data

Introduction and Methodology

Toowoomba is the only community in Australia to have voted on a proposed PRW scheme. As such, it provides a unique opportunity to examine the motivations behind actual behaviours (voting in the referendum) as opposed to behavioural intentions. Leading up to the referendum on PRW in Toowoomba, polling suggested majority support for the introduction of the scheme; however the community voted in opposition to the proposed scheme. The results suggest a change of heart by many people who might initially have intended to vote 'Yes'. The Toowoomba context clearly indicates that attitudes towards and support for PRW can change as its introduction becomes more real and immediate and as emotions heighten in responses to political campaigns and media coverage.

Recent theoretical developments have also highlighted the critical role of emotion in individuals' decision-making and appraisal of risk. Previously, a dichotomy was drawn in the literature between rational and emotional influences on decision-making, with emotion seen as a less valid input. Current approaches suggest that emotion is adaptive when used to inform decision-making and can facilitate behavioural responses. Importantly, people are poor emotional forecasters; that is, they often inaccurately predict how they will feel in the future (i.e., affective forecasting, Wilson and Gilbert, 2003; Pham, 2004). The anecdotal evidence from Toowoomba and the theoretical and empirical literature point to the possibility that emotion may become a more important predictor of intention to drink PRW as the implementation of the scheme draws closer.

Four workshops were conducted in April 2008 with a sample of 17 Toowoomba residents, who voted for and against the proposed Purified Recycled Water scheme in the Toowoomba referendum held on the 29th of July, 2006. Two workshops were conducted with a total of nine residents who supported the scheme and voted 'Yes' in the referendum; and two workshops were conducted with a total of eight residents that had opposed the scheme and voted 'No' in the referendum. The workshops were designed to elicit the arguments underlying respondents' decisions to support or oppose the PRW scheme.

The Toowoomba workshop discussions were recorded and qualitative thematic analysis was undertaken on the transcripts using NVivo software. Table 20 provides an overview of the key themes extracted from the workshop data and compares the amount of references made to each theme by the Yes and No voters.

Overview of Results

As shown in Table 20, the workshop participants who voted for and against the proposed scheme in the Toowoomba referendum (who will be referred to as supporters and opponents for sake of ease) demonstrated some similarities in terms of the most commonly discussed themes. The most common themes for both the supporters and the opponents were: the referendum campaign and materials; and their level of confidence in the science and experts. Despite discussing similar themes to a comparable extent, the nature of the specific discussions was varied between the supporters and the opponents. Often similar arguments were used by both sides of the debate to reach conclusions that were polar opposites. For instance, both opponents and supporters felt that:

- The 'other side' had more resources to invest in the referendum campaign and materials. This perceived inequity influenced their level of support for the scheme.
- The 'other side' was derogatory, emotional and irrational. The opponents felt that the supporters were driven by a fear of running out of water and cost saving, resulting in minimal attention being paid to 'viable' water supply alternatives. The supporters felt that the opponents were driven by a fear of health risks and drinking sewage, along with 'blind faith' in alternative water supply options. Both the opponents and supporters distanced themselves from emotional reactions and claimed that the negative emotional states of others made them resist the arguments put forward.

Table 20: Toowoomba Retrospective workshops: References to themes made by Yes and No voters in the PRW referendum.

Themes	Voted YES	Voted NO
Referendum	44	40
• Yes campaign & materials	15	35
• No campaign & materials	28	9
Level of confidence in science & experts	32	29
• Proposed treatment scheme	16	8
• Council & politicians	7	13
• Science and experts	9	8
• Procedural fairness	0	3
Alternative water supply	28	19
• Other water capture	9	10
• Distributive fairness	10	0
• Non-potable usage	0	4
• Alternative treatment options	0	4
Views of others	26	13
• Social norms	20	6
• Public perception of Toowoomba- economic impacts	7	7
Risk attitudes	21	17
• Relative risk	22	7
○ Poor existing water quality	19	6
• Pharmaceuticals & contaminants	4	10
• Health risk	5	6
Affect	18	18
• Emotion	12	16
• Sewage	8	2
Water availability	26	7
Worldview & values	7	8
• Worldview	7	7
• Natural order	1	3
Freedom of choice	1	3

KEY: theme references	Highly referenced
	No reference

Despite the 'Yuk-factor' being presented as a primary explanation in the media for the Toowoomba community's rejection of the proposed scheme in the referendum, emotion was not one of the most commonly discussed themes (see Table 20 for theme frequencies).The majority of the discussions of both the opponents and supporters was focused on cognitive appraisals of the scheme such as: the referendum process; levels of confidence in the science and experts; and the viability of alternative water supply options.

Key differences were observed between the workshop participants who voted for and against the scheme as listed below.

The supporters of the scheme placed more emphasis on:

- Water availability. Concerns were expressed about Toowoomba's capacity to support expected population growth without the proposed scheme being put in place. Low rainfall, water restrictions and the levels and locations of dams were also widely discussed.
- The distributive fairness of the alternative water supply options. It was thought to be unfair for Toowoomba residents to use bore water and water sourced from other localities, as typified in the following quote: *"When people were discussing recycled water they weren't*

thinking about what happens when you start using up the bore water, which deprives the farmers…someone, loses out and the rates will go up".

- The risk of the scheme relative to other risks, particularly those associated with junk food and products imported from other countries with less stringent health regulations. PRW was viewed as being of a higher quality than the current drinking water supplies from dams and water tanks, which were thought to contain animal waste, bacteria, other organic materials and chemicals used in pesticide sprays.
- Social norms. Personal views were presented as being strongly aligned to friends and family who had worked in science or had a mutual faith in science and technology.

The opponents of the scheme placed more emphasis on:

- Alternative water supply options. Alternatives such as: desalination plants, coal seam gas, a pipeline from Herbert River, water trading with northern irrigators were considered viable options. Other water options such as stormwater capture and the use of rainwater tanks were also viewed as preferable to PRW.
- The fairness of the decision-making processes. Levels of confidence in the science and experts had been negatively affected by the perceived unfairness of the decision-making processes associated with the Toowoomba referendum. The information presented about the scheme was perceived as biased, and the funding provided for campaign materials was perceived as inequitable.

Like the supporters, the opponents also acknowledged the lack of water availability and poor quality of existing drinking water; however they did not feel that these factors warranted exposing the community to potential risks from PRW. They tended to view risks in a cumulative rather than relative manner. For instance, the existing risks associated with water supplies only made the potential risks of PRW worse. The supporters on the other hand tended to use these same arguments to suggest that the risk of PRW was too small to worry about when so many other risks were present.

The opponents of the scheme tended to believe that the water recycling process interfered with, or violated, natural processes and laws of nature. For some opponents, their attitudes towards PRW were related to their personal worldview regarding nature and '*God's law'*. Conversely, the supporters tended to believe that the water recycling process was *'the same as nature, just sped up'*. The supporters were not concerned about interfering in natural processes as their worldviews tended to involve a faith in science and technology; thereby they accepted human interference in natural processes as rational and reasonable.

Both the opponents and the supporters acknowledged the potential economic impacts of the PRW scheme to Toowoomba. For instance, they felt that negative public perceptions of Toowoomba, or *'Poowoomba',* that may have resulted from the PRW scheme could affect business investment and tourism in the area. The supporters tended to dismiss these potential economic impacts by stating that '*business could look after itself'* and pointing out the PRW scheme was necessary to support continued population growth and development in the area. The opponents however felt that negative impacts to the Toowoomba economy and real estate prices were unacceptable and they did not recognise the potential of the PRW scheme to support development.

The opponents and supporters discussed their levels of confidence in the science and the experts to a comparable extent; however the nature of these discussions was varied. The supporters trusted the scientists, councillors and politicians who were promoting the scheme and did not believe that the community would be knowingly put at undue risk, whereas the opponents did not. The supporters were not concerned about the proposed water recycling scheme because similar schemes were used elsewhere in the world. They felt that Australian regulations and technologies were superior to those of other nations with similar schemes, and as such, the proposed scheme would be even safer. Some of the opponents, on the other hand, felt that Australian standards and technology would not be *'up to scratch'*. The opponents also pointed out the recycled water schemes used internationally were not the same as the one proposed for Toowoomba, which

involved putting higher concentrations of PRW into stagnate dams rather than running water or aquifers.

The opponents were particularly concerned about the degree of uncertainty associated with the scheme and the water recycling science. For instance, the proposed water recycling scheme had not been trialled elsewhere and could not be conclusively proven to be safe. They also provided examples of instances in which science had been wrong about risks such as asbestos, thalidomide and smoking. The opponents were particularly concerned the potential long-term health impacts of PRW would not be able to be measured accurately. The supporters on the other hand were comfortable with scientific uncertainties, and accepted that "*it's hard to prove that anything is unequivocally safe, but it's easy to bash things".*

New items were developed for inclusion in the monitoring survey questionnaire as a result of these workshops. These items were designed to measure:

- the perceived risk of PRW relative to other risks;
- the distinctions people make between their own attitudes and the perceived attitudes of others in their community;
- concerns about climate change and water availability; and
- concerns about PRW contravening or violating a natural process, or law or nature.

The following sections provide a more detailed description of themes extracted from the qualitative analysis of workshop data.

Referendum
Both the supporters and opponents of the scheme widely and critically discussed the referendum campaign mounted by the 'other side'. Interestingly, both sides felt that the other was emotive, derogatory and more resourced.

The No Campaign and Materials. The supporters felt that No campaign materials (such as flyers, posters and adverts) were designed to elicit disgust towards the scheme by focused on '*drinking sewage'*. Many of the supporters suggested that they reacted against the negative nature of the No campaign. Some believed that the No campaign had more resources than the Yes campaign to promote their cause. They were also concerned that key public figures in Toowoomba had an undue influence on the referendum by capitalising on their good standing in the community in order to encourage other residents to oppose the scheme.

The opponents discussed the No campaign to a lesser extent than the supporters. They tended to believe that the No campaign was focused on alternative water treatment options and potentially negative economic impacts of the scheme that the Council had not fully considered. They felt that the No campaign was under-resourced relative to the Yes campaign.

> *"The no campaign only really happened in the last 3-4 weeks because there was no money given. It only added fuel to the fire."*

The Yes Campaign and Materials. The opponents of the proposed scheme discussed the Yes campaign and materials to a much greater extent than the supporters did. They felt that the information presented by the Yes campaign was inconsistent, biased and focused on cost saving at the expense of community health. They felt that the Yes campaign was designed to elicit fear about running out of water. The opponents felt that the supporters dismissed the referendum outcome as being related to conservative attitudes of older Toowoomba residents. The opponents thought that the materials produced for the Yes campaign were "glamorous" and a "waste of tax payers' money". They also indicated that they did not taste test the samples of PRW that were provided by the Yes campaign as their decision to oppose the scheme was not related to taste.

"The figures weren't right, so what else wasn't right? I was doing internet searches and finding inconsistencies. Once you find out one cover up you start questioning all the other information"

"The yes campaign was all about the fear of running out of water. It was a case of near enough is good enough."

Several of the supporters of the scheme reported that they taste-tested the water from the scheme and were not able to identify the PRW; however they indicated that the taste testing did not influence their decision. They felt that the Yes campaign was unbiased and design to ensure a safe future. They felt that the materials that were presented by the Yes campaign were useful; although they indicated that the materials did not alter their opinions about the scheme.

Confidence in Science and Experts
The supporters and opponents of the scheme demonstrated different levels of confidence in the science and experts.

Trust in Council and Politicians. The opponents of the scheme demonstrated distrust towards the Toowoomba councillors who were proposing the scheme and toward politicians in general. The opponents felt that the Council had misled Toowoomba residents about the scheme by presenting price estimates that were inaccurate and inconsistent, and by suggesting that similar schemes were used internationally.

"The council forum involved discussion of the different options available, but it always came back down to cost. The figures they presented didn't add up though, it didn't make sense"

The supporters on the other hand trusted the local councillors' decisions and actions in relation to the proposed scheme. They felt that the councillors were acting rationally and were not trying to *"force their opinions*" on Toowoomba residents. Furthermore they did not believe that the Council would place the community at risk, as demonstrated in the following quotes:

"Council wouldn't do something that would harm the community, I have confidence in them"

No mayor would put the people at risk"

Trust in the Experts and Scientists. The supporters of the scheme generally trusted the scientists and experts involved in water recycling. The supporters indicated that they had faith in the technology used in water recycling because it had been used overseas for some time, and must have improved since first implemented. Some of the supporters stated that they had come from a science background, or had close personal contact with someone who did. As such they were more comfortable with scientific uncertainties or unknowns and had more faith in the science used in water recycling. They were also willing to accept that the scheme was safe even if it could not be conclusively proven to be without risks.

"I believe in science"

"All the science things that I've seen have shown me that it's hard to prove that anything is unequivocally safe, but it's easy to bash things"

"...we could do 300 to 400 tests [for contaminates in PRW], *but we only do a limited amount to look for what's in there, because you can't test everything, that's understandable"*

On the other hand, the opponents were uncomfortable about scientific uncertainties associated with water recycling, and felt that it was not possible to prove that it could be done safely. These participants felt that Toowoomba was being used as a *"guinea pig"* to trial new technology. They

provided examples of instances in which science had been wrong about risks such as asbestos, thalidomide and smoking. They were also concerned the potential health impacts of PRW would not be able to be measured accurately, as illustrated by the following quote:

> *"We haven't heard about health impacts or deaths from other countries* [that use PRW] *but what about clusters of cancer? They'd just attribute that to something else."*

Procedural Fairness. The opponents of the scheme were concerned about the fairness of the processes used to inform decision making in the Toowoomba referendum, which influenced the amount of confidence they had in the experts. They felt that the information presented about the scheme was biased and that the funding provided for campaign materials was inequitable. For example, they suggested that no money had been provided to support the development and dissemination of referendum campaign materials that criticised the scheme. They were also concerned that there had been a lack of appropriate community consultation regarding the scheme.

> *"The No campaign wasn't allocated any money…but there was over $800 000 for the Yes vote. The No vote had to support themselves and this made me think 'what are they hiding' if they won't support both sides of the argument?"*

Trust in the Proposed Treatment Scheme. The opponents and supporters of the scheme discussed the proposed recycled water treatment scheme to a comparable extent, but the nature of the discussions was dissimilar. The opponents were concerned that the proposed scheme was different to other water recycling scheme that are used internationally. The main differences that they identified in international schemes were: smaller proportions of PRW used to supplement water supplies than those proposed; and introduction of PRW to aquifers and rivers rather than dams. Some of the opponents were also unsure whether the water recycling technologies employed in other countries could be implemented in Australia to the same standards.

> *"They gave examples of people in London drinking recycled water, but they don't use the same system, they put it into running water not stagnate dams"*

> *"Other places use 10% or less of PRW in their water supplies…but here they wanted to use 25%…and anyway when you go overseas they tell you not to drink the water"*

> *"There is not enough water in the dams to dilute the recycled water anyway. But on the other side they say it's cleaner than dam water. Then why put it in the dam in the first place, it raises questions"*

> *"Would our methods be good enough? Other countries are cashed up, and we're not"*

The supporters were confident in the technology that was to be used in the proposed recycling scheme, largely because such technology was used elsewhere in the world. They were also confident that the application of water recycling technology in Australia would be superior to that of other countries. Some believed that the proposed scheme was the cheapest option and therefore most viable. Many felt that the recycled water would be of a very high standard, and acknowledge that only part of the recycled water would actually come from toilets.

> *"Our country is not backwards, so our technology is better by now"*

> *"If they do it overseas already, it would have to be better here because the technology has improved"*

> *"Recycled water is the cheapest and most immediate"*

> *"But the water is good enough for kidney machines"*

Alternatives
The opponents of the scheme mentioned several other **alternative water treatment schemes** as viable options that had not been fully considered, whereas the supporters did not. For instance, opponents discussed desalination plants, coal seam gas, the pipeline from Herbert River, water trading with northern irrigators.

Supporters discussed the **fairness** of alternative water supply options to other water users, whereas the opponents did not. For instance, some of the supporters felt that it was unfair for Toowoomba residents to use bore water and water sourced from other localities, as typified in the following quotes:

> *"They* [opponents of the scheme] *started talking about the dams in Crow's Nest Shire, but hang on, we're in Toowoomba and we can't expect their water…it was a case of borrowing from Peter to pay Paul"*

> *"When people were discussing recycled water they weren't thinking about what happens when you start using up the bore water, which deprives the farmers…someone, loses out and the rates will go up"*

The opponents of the scheme stated that they were not necessarily opposed to recycling water as long as it was **only for non-potable use**, and discussed the use of greywater for gardens.

The opponents and supporters of the scheme discussed **other water capture options** to a comparable extent; however the nature of the discussion varied. Opponents felt that other water capture options such as water tanks, stormwater, and groundwater were preferable when compared to PRW, whereas supporters of the scheme disputed the feasibility of options such as pipelines, and water sourced from Emu creek and Brisbane River.

Views of Others
Both the opponents and supporters discussed the views of others in their community and social norms; however different emphasis was placed on different themes.

Public Perception of Toowoomba - Economic Impacts. The opponents of the scheme were concerned that the public perception of Toowoomba would be tarnished if the proposed scheme was put in place, which could in turn affect tourism, real estate and business.

> *"Think about the impacts to tourism, the bakeries, coffee shops and any business that uses water"*

> *"Property prices would have gone down, and a lot of food industries would have moved out of the area*

The supporters of the scheme felt that industry would not be affected by the proposed scheme. They tended to dismiss the potential of economic impacts by considering the broader international context and existing water quality issues. Some of these participants did acknowledge the potential for housing prices to be negatively affected though.

> *"Industry would be able to compensate for these things. If you think about what we receive from other countries, if they can get imports into our country we should be able to export no problems"*

> *"The standard of Toowoomba water is not good enough anyway, and it's treated in plants for manufacturing anyway. So why would industry decline to use the PRW?"*

Social Norms. Both the supporters and opponents mentioned the views of friends and family when describing their own views. The supporters, however, discussed social norms to a greater extent that the opponents. The supporters would often present their views as being aligned to a scientific perspective by referring to a friend or family member who worked in medicine or

science. Some of the supporters also suggested that peoples' age influenced their opinions about the scheme, with those in their twenties being most supportive.

> *"Most of the people I knew were for it, but they had some experience in that area and faith in technology"*

Risk Attitudes

The opponents and supporters demonstrated different attitudes to the potential risks associated with the scheme. The supporters tended to accept risk and uncertainty whereas the opponents did not.

Health Risk. The opponents and supporters of the proposed scheme focused on potential health risks to a comparable extent. The opponents were concerned about the lack of certainty regarding potential health impacts from PRW, namely as cancer. The supporters on the other hand tended to dismiss the health risk potential, and discussed it largely in terms of their impression of the opponents. They tended to weigh up health risks relative to other risks. It was also suggested by supporters that recycled water might be too clean and would reduce people's immunity:

> *"What's wrong with germs anyway, we'll loose our immunity if you take them all out because it's too sterile. That's a problem with recycled water though, if it's as sterile and clean as they say. I've justified this by thinking 'well if it's going into the dam…'"*

Pharmaceuticals and Other Contaminates. The opponents of the scheme discussed pharmaceuticals and other contaminants in recycled water considerably more than the supporters. They stated that they were not concerned about the taste of PRW, or if it contained organic contaminates found in nature. It was chemicals, hospital waste and medications that worried them:

> *"We all know that we live downstream from something and that things die in the dam…it's the chemicals that I'm worried about."*

The supporters of the scheme were less concerned about pharmaceuticals and other chemical contaminates, but they did discuss potential male feminisation from traces of contraceptive pills in the PRW and the uncertainty associated with chemicals.

Relative Risks and Existing Water Quality. The supporters discussed the PRW scheme in relation to other risks considerably more than the opponents did. They stated that they were not concerned about the potential health risks posed by PRW, as there were already too many other risks associated with food products, particularly junk food and those products imported from other countries with less stringent health regulations. They felt that PRW would probably be of a higher quality than the current water supplies from dams and water tanks, which were thought to contain animal waste, bacteria, other organic materials and chemicals used in pesticide sprays. After the referendum, the quality and taste of dwindling water supplies were thought to have worsened as contaminates become more concentrated.

> *"The cancer debate doesn't mean much to me, it's the relative risk…just add it to the list, which includes tea, coffee, biscuits, which could all cause cancer."*

> *"I have more hesitation about rainwater tanks, with the waste from animals, and it's not treated"*

> *"Just watching the water quality here deteriorate, there is not guarantee that it's safe anyway. The system is not perfect now"*

> *"If you drink water from the creek you don't know what runoff is in it. Its better to recycle and control what is in it"*

Some of the opponents stated that they had lived in the country and as such were used to drinking water that was of a poor quality, and other opponents stated that they did not drink Toowoomba tap water without filtering or boiling it first. They felt that the existing poor water quality did not justify the proposed scheme.

Affect
Interestingly, both the supporters and opponents suggested that people who supported the opposite side of the debate to themselves were responding emotionally and trying to use scare tactics to achieve their aims. Some of the opponents felt that they were being blackmailed or railroaded into supporting the scheme through the use of claims that water would run out; whereas the supporters felt that the opponents' focus on drinking sewage and the potential impacts to children's health was overly-emotive. The following quotes typify these discussions:

> *"Both sides were trying to present themselves as rational and the other as not"*

> *"The Yes side said we'd die from drought, the no side said we'd die from health problems"*

The opponents of the scheme did acknowledge their own emotional reactions to the scheme, stating that they were "disgusted by the thought of it" and swayed by referendum campaign materials that contained pictures of children with headings that read 'I don't want to die mummy'. The supporters of the scheme were less likely to personally acknowledge emotional reactions, as exemplified by the following quote:

> *"I didn't see the Yes campaign as appealing to emotions"*

Water Availability
Those who supported the scheme spent considerably more time discussing water availability issues. The supporters felt that water availability was "the most important thing" and expressed concern about Toowoomba's capacity to support expected population growth without the proposed scheme being put in place. Low rainfall, water restrictions and the levels and location of the dam were widely discussed. One supporter expressed concern that over-reliance on bores in place of PRW was affecting groundwater quantity and quality.

Those who opposed the scheme also recognised a lack of water availability and changing weather patterns; however they demonstrated less concern about the possibility of running out of water than the supporters. For instance, participants stated that they had experienced droughts before and the dam levels were "still quite full now".

Worldview and Values
The opponents and supporters demonstrated differing attitudes towards whether the scheme was 'unnatural'. The supporters on the other hand felt that the proposed scheme was "the same process as nature, just sped up". The opponents tended to believe that water recycling violated some **natural order**, or law of nature. The use of technology in place of natural processes and filtration systems was seen as problematic. It was suggested by some opponents that people's religious views may influence their attitudes towards water recycling.

> *"I'd rather trust god than man…the rain will come. A lot of Christians feel this way"*

Both the opponents and supporters felt that people's **worldviews**, or values, influenced their opinions about the proposed scheme and that the information provided did not change people's opinions a great deal. The supporters suggested that Toowoomba is a conservative place, and these conservative values influenced the referendum outcome.

> *"Everyone is different. But just like every election most people knew how they were going to vote. Only a few people were uncertain. Most people don't get swayed by information"*

Those who opposed the scheme felt that their **freedom to choose** whether they ingested water containing PRW would be removed. They suggested that people could choose not to drink tap water from scheme but would have no control over the water used for food production and hospitality.

In summary, supporters and opponents of the proposed Toowoomba PRW scheme demonstrated some similarities in terms of the most commonly discussed themes, namely: the referendum campaign and materials; and their level of confidence in the science and experts. The nature of the specific discussions was varied between the supporters and the opponents with similar arguments used to reach very different conclusions. In light of the Toowoomba referendum data, a number of additional concepts were measured in the monitoring surveys of community acceptance of PRW in SEQ. These concepts were as follows:

- the perceived risk of PRW relative to other risks,
- the distinctions people make between their own attitudes and the perceived attitudes of others in their community;
- concerns about climate change and water availability; and
- concerns about PRW contravening or violating a natural process, or law or nature.

Appendix 6 - Details of Additional Concepts Used in Secondary Analysis

Scale	Items	Cronbach α
Climate Concerns The extent to which people are concerned about climate impacting on South East Queensland's water supplies	I'm afraid that SEQ will run out of water I believe that climate change will have a significant impact on how much water we have in SEQ I'm sure that there will be enough rainfall in SEQ for future water supplies*	Time 2 = 0.67
Measured on a 5 point scale ranging from 1= strongly disagree through to 5 = strongly agree		
Natural Order Concerns The extent to which people are concerned about PRW violating a natural order	I'm afraid about the long-term health impacts of PRW I can't get the thought of sewage out of my mind when I think about PRW I feel uneasy about human interference in the natural water cycle The PRW treatment just speeds up the natural water recycling process*	Time 2 = 0.82
Measured on a 5 point scale ranging from 1= strongly disagree through to 5 = strongly agree		
Third Person Effect (e.g., Duck and Mullin, 1995).	People in SEQ are influenced by the negative messages about PRW in the media My family is influenced by the negative messages about PRW in the media I am influenced by the negative messages about PRW in the media	
Measured on a 5 point scale ranging from 1= strongly disagree through to 5 = strongly agree		

APPENDIX 7 - Summary Statistics for Key Scales Over Time: Baseline and Times 1, 2 and 3 Monitoring Surveys

Variable		Trust in Government	Trust in Science	Emotion	Distributive fairness	Procedural Fairness	Health Risks	Relative Risks	System risk	Support score	Behaviour intention
Baseline	N	583		578			582		577	577	577
	Mean	3.26		4.73			2.38		15.11	4.62	4.59
	Std.dev	1.13		1.77			1.04		7.42	1.45	1.44
	Cronbach a	0.89		0.97			0.83			0.95	0.90
	Mean inter-item correlation	0.80		0.86			0.72			0.76	0.72
Time 1	N	301	301	300	300	300	301	301	301	299	301
	Mean	3.12	2.87	4.59	3.25	3.18	2.52	2.92	13.51	4.48	4.53
	Std.dev	1.18	0.94	1.83	0.99	0.82	1.07	1.01	7.66	1.42	1.37
	Cronbach a	0.87	0.64	0.97	0.53	0.74	0.80	0.63		0.94	0.87
	Mean inter-item correlation	0.77	0.47	0.85	0.37	0.27	0.67	0.47		0.69	0.64

Variable		Trust in Government	Trust in Science	Emotion	Distributive fairness	Procedural Fairness	Health Risks	Relative Risks	System risk	Support score	Behaviour intention
Time2	N	352	349	351	352	352	350	352	350	350	350
	Mean	3.09	2.92	4.61	3.26	3.40	2.60	2.86	13.27	4.46	4.54
	Std.dev	1.21	0.99	1.86	1.02	0.83	0.99	1.06	8.16	1.53	1.46
	Cronbach a	0.91	0.69	0.97	0.62	0.81	0.66	0.74		0.96	0.91
	Mean inter-item correlation	0.83	0.53	0.89	0.45	0.35	0.50	0.59		0.78	0.73
Time 3	N	401	402	391	390	384	390	395	387	388	394
	Mean	2.89	2.88	4.21	3.11	3.33	2.61	3.02	14.07	4.22	4.27
	Std.dev	1.26	1.03	1.89	1.01	0.89	1.22	1.16	8.20	1.64	1.59
	Cronbach a	0.92	0.69	0.97	0.54	0.74	0.83	0.74		0.96	0.91
	Mean inter-item correlation	0.85	0.53	0.87	0.37	0.30	0.71	0.60		0.77	0.73

APPENDIX 8 - Correlation Tables for Key Concepts Over Time

Time 3	Trust in Govt'	Trust in Science	Health Risks	Relative Risks	System Risks	Distributive Fairness	Procedural Fairness	Emotion	Support for Scheme	Behavioural Intentions	Likelihood of incident	Seriousness of incident	Govt' control over incident
Trust in Government													
Trust in Science	0.68**												
Health Risks	-0.65**	-0.63**											
Relative Risks	-0.69**	-0.61**	0.79**										
System Risks	-0.54**	-0.55**	0.67**	0.63**									
Distributive Fairness	0.39**	0.40**	-0.62**	-0.48**	-0.47**								
Procedural Fairness	0.60**	0.57**	-0.70**	-0.68**	-0.53**	0.43**							
Emotion	0.70**	0.61**	-0.76**	-0.79**	-0.65**	0.46**	0.69**						
Support for Scheme	0.71**	0.64**	-0.84**	-0.83**	-0.69**	0.57**	0.74**	0.87**					
Behavioural Intentions	0.67**	0.62**	-0.80**	-0.79**	-0.65**	0.53**	0.72**	0.84**	0.98**				
Likelihood of incident	-0.45**	-0.49**	0.58**	0.54**	0.89**	-0.44**	-0.43**	-0.54**	-0.58**	-0.56**			
Seriousness of incident	-0.36**	-0.32**	0.46**	0.42**	0.68**	-0.25**	-0.39**	-0.45**	-0.46**	-0.43**	0.37**		
Govt' control over incident	0.59**	0.51**	-0.55**	-0.54**	-0.54**	0.32**	0.51**	0.57**	0.58**	0.56**	-0.37**	-0.31**	

**Indicates statistically significant difference at $p<.01$

Time 2	Trust in Govt'	Trust in Science	Health Risks	Relative Risks	System Risks	Distributive Fairness	Procedural Fairness	Emotion	Support for Scheme	Behavioural Intentions	Likelihood of incident	Seriousness of incident	Govt' control over incident
Trust in Government													
Trust in Science	0.69**												
Health Risks	-0.65**	-0.53**											
Relative Risks	-0.71**	-0.68**	0.70**										
System Risks	-0.61**	-0.58**	0.68**	0.65**									
Distributive Fairness	0.47**	0.53**	-0.49**	-0.60**	-0.51**								
Procedural Fairness	0.69**	0.65**	-0.63**	-0.71**	-0.61**	0.59**							
Emotion	0.66**	0.61**	-0.73**	-0.74**	-0.70**	0.53**	0.65**						
Support for Scheme	0.73**	0.67**	-0.77**	-0.78**	-0.72**	0.63**	0.74**	0.85**					
Behavioural Intentions	0.70**	0.65**	-0.74**	-0.76**	-0.69**	0.62**	0.74**	0.82**	0.98**				
Likelihood of incident	-0.55**	-0.54**	0.61**	0.60**	0.91**	-0.47**	-0.57**	-0.62**	-0.65**	-0.63**			
Seriousness of incident	-0.32**	-0.33**	0.40**	0.38**	0.72**	-0.30**	-0.35**	-0.42**	-0.40**	-0.38**	0.46**		
Govt' control over incident	0.61**	0.49**	-0.55**	-0.52**	-0.63**	0.38**	0.50**	0.58**	0.60**	0.59**	-0.53**	-0.26**	

**Indicates statistically significant difference at $p<.01$

Time 1	Trust in Govt'	Trust in Science	Health Risks	Relative Risks	System Risks	Distributive Fairness	Procedural Fairness	Emotion	Support for Scheme	Behavioural Intentions	Likelihood of incident	Seriousness of incident	Govt' control over incident
Trust in Government													
Trust in Science	0.70**												
Health Risks	-0.67**	-0.64**											
Relative Risks	-0.64**	-0.54**	0.71**										
System Risks	-0.64**	-0.59**	0.70**	0.58**									
Distributive Fairness	0.40**	0.35**	-0.50**	-0.43**	-0.44**								
Procedural Fairness	0.68**	0.55**	-0.69**	-0.64**	-0.64**	0.55**							
Emotion	0.69**	0.58**	-0.71**	-0.68**	-0.66**	0.46**	0.66**						
Support for Scheme	0.70**	0.61**	-0.78**	-0.71**	-0.67**	0.52**	0.74**	0.84**					
Behavioural Intentions	0.64**	0.57**	-0.75**	-0.67**	-0.64**	0.52**	0.70**	0.78**	0.97**				
Likelihood of incident	-0.59**	-0.52**	0.64**	0.53**	0.86**	-0.43**	-0.57**	-0.58**	-0.60**	-0.57**			
Seriousness of incident	-0.37**	-0.38**	0.41**	0.34**	0.71**	-0.24**	-0.36**	-0.41**	-0.37**	-0.35**	0.38**		
Govt' control over incident	0.51**	0.40**	-0.45**	-0.39**	-0.57**	0.25**	0.48**	0.44**	0.48**	0.46**	-0.41**	-0.23**	

**Indicates statistically significant difference at $p<.01$

Baseline	Trust in Government	Health Risks	System Risks	Emotion	Support for Scheme	Behavioural Intentions	Likelihood of incident	Seriousness of incident	Govt' control over incident
Trust in Government									
Health Risks	-0.67**								
System Risks	-0.57**	0.64**							
Emotion	0.60**	-0.75**	-0.60**						
Support for Scheme	0.66**	-0.79**	-0.64**	0.85**					
Behavioural Intentions	0.62**	-0.76**	-0.61**	0.83**	0.98**				
Likelihood of incident	-0.51**	0.55**	0.89**	-0.50**	-0.55**	-0.52**			
Seriousness of incident	-0.26**	0.35**	0.62**	-0.34**	-0.35**	-0.34**	0.27**		
Govt' control over incident	0.51**	-0.44**	-0.50**	0.40**	0.45**	0.43**	-0.38**	-0.14**	

**Indicates statistically significant difference at $p<.01$

APPENDIX 9 - Summary of Key Variables for Those Who Oppose the Scheme, are Uncertain and Support the Scheme Over Time

		Baseline			Time 1			Time 2			Time 3		
		Oppose	Uncertain/ neutral	Support	Oppose	Uncertain/ neutral	Support	Oppose	Uncertain/ neutral	Support	Oppose	Uncertain/ neutral	Support
Trust in Science	N				49	56	194	61	51	235	90	55	242
	Mean				1.72	2.58	3.24	1.70	2.48	3.34	1.89	2.54	3.36
	Std. Dev.				0.57	0.78	0.78	0.59	0.77	0.80	0.78	0.90	0.80
	Significance				F(2, 296) = 85.21, *p*<.01			F(2, 344) = 120.3, *p*<.01			F(2, 384)= 113.4, *p*<.01		
Health Risks	N	85	77	414	49	56	194	63	51	235	85	54	240
	Mean	4.03	3.03	1.91	4.07	2.97	1.99	4.04	2.92	2.15	4.28	3.06	1.90
	Std. Dev.	0.78	0.76	0.66	0.80	0.86	0.67	0.72	0.82	0.62	0.70	0.86	0.71
	Significance	F(2, 573) = 370.8, p<.01			F(2, 296) = 172.7, *p*<.01			F(2, 346) = 204.2, *p*<.01			F(2, 376)= 347.3, *p*<.01		
Relative Risks	N				49	56	194	63	51	236	89	53	239
	Mean				4.22	3.48	2.44	4.40	3.28	2.36	4.48	3.58	2.32
	Std. Dev.				0.76	0.74	0.72	0.58	0.83	0.71	0.56	0.81	0.73
	Significance				F(2, 296) = 136.1, *p*<.01			F(2, 347) = 219.6, *p*<.01			F(2, 376)= 322.67, *p*<.01		
Trust in Government	N	85	78	414	49	56	194	63	51	236	88	55	243
	Mean	1.72	2.74	3.68	1.52	2.64	3.66	1.43	2.64	3.63	1.52	2.39	3.54
	Std. Dev.	0.91	0.97	0.84	0.62	0.91	0.90	0.61	1.04	0.89	0.56	0.94	1.00
	Significance	F(2, 574) = 198 , *p*<.01			F(2, 296) = 131.9, *p*<.01			F(2, 347) = 168.3 *p*<.01			F(2, 383)= 169, *p*<.01		
Distributive fairness	N				49	55	194	63	51	236	86	53	237
	Mean				2.27	2.95	3.59	2.11	2.97	3.63	2.19	2.83	3.52
	Std. Dev.				0.84	0.82	0.88	0.83	0.86	0.83	0.77	0.95	0.85
	Significance				F(2, 295) = 50.1, *p*<.01			F(2, 347) = 85.14, *p*<.01			F(2, 373)= 81.5, *p*<.01		
Procedural Fairness	N				49	56	193	63	51	236	85	54	233
	Mean				2.21	2.99	3.72	2.23	3.22	3.75	2.14	2.85	3.64
	Std. Dev.				0.62	0.49	0.61	0.71	0.57	0.58	0.64	0.51	0.66
	Significance				F(2, 295) = 138.2, *p*<.01			F(2, 347) = 160.1, *p*<.01			F(2, 369)= 183, *p*<.01		
Emotion	N	84	77	411	49	55	194	62	51	236	88	53	237
	Mean	1.63	3.64	5.59	1.58	3.67	5.61	1.59	3.71	5.59	1.64	3.35	5.39
	Std. Dev.	0.91	1.18	0.99	0.75	1.35	0.97	0.91	1.38	0.99	1.00	1.38	0.98
	Significance	F(2, 569) = 594.9 , *p*<.01			F(2, 295) = 322.8, *p* <.01			F(2, 346) = 386.58, *p*<.01			F(2, 375)= 430.5, *p*<.01		

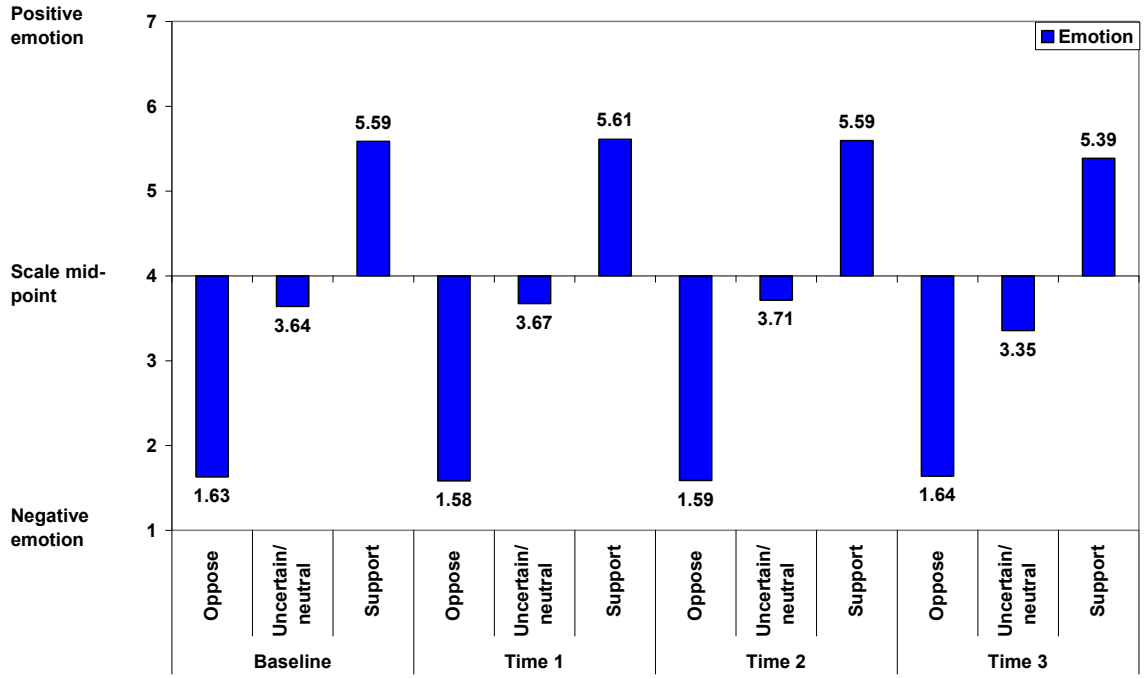

Figure 23: Mean emotion for those who support the scheme, are uncertain and oppose the scheme over time.

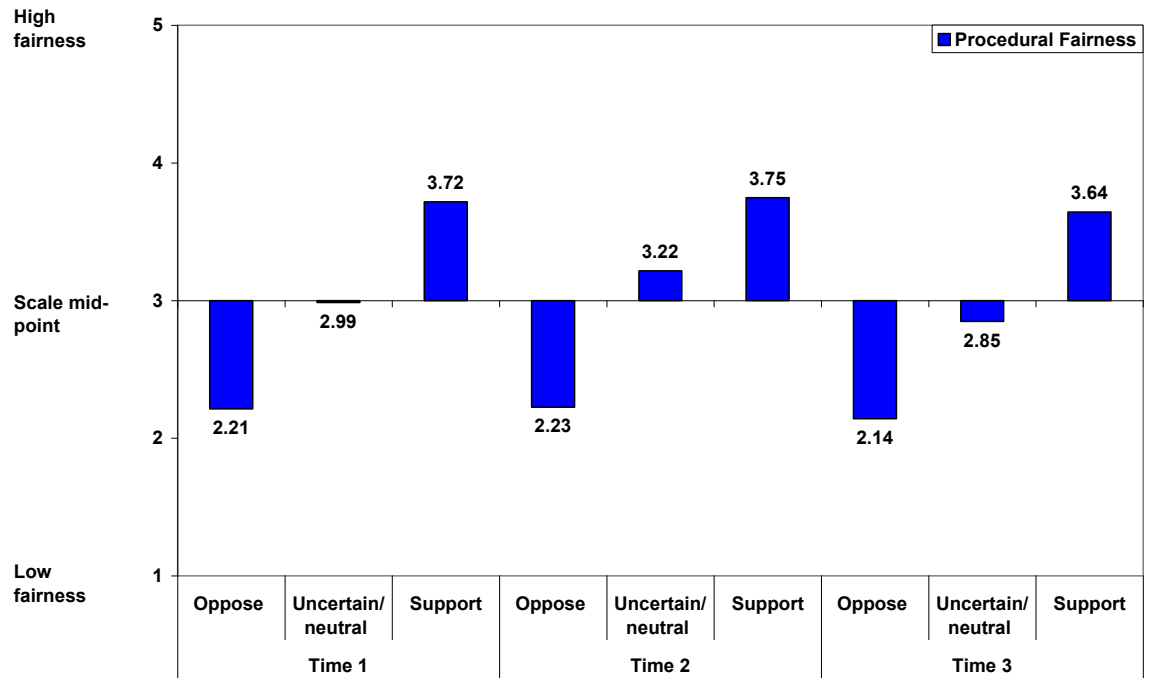

Figure 24: Mean procedural fairness for those who support the scheme, are uncertain and oppose the scheme over time.

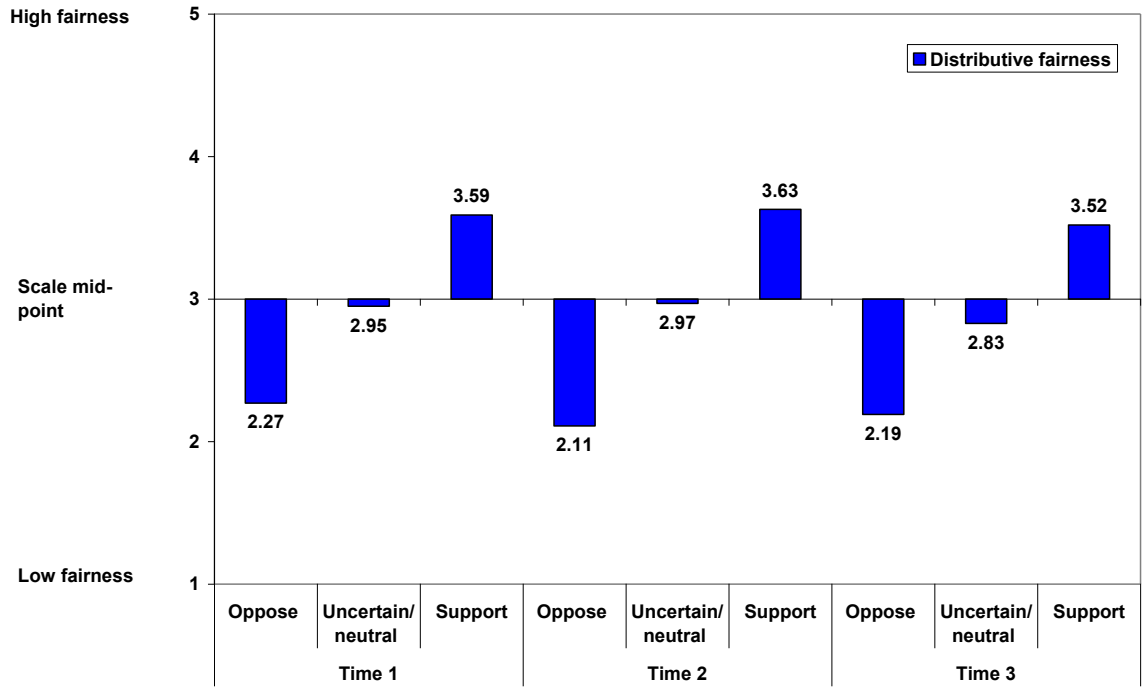

Figure 25: Mean distributive fairness for those who support the scheme, are uncertain and oppose the scheme over time.

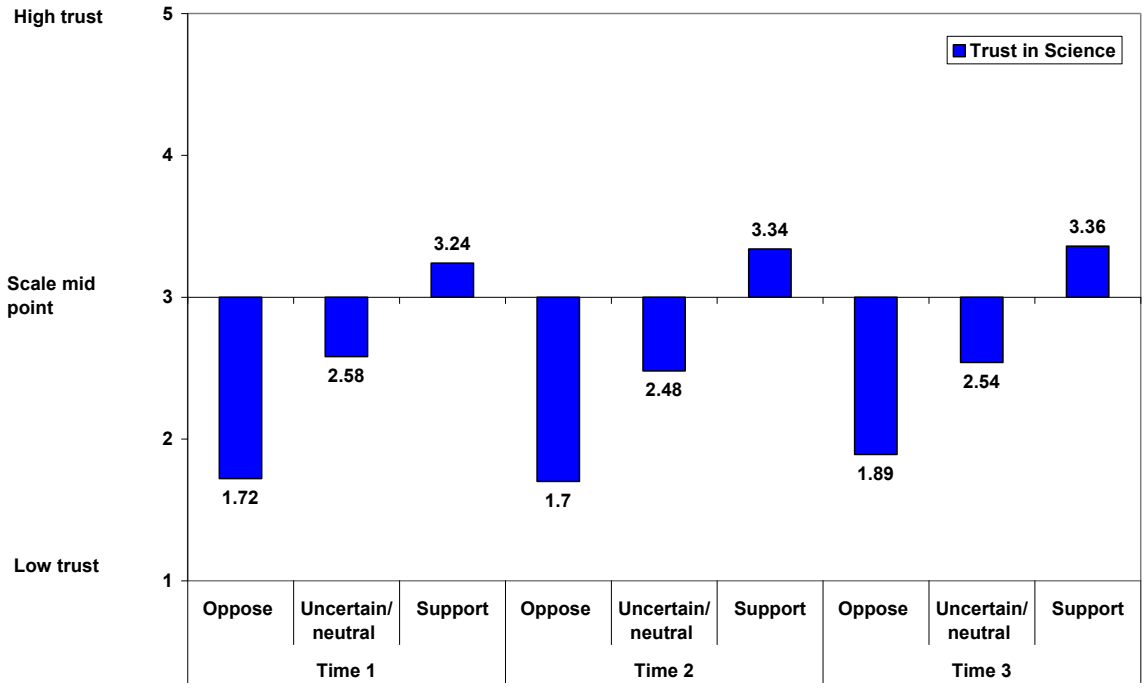

Figure 26: Mean trust in science for those who support the scheme, are uncertain and oppose the scheme over time.

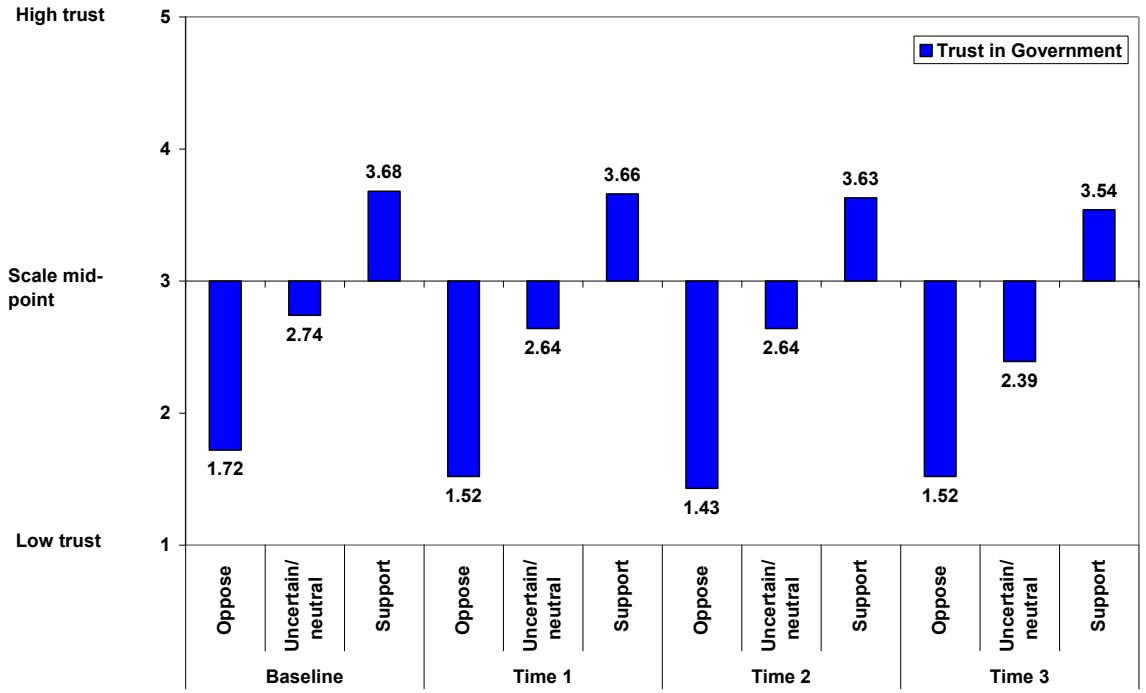

Figure 27: Mean trust in government for those who support the scheme, are uncertain and oppose the scheme over time.

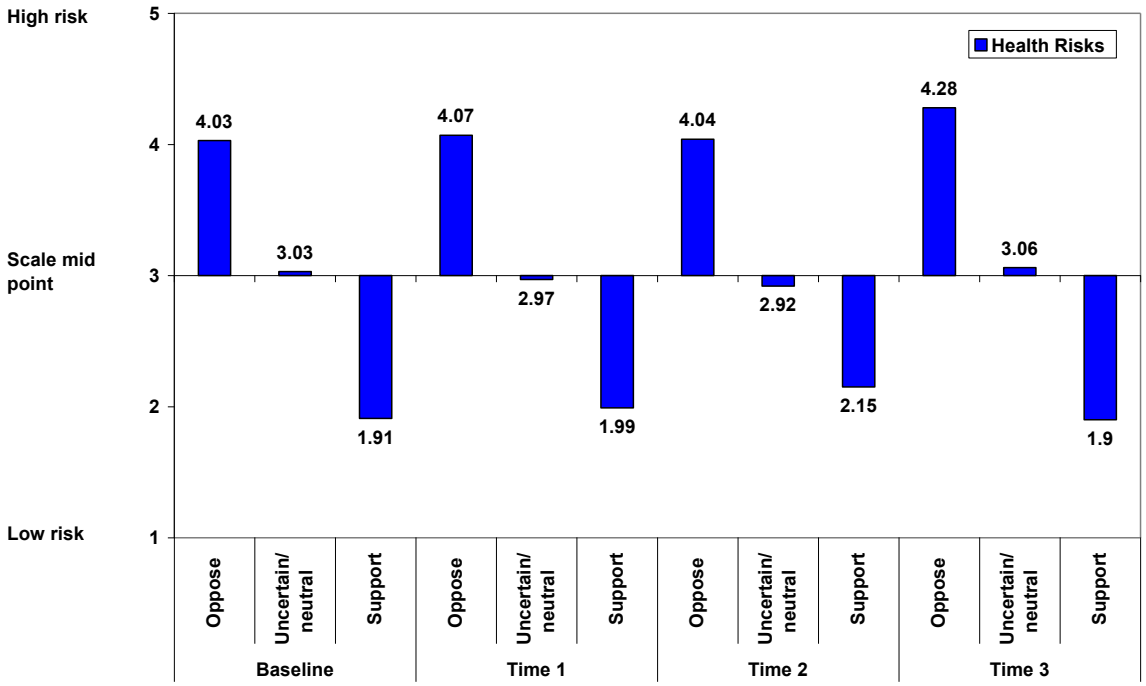

Figure 28: Mean health risk for those who support the scheme, are uncertain and oppose the scheme over time.

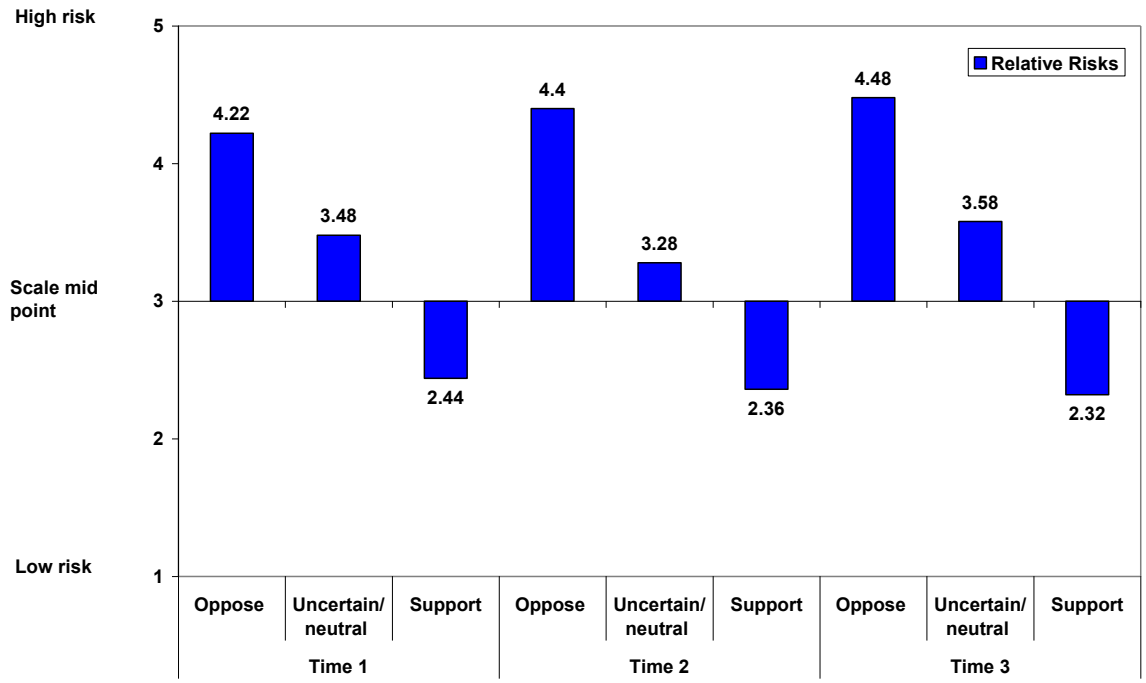

Figure 29: Mean relative risk for those who support the scheme, are uncertain and oppose the scheme over time.

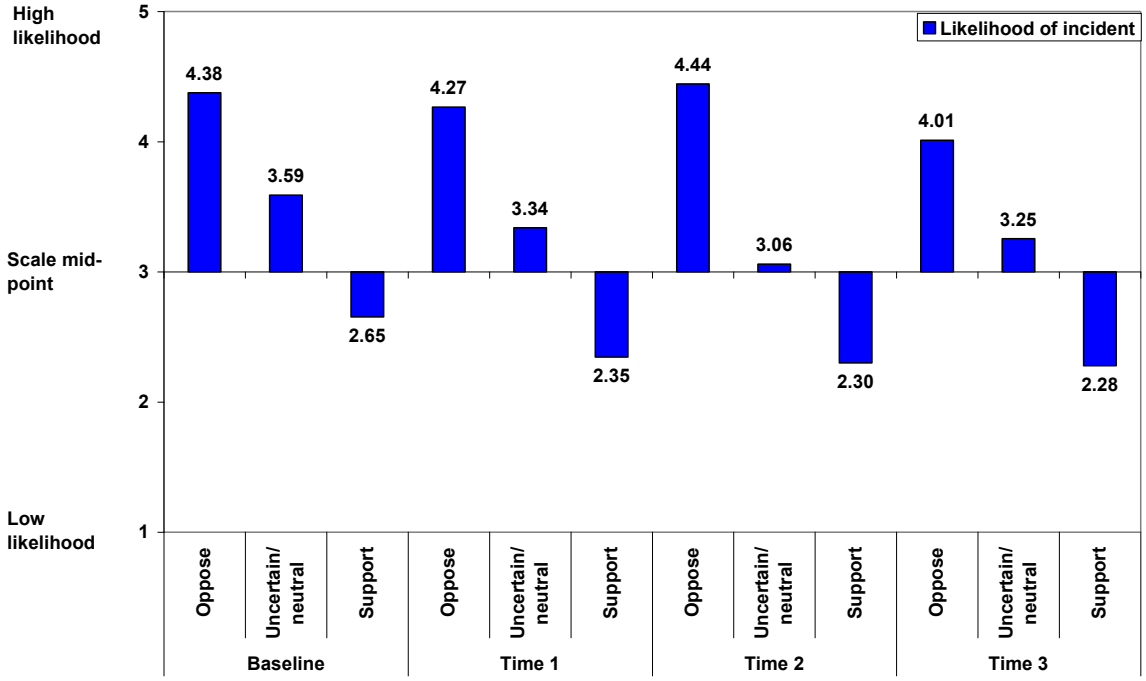

Figure 30: Mean perceived likelihood of incident for those who support the scheme, are uncertain and oppose the scheme over time.

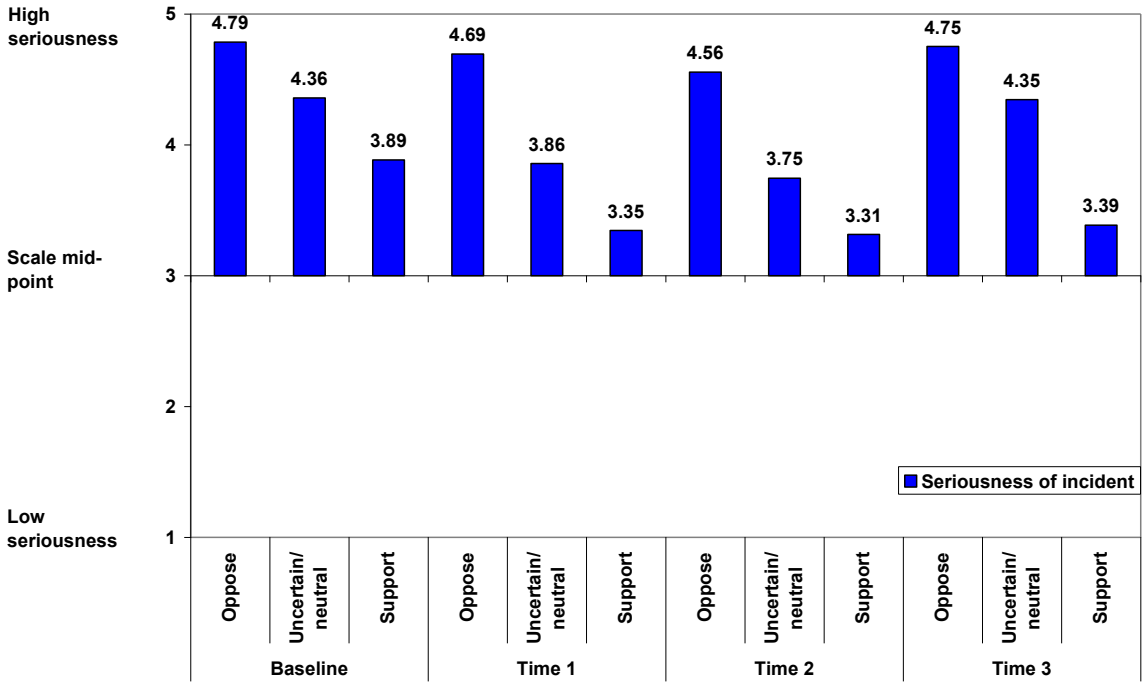

Figure 31: Mean perceived seriousness of incident for those who support the scheme, are uncertain and oppose the scheme over time.

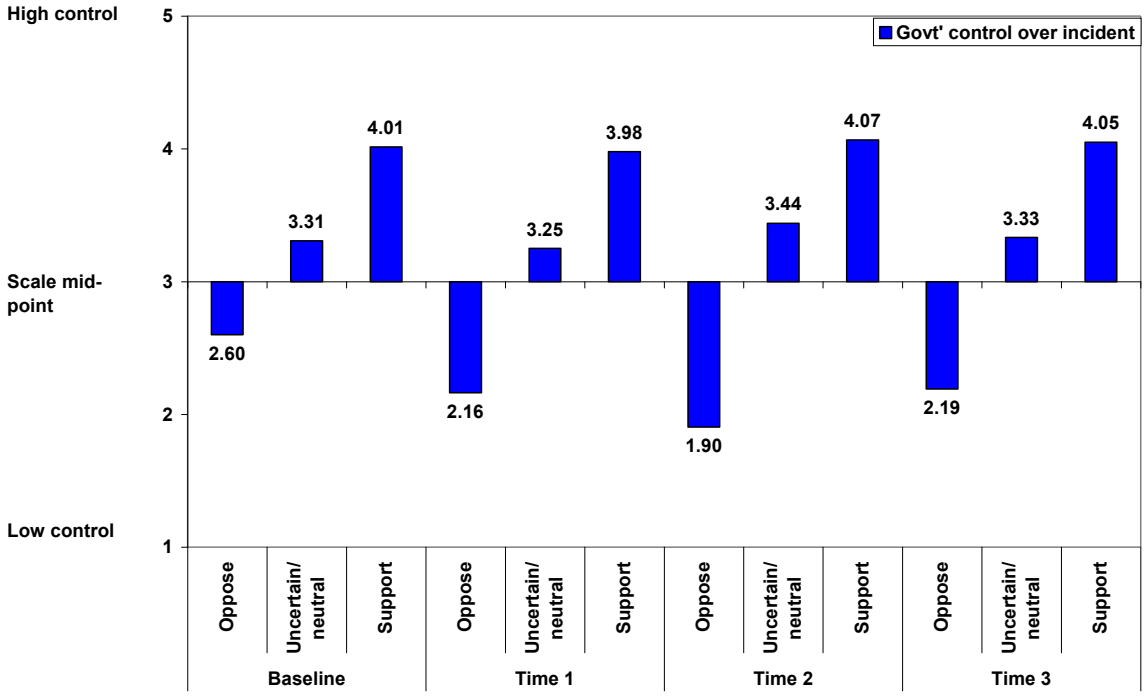

Figure 32: Mean perceived government control over incident for those who support the scheme, are uncertain and oppose the scheme over time.

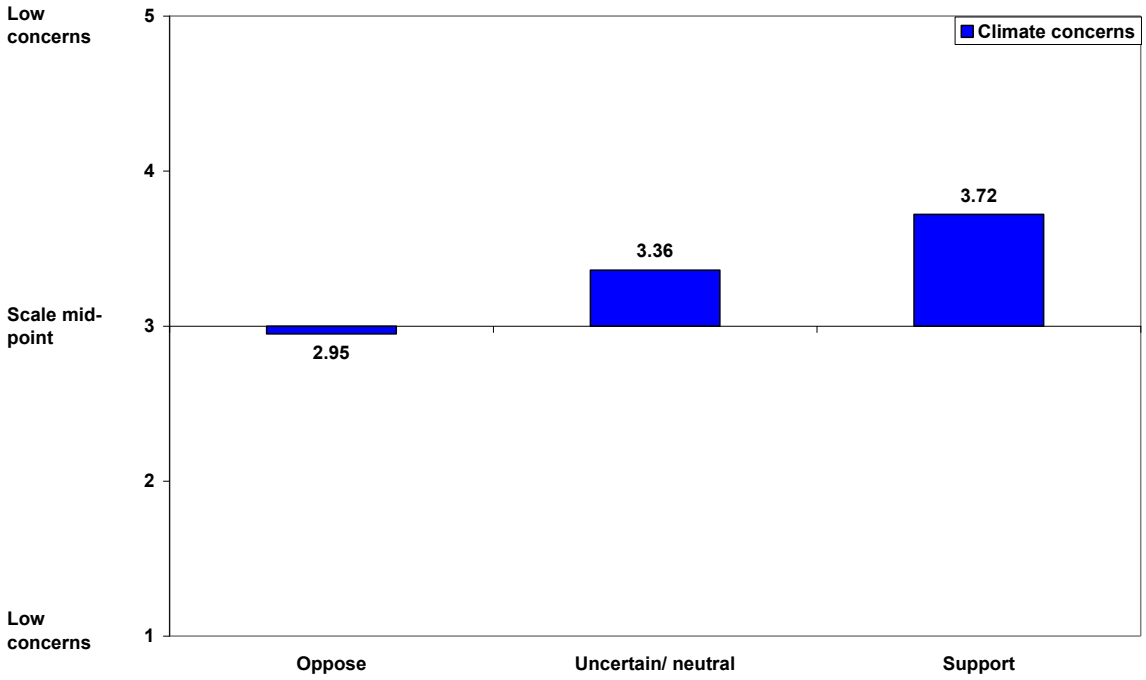

Figure 33: Mean climate concerns for those who support the scheme, are uncertain and oppose the scheme: Time 2.

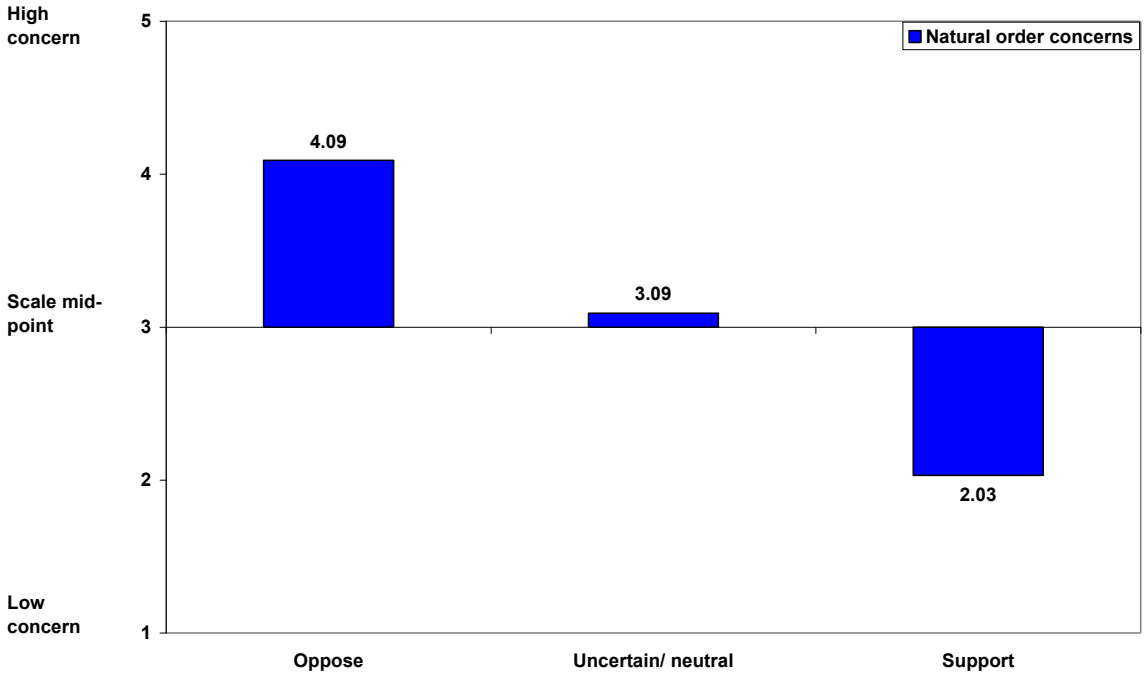

Figure 34: Mean natural order concerns for those who support the scheme, are uncertain and oppose the scheme: Time 2.

APPENDIX 10 - Summary of Significant Differences for Independent Groups

Scale	Baseline (n= 378)	Time 1 (n=82)	Time 2 (n= 83)	Time 3 (n=195)	Significant difference
Trust in Government			3.21	2.85	**
Health risk		2.43	2.66		*
Distributive fairness			3.28	3.09	*
Procedural fairness			3.37	3.07	**
Likelihood	2.97	2.70	2.73	2.93	* Baseline & Time 1 * Time 3 & 2
Seriousness	4.09	3.79	3.57	3.85	* Baseline & Time 1 ** Time 3 & 2
Emotion			4.66	4.08	**
Support			4.43	4.17	*

** Significant difference (p<.01)
* Significant difference (p<.05)

Some of the new respondents recruited at each survey time point went on to complete another survey later (thereby becoming retest respondents), but some of these new respondents did not complete subsequent surveys. The above provides an overview of the statistically significant differences observed for those respondents who completed only one survey at each time point. This analysis has been completed in order to ensure to that a statistical criteria can be satisfied, namely the *assumption of independence*. This means that the groups being compared statistically are unrelated, or entirely comprised of different respondents.

APPENDIX 11 - Summary of Multiple Hierarchical Regression Over Time

Table 21: Coefficient extended summary: Time 1, 2 and 3.

Model	Variables	Time 1				Time 2				Time 3			
		B	Std. Error	Beta	Significance	B	Std. Error	Beta	Significance	B	Std. Error	Beta	Significance
1	Household unit	-.059	.033	-.112		-.047	.033	-.083		.008	.036	.014	
	Age	-.183	.072	-.157	*	-.155	.074	-.119	*	-.135	.083	-.099	
	Gender	.421	.164	.148	*	.171	.164	.056		.247	.181	.077	
	SES	.169	.114	.086		.114	.117	.052		.096	.131	.042	
2	Household unit	-.002	.015	-.004		-.001	.014	-.001		-.006	.014	-.010	
	Age	-.080	.035	-.069	*	-.024	.032	-.019		-.024	.034	-.018	
	Gender	-.014	.078	-.005		.024	.070	.008		-.068	.072	-.021	
	SES	.024	.053	.012		.081	.050	.037		.038	.052	.017	
	Trust in govt'	.011	.056	.009		.120	.048	.095	*	.027	.046	.021	
	Trust in science	.066	.061	.043		.043	.055	.028		-.019	.054	-.012	
	Health risks	-.290	.064	-.217	**	-.253	.058	-.163	**	-.277	.061	-.209	**
	Relative risks	-.070	.060	-.050		-.115	.061	-.080		-.239	.060	-.172	**
	System risks	-.001	.008	-.007		-.009	.007	-.050		-.016	.006	-.083	*
	Distributive fairness	.095	.047	.066	*	.167	.045	.111	**	.131	.046	.082	**
	Procedural fairness	.318	.076	.182	**	.219	.068	.120	**	.194	.061	.108	**
	Emotion	.357	.035	.460	**	.345	.033	.423	**	.346	.038	.398	**

Table 22: Model summary: Time 1, 2 and 3.

Model	Time 1			Time 2			Time 3		
	R Square	Std. Error of estimate	Sig. F Change	R Square	Std. Error of estimate	Sig. F Change	R Square	Std. Error of estimate	Sig. F Change
1	.052	1.40	**	.020	1.52		.020	1.60	
2	.804	0.65	**	.832	0.64	**	.854	0.62	**

APPENDIX 12 - Overview of Engagement Techniques Used in Public Participation Processes Based On and Extended From an Evaluation by Abelson *et al* (2003)

Citizen Juries - are groups of people that deliberate on a specific policy question over several days. They are paid to attend a series of meetings or discussions (usually over 2-4 days) where they hear evidence from expert witnesses who can be cross-examined (Kenyon, 2005). The discussion is facilitated by a neutral moderator. The group is usually comprised of 12-24 people that represent a specific population. The jurors are permitted considerable time to deliberate and develop a set of recommendations which are made publically available or reviewed by the sponsoring authority (Abelson et al, 2003). Citizen juries can increase communication and trust between the stakeholder groups that are represented, experts and policy makers (Stewart et al, 1994). This method is not designed for special interest groups who can dominate discussion. Citizen juries are most effective when the issues to be addressed are concrete and clearly defined. The questions to be answered should be targeted, focused at a local or regional level and not focused on technical issues (Abelson et al, 2003). Citizen juries need to be well structured with a clear agenda overseen by key stakeholders. Representativeness of jurors can be problematic, as can their accountability and legitimacy. Hierarchical relationships can develop between experts and citizens. Citizen juries have been recommended as an approach in the implementation of water frameworks and in environmental planning and management (Kenyon, 2005).

Citizen Panels - can vary in size from small (10-15) to large samples (500-3000) (Kenyon, 2005). The panel is used as a sounding board for an authority to gauge opinion on policies, practices and processes. Citizens are randomly selected to represent the community and provide routine feedback (eg. up to four times per year) on a variety of issues through meetings or surveys. This allows opinions and attitudes of participants to be tracked over time and the impact of policies to be monitored. Due to attrition rates, and in order to increase representativeness, a proportion of the panel members are replaced regularly (Abelson et al, 2003). Citizen panels are a top-down approach which is closer to the 'tokenistic' side of public participation because the consultation agenda is set by the authority. There are also problems associated with under-representation of hard-to-reach groups. Citizen panels are best suited to development of policy documents or to guide health or resource allocation decisions (Abelson et al, 2003). Citizen panels may in part address issues associated with representativeness or scale, but do not provide an educational component. Kenyon (2005) suggests that citizen panels may be a useful alternative or a complementary process to citizen juries in catchment management.

Planning Cells - are similar to citizen juries and are used to guide decision-making of authorities. Cells or groups of around 25 representative participants are formed so that a problem or issue, defined by an authority, can be deliberated upon. Information is provided beforehand so that participants can develop an informed opinion; however the information disseminated can often be biased (Abelson et al, 2003). The small size group size provides a more comfortable setting for participants and may promote enhanced involvement, innovation and honesty. As such, Planning Cells are often used in conflict resolution and when quick response or a unique solution is required. The outcomes of the deliberations are reported to the responsible authority which must agree to consider them in decision-making. This may not be feasible however for long-term planning. This planning process has been criticised for deliberately breaking up inter-linked managerial functions by creating independent groups (Chidambaram, 2005).

Consensus Conference - is a small group of randomly-selected representative citizens (around 15) who meet with experts to discuss scientific or technical matters and develop consensus (Dryzek and Tucker, 2008). Main conclusions are presented to the public at a press conference. Participants with varied backgrounds meet before the discussions (usually over 2 weekends) to set the agenda for a four-day public session. The process is informed by an advisory committee who frames the initial question

and provides information along with a list of experts/ advocates who can give testimonials. The conference has a strong educative focus and is used to obtain informed opinions from the general community. The consensus conference is a complex process requiring significant resources. The recruitment method may not ensure representative participation and as such multiple conferences may be required. The process is typically applied to technological questions, such as Genetic Modification (Kenyon, 2005).

Deliberative Polling - extends the opinion poll method by including educational and deliberative elements (Abelson et al, 2003). It involves large samples (around 300-500) that are not required to reach a consensus. Deliberative polling usually takes place over two to four days. Participants discuss issues in small groups and have the opportunity to question experts and politicians. Participants are briefed beforehand and provided information. This may overcome the problems associated with uninformed democratic participation evident in polling which can result in 'non-attitudes' (Fishkin, 2006). The method is used to measure public opinion that is informed and engaged around an issue. The participants are selected to represent the opinions and demography ascertained through a baseline survey (Kenyon, 2005). Participant attitudes are measured before and after the process, and have been found to significantly change due to increased knowledge (Hansen and Andersen, 2004). The method is resource dependent and often involves incentives for participation. The method is best applied to issues that present a number of options that are not widely known of. Deliberative polling may increase public awareness through participants transferring the knowledge they acquire to others (Fishkin, 2006).

World Café - is designed to generate conversation and interaction in a comfortable café-like setting in order to improve participants' knowledge. Participants from diverse backgrounds talk openly, allowing for cross-pollination of ideas and transmission of knowledge via social networks (Brown and Isaacs, 2005). The conversations take the form of open-ended explorations rather than problem-solving. Participants are encouraged to move to other tables in the 'Café' and talk with different people, sharing the essence of previous conversations and creating a web or network of conversations. The World Café utilises a variety of techniques that promote active listening and story sharing including 'talking objects' that identify a designated speaker, as well as pens and paper tablecloths so that people can co-create pictures. The last phase of the Café involves reflecting on the process and any insights, patterns and themes that have emerged.

Visioning - is a process of describing potential future scenarios as part of the planning process (O'Brien and Meadows, 2001). Visioning is primarily concerned with identifying desirable future options, rather than making predictions. The technique is similar to community planning but extends beyond community service provision to include broader goals and aspirations (Abelson et al, 2003). O'Brien and Meadows suggest that there are five key components of developing a vision: 1) analysis of the current internal context and how it came about; 2) analysis of the broader external or environmental context; 3) identification of inspirational future scenarios; 4) Connecting the present conditions to the future; and 5) testing the vision.There are numerous ways of undertaking a visioning process (O'Brien and Meadows, 2001) but they are characterised as being a deliberative and iterative process where ideas are gradually refined. The process is not likely to result in a definitive or prescriptive plan; rather it provides an avenue for developing mutual understanding, shared goals and visions. As such, the emphasis is on consensus building, collaboration and development of relationships and partnerships. A limitation suggested by Abelson et al (2003) however, is that the process may develop unachievable expectations.

Public Hearings - are usually in the form of public meetings and involve presentations from experts to interested members of the public. The method potentially has an educative component, but may be dominated by special interest groups with polarised and fixed opinions. Hard-to-reach and disadvantaged groups may be excluded. Public hearings can improve decision making, but often result in heated discussions. The opinions expressed in public hearings may not be representative and reporting of outcomes needs to be done with caution (Abelson et al, 2003).

Public Displays - often in the form of open houses or interactive demonstrations, allow the public to drop by a location at their leisure over a period of time. This is an informal process that allows the public to speak with experts or representatives of an authority. The visual nature of the displays is particularly effective in engaging people, encouraging discussion and providing information (Abelson et al, 2003). This method creates a relaxed setting in which sensitive topics can be discussed. Responses to the public's questions can be specifically adapted to suit their information needs. Public displays can be staff resource intensive and may not have set goals or specific outcomes.

Citizen Advisory Committee - are comprised of a variety of different organisations that are intended to be representative of the broader public. Balancing the committee can be problematic, but if achieved the method can build trust between institutions (Abelson et al, 2003).

GLOSSARY

ANOVA – A term used to refer to a statistical technique called Analysis of Variance, which is used to detect statistical differences between respondents or time points.

Cronbach's alpha – a statistical term used to describe the reliability of a constructed scale. In other words, it is a measure of how similarly specified questionnaire items are functioning which comprise a scale (construct, variable or factor). Cronbach's alpha is presented as a number ranging from zero to one. The closer the number is to one the more reliable the items in the scale are.

Effect size – a statistical term used to describe the size of the difference between scores obtained for survey items or scales.

Likert Scales – a means of measuring the extent of agreement with an item in a questionnaire. Likert scales have values (such as strongly disagree, disagree, agree, strongly agree) attached to a number.

Matched sample – respondents who have participated in more than one survey who have had the scores that they obtain on questionnaire items matched from one time point to another for comparative purposes.

PRW – Purified Recycled Water

Psychosocial variables– salient constructs or factors related to psychological or social processes. They can be thought of as being attitudes, values and behaviours.

Reliability – a statistical term used to describe how well a constructed variable hangs together. A reliable scale is comprised of questionnaire items that are functioning in a similar manner or co-varying. A reliable scale is thought measure a construct in a reliable manner.

Respondents – People who participated in the survey and responded to the questionnaire.

Scales – Variables, constructs or factors that have been constructed to measure the extent of a specified attitude, value or behaviour demonstrated through responses to items in a questionnaire. Scales are comprised of a number of items that are theoretically coherent and measured on a likert scale.

SEQ – South East Queensland

Structural Equation Modelling – statistical technique for understanding the causal relationships between two or more latent variables.

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