from Cloudy to Clear

WRF 07-03

# Talking About Water

## Understanding How to Communicate for Public Understanding: the Key to Public Acceptance

## 2011 Idaho DEQ Water Reuse Conference

PRESENTED BY EMILY CALLAWAY | CH2M HILL

May 24, 2011

## Brought to you by

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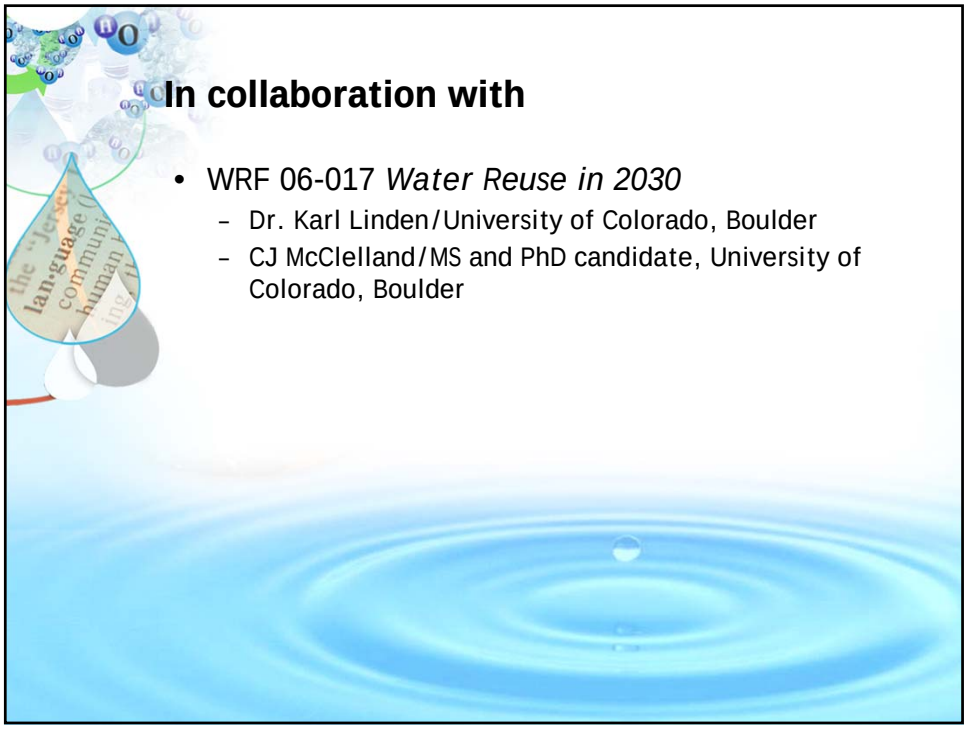
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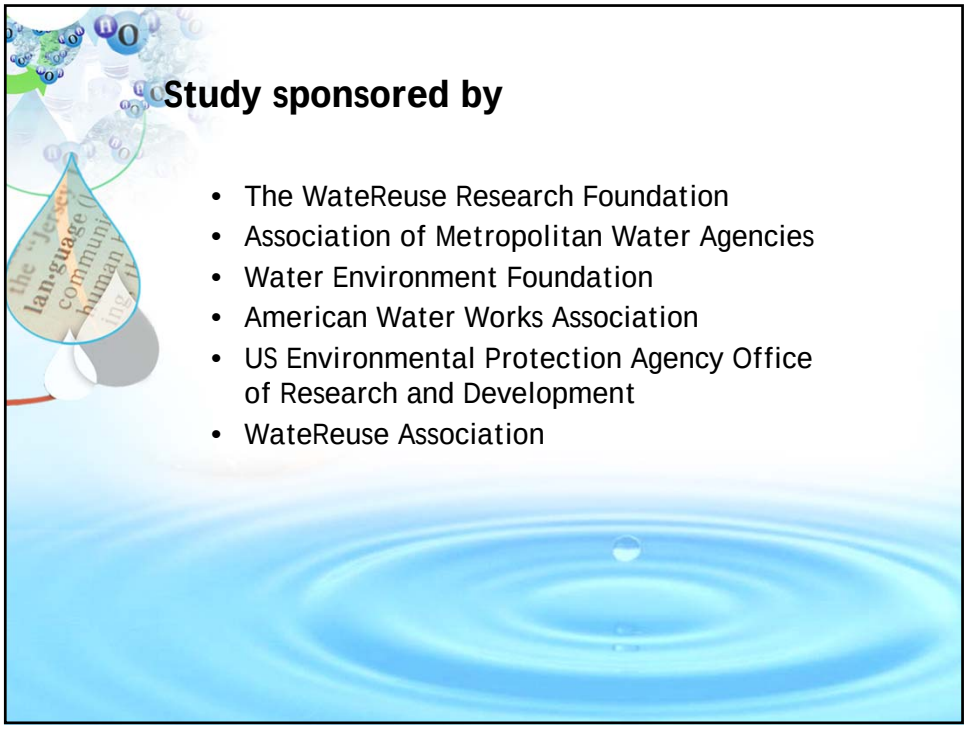
– Dr. Karl Linden/University of Colorado, Boulder
– CJ McClelland/MS and PhD candidate, University of Colorado, Boulder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- City of Oxnard, California
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- City of Tampa, Florida
- Clean Water Services, Oregon
- Denver Water, Colorado
- El Paso Water Utilities, Texas
- Griffith University, Queensland, Australia
- Miami Dade Water & Sewer Department, Florida
- Water Corporation, Perth, Australia
- West Basin Municipal Water District, California

## and WRF 07-03 Project Advisory Committee

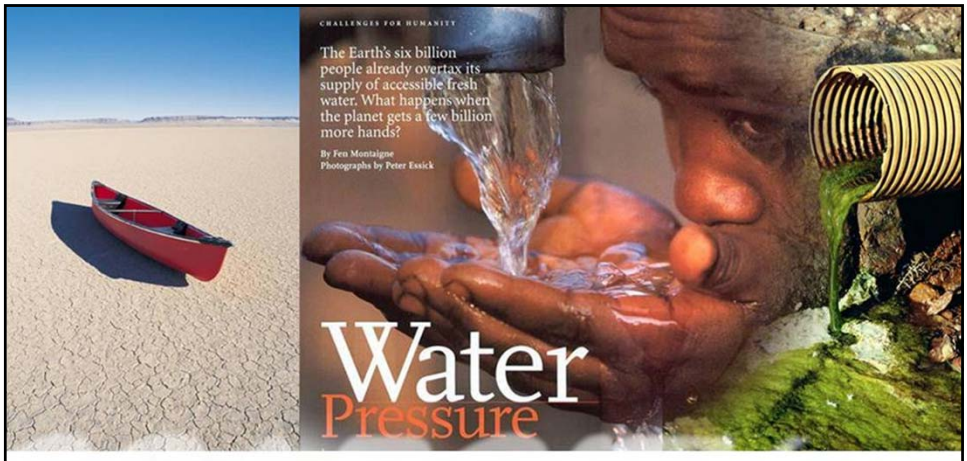
- Wade Miller, WateReuse Association
- Alan Roberson, American Water Works Association (AWWA)
- Eileen Leininger (acting on behalf of AMWA)
  Paula Kehoe (acting on behalf of WEF)
- Chris Impellitteri, Ph.D., US EPA National Risk Management Research Laboratory
- Chris Hornback, National Association of Clean Water Agencies (NACWA)

# The talk today will cover:

- Purpose and need for the research
- Methodology
- Research Findings
- Recommendations

# •Purpose and need for the research

- Methodology
- Research Findings
- Recommendations




## Purpose and need for this research

We have a problem:

- Water scarcity and water quality are global issues that demand public attention.

## Purpose and need for this research

- We have the technology to reuse and desalinate water to alleviate this growing crisis
- Lack of public acceptance shuts down projects (particularly potable reuse projects) often before they even get off the ground

## Purpose and need for this research

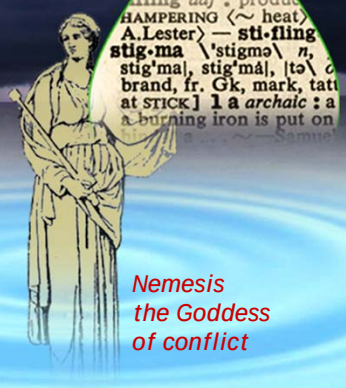
Reused Wastewater
Indirect Potable Reuse
Recycled Wastewater
Influenced Waters

**THAT IS THE QUESTION!**

- Could it be that there are vocabulary and images to explain technology and the concept of reuse to the public that could increase their understanding and foster acceptance?
- Vocabulary and images are not a problem with desalination, which faces different challenges

## STIGMA!

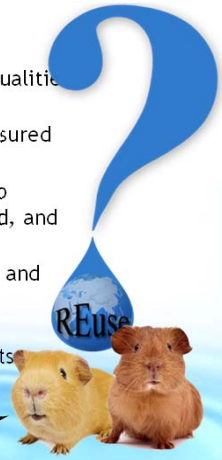
- Opponents of water recycling are aware of the stigmatizing effects of language
- The use of words that magnify fears is invariably more powerful than countervailing efforts to emphasize facts




*Nemesis the Goddess of conflict*

## Exploration of related issues

- What do people understand about water science?
- Does improved knowledge enhance acceptance?
- How does the water community explain the various qualities of water available for recycling and desalination?
- Does the water community adequately explain the assured safety of reclaimed and desalinated water?
- What types of information does the lay public need to understand how water can be treated, managed, used, and reused?
- Can certain terms and images improve understanding and acceptance?
- Whether the potential for public acceptance and understanding improves when water is described by its quality, rather than by its history.




Are we guinea pigs?

- Purpose and need for the research
- **Methodology**
- **Research Findings**
- Conclusions and Recommendations

## Research methodology

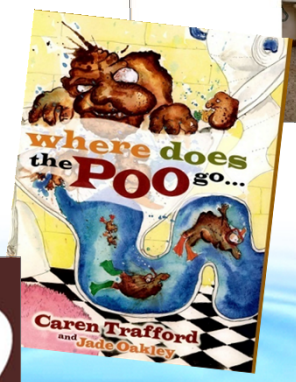
- Review of published materials
  - Community outreach and education materials
  - Survey research conducted between 1987 and 2009 related to reuse
  - Survey research related to desalination
  - Outreach and education guidance documents
  - Terms and definitions used within the industry
  - Images and phrases used by the media
- Quantitative investigation: web-based survey
- Qualitative investigation: focus groups in the US and Australia

## Community Outreach and Education Materials

## Community outreach and education materials

- Lack of consistency and coordination between water professionals and water industry professional organizations
- A focus on waste and feces could lead to adverse reactions to the concept that water can be reused






## Community outreach and education materials

- Terminology was used inconsistently even within the same organization
- For example:
  - One page of an organization's website discusses "wastewater reuse" while another page uses the phrase "potable recycling"

So which is it?
Are those the same thing?

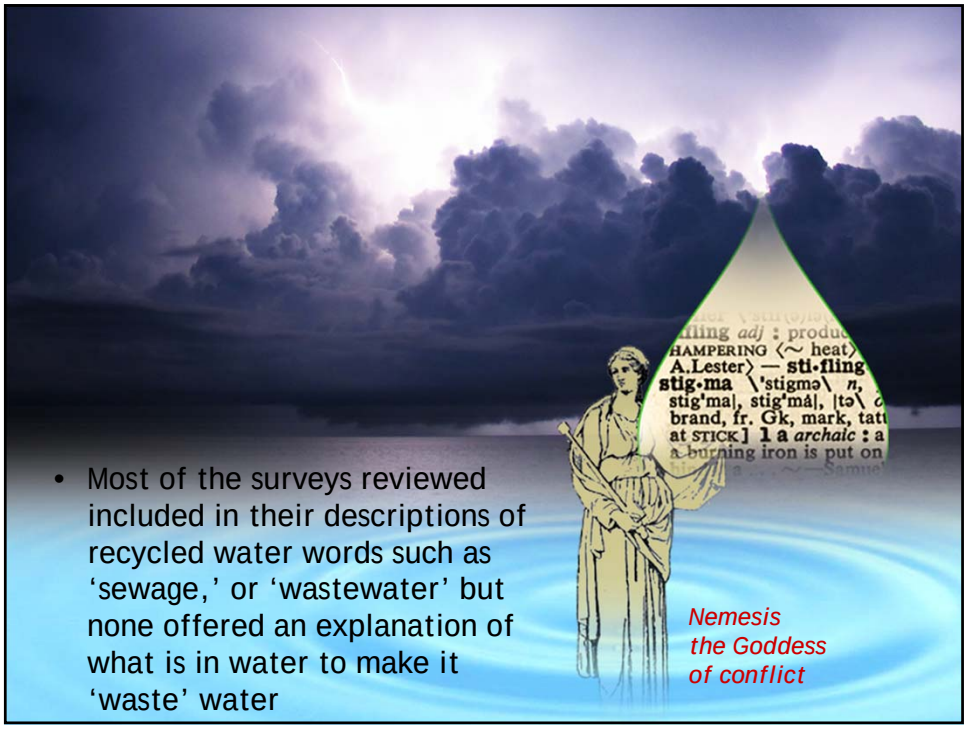

Community outreach and education materials
• Materials tended to be highly technical.
• In some cases, the reading ease was equivalent to the fine print of an insurance policy

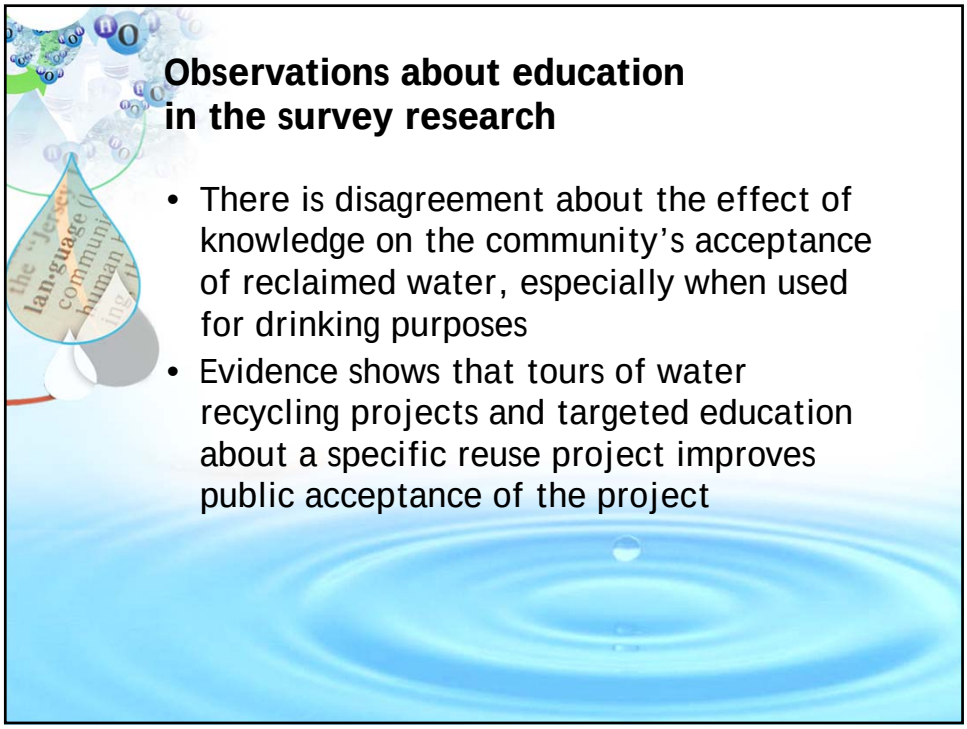

Community outreach and education materials
• The various parts of the water cycle were treated separately – the subject of water recycling was rarely considered in the broader context of the water cycle
• The material examined was not always accurate
• There was little information about wastewater and its treatment – what makes water "wastewater" and how we take the wastes out again – for beneficial use

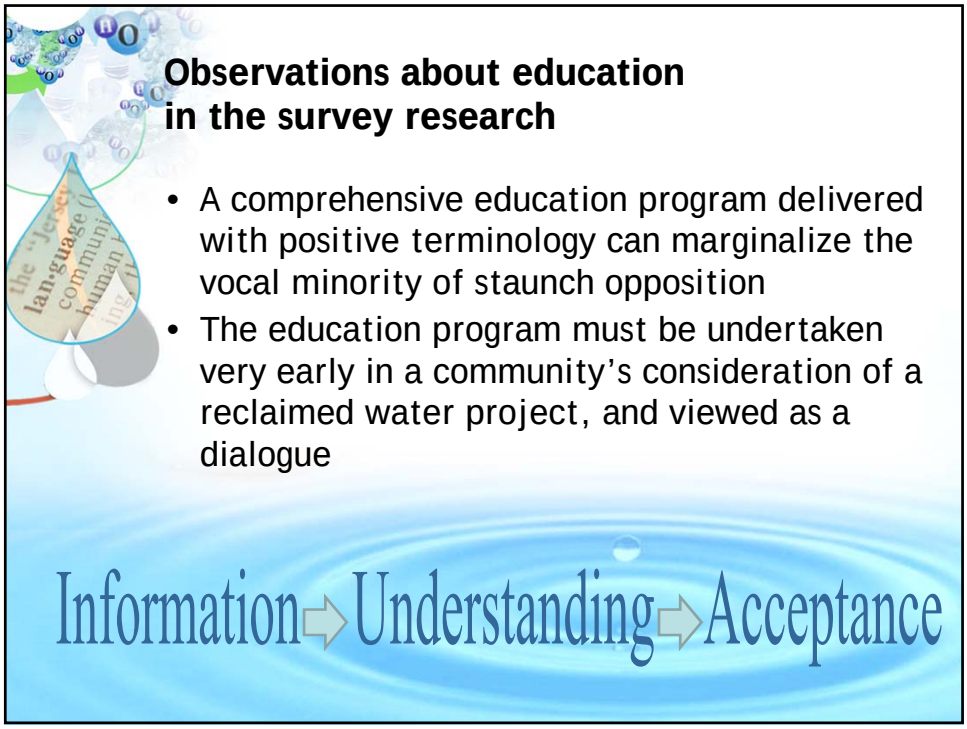
# Examples of Survey Research Related to Reuse

## Examples of survey research

- Many surveys have been done
  - to establish how accepting people are of the use of reclaimed water and
  - to determine the factors that affect its acceptance
- Some examined demographic traits while others tested the impact of trust, knowledge, and experience on acceptance
- Most of the work focused on what causes aversion rather than exploring ways to overcome it


• Most of the surveys reviewed included in their descriptions of recycled water words such as 'sewage,' or 'wastewater' but none offered an explanation of what is in water to make it 'waste' water
Nemesis
the Goddess
of conflict


Observations about education in the survey research
• There is disagreement about the effect of knowledge on the community's acceptance of reclaimed water, especially when used for drinking purposes
• Evidence shows that tours of water recycling projects and targeted education about a specific reuse project improves public acceptance of the project


Observations about education in the survey research
• A comprehensive education program delivered with positive terminology can marginalize the vocal minority of staunch opposition
• The education program must be undertaken very early in a community's consideration of a reclaimed water project, and viewed as a dialogue
Information Understanding Acceptance

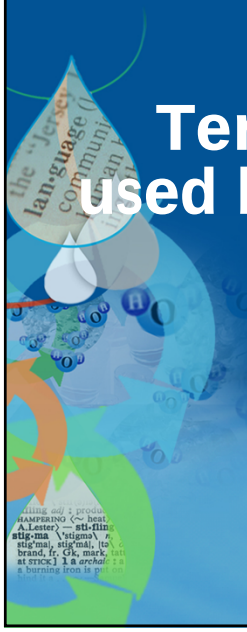

Outreach and Consultation Guidance

## Outreach & consultation guidance


## Outreach & consultation guidance

- While there is much to recommend in these documents, there are a number of gaps:
  - although they invariably mentioned the need to provide information, they did not detail what information should be available nor how it should be delivered
  - there were no terms or images to explain different water qualities, different types of reuse and how water is treated to make it suitable for various uses

# Terms and Definitions used by the Water Industry



## Terms and definitions

- Even technical professionals disagree on the definition and use of many fundamental water terms
- The terms used are imprecise with overlapping meanings that do not define the water's quality
- While the subtle variation in reuse semantics may cause confusion and inconsistency among professionals, it results in a lack of confidence among laypeople

## Terms and definitions

- Most dictionaries and glossaries that define terms relating to water are written for water professionals and require some technical savvy
- They presume the reader has a working knowledge of water treatment processes and are often found in expensive books and specialty publications that are inaccessible to the general public

## Terms and definitions

- On-line references such as Wikipedia are often incorrect, imprecise, or clumsy and add to confusion and lack of public confidence
- Publications available from utilities or from utility websites are often better, but still are inconsistent in many fundamental definitions

# Images and Phrases used by the Media

## Images and phrases used by the media

- *"Toilet-to-tap: You soon might be drinking purified toilet water"*
- Physicians for Social Responsibility from the OWL Foundation referred to all water that has not received advanced treatment (membranes and reverse osmosis) as "**partially treated sewage"**

**San Diego should flush "toilet to tap" plan**
July 24, 2006

Your golden retriever may drink out of the toilet with no ill effects. But that doesn't mean humans sho do the same.

San Diego's infamous "toilet to tap" plan is b once again, courtesy of Water Departm bureaucrats who are prodding the City Council adopt this very costly boondoggle. The proj was rightly shelved seven years ago amid a pub outcry over potential health hazards and t fact that some of San Diego's least afflue neighborhoods were to be the recipi treated wastewa

**A taste for waste**

By MICHAEL THOMSON

STANDING on the crusty bottom of Goulburn's bone dry Pejar Dam on the Southern Tablelands, it is obvious that the weakness of such large water storages is their susceptibility to drought.

It is no surprise, therefore, that Goulburn Mulwaree Council is launching itself down the controversial path of recycling sewage effluent.

forced to close its sporting fields because they were bare of grass cover and too hard for safe winter sport activity.

"Goulburn's water crisis is much

to inform the community of options for alternative sources of water so there is no delay in working towards a remedy and those remedies have community support," he said.

And he is pushing for major cities to follow suit to ease their burden on current supplies, saying "Goulburn today could be Sydney or

## Images and phrases used by the media

- *Making water: This time around, L.A. must get over the 'yuck factor' and recycle its $H_2O$.*

If You Vote YES Look At The PURIFIED WATER You WILL BE Drinking from

WAter Futures: the water cycle starts here

posted by Shearers Nightmare at Saturday, July 15, 2006 | 3 comments links to this post

## Images and phrases used by the media

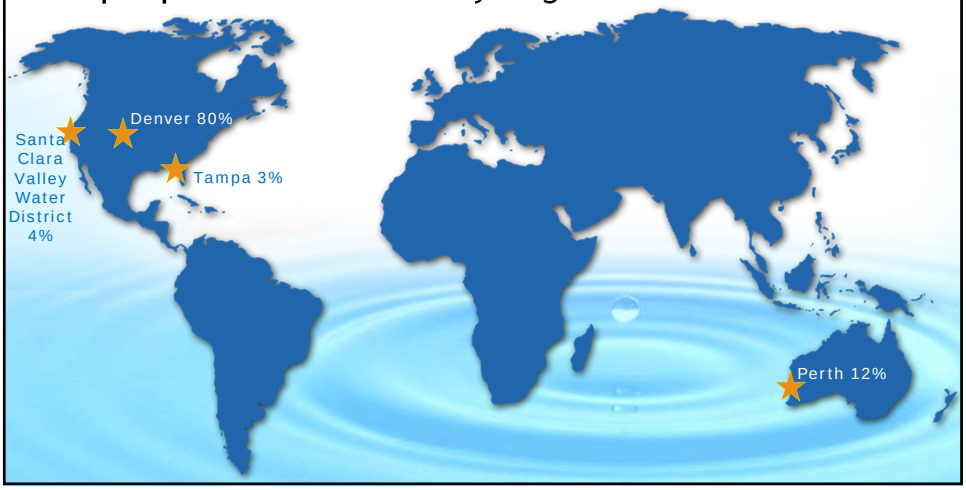
## Images and phrases used by the media

- Sensational media articles, phrases, and images may play a role in the community's mental model of reuse
- Terminology is inconsistent and emphasizes the source of the water (as wastewater) rather than its quality (technology and monitoring)

# Quantitative Survey Research

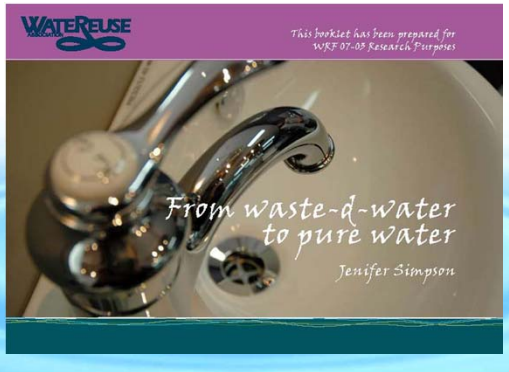
## Quantitative Survey Research

- 3,613 total respondents
- 40 questions asked about general water science, water and wastewater terminology, and public perspectives on water recycling




## Quantitative Survey Research

- Testing the impacts of information:
  - half of the individuals surveyed received an on-line copy of From waste-d water to pure water, but the other half did not receive any accompanying information



## Quantitative Survey Research

- In Perth, respondents used a version of *From waste-d-water to pure water* that included star markers for various water qualities suitable for different water uses
- Star markers were not used in the United States


## Selected questions from the survey

# The question was:

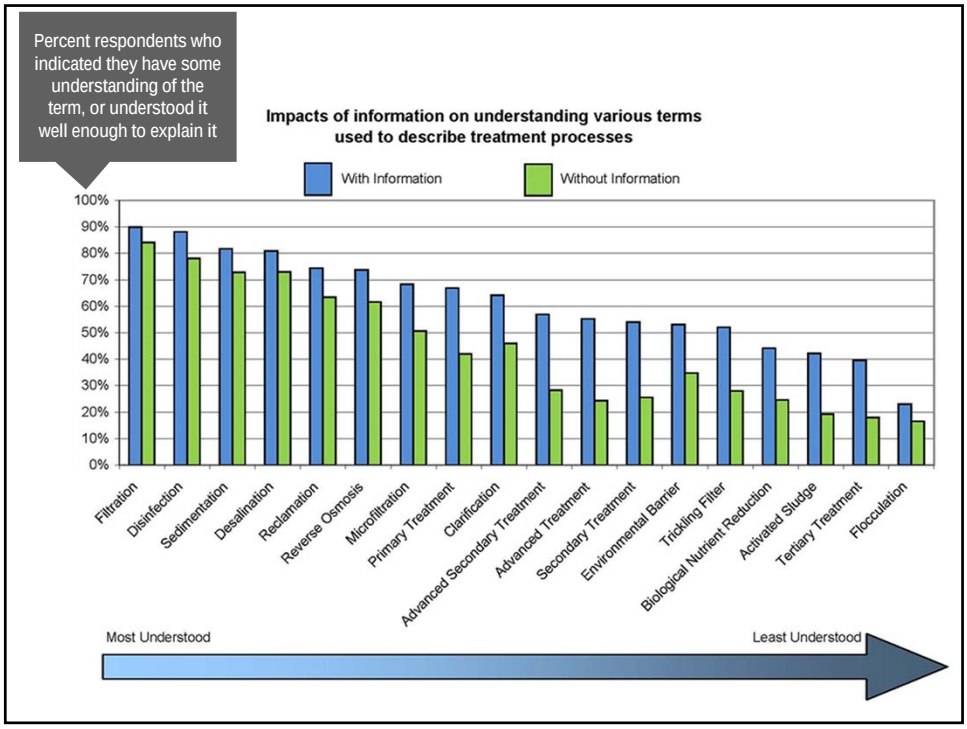
- *There is a variety of terms used to describe the processes used to clean wastewater and water. Rate from 1 to 4 how well you understand the terms*.

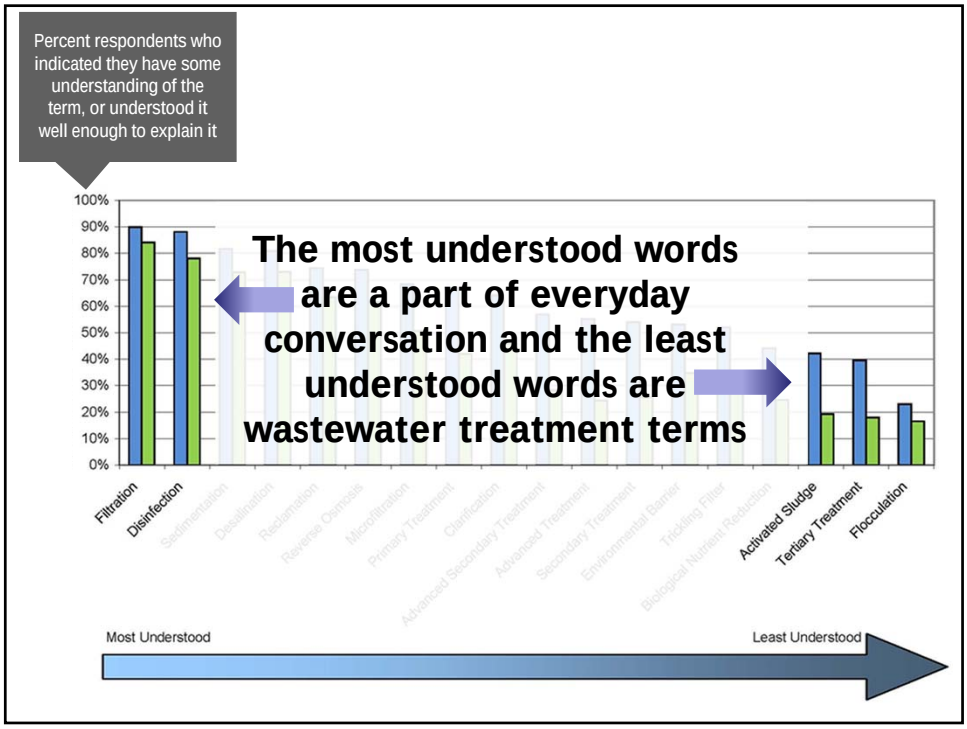
  1 = I have never heard of the term

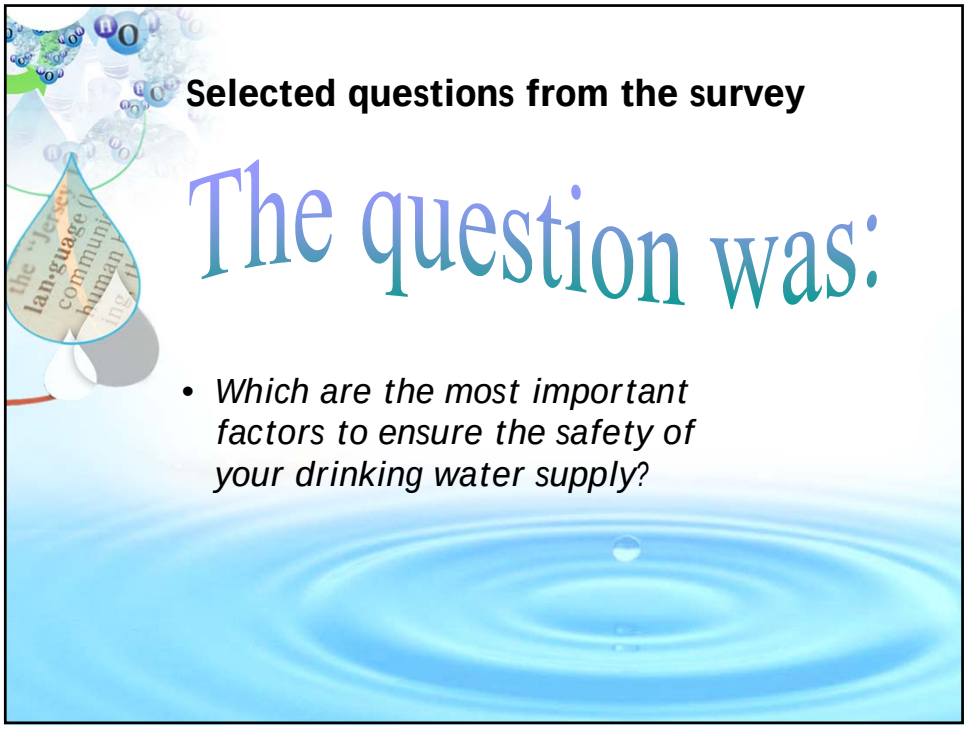
  2 = I have heard of the term but do not know know what it means

  3 = I have some understanding the term

  4 = I understand it well enough to explain it


Percent respondents who indicated they have some understanding of the term, or understood it well enough to explain it
Impacts of information on understanding various terms used to describe treatment processes
With Information
Without Information
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Filtration
Disinfection
Sedimentation
Desalination
Reclamation
Reverse Osmosis
Microfiltration
Primary Treatment
Clarification
Advanced Secondary Treatment
Advanced Treatment
Secondary Treatment
Environmental Barrier
Trickling Filter
Biological Nutrient Reduction
Activated Sludge
Tertiary Treatment
Flocculation
Most Understood
Least Understood


Percent respondents who indicated they have some understanding of the term, or understood it well enough to explain it
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
The most understood words are a part of everyday conversation and the least understood words are wastewater treatment terms
Filtration
Disinfection
Activated Sludge
Tertiary Treatment
Flocculation
Most Understood
Least Understood




## What factors ensure drinking water safety?

| Factor | With information | Without information |
|---|---|---|
| Water treatment technology | 84% | 85% |
| Monitoring finished water | 84% | 84% |
| Identifying pollution sources | 56% | 64% |
| Residual disinfection | 42% | 49% |
| Raw water quality | 23% | 29% |

**The industry assumes…**

*…the public thinks the quality of raw water is most important for safety.*

**The reality is…**

*…the public actually thinks that water treatment and monitoring are more important for safety.*

**Selected questions from the survey**

# The question was:

- *How should effluent and reclaimed water quality be described?*

## How should water quality be described?

| Description Option | Percent "Very Helpful" responses |
|---|---|
| **uses for which it is suitable** | **50.3** |
| icons depicting the uses for which it is suitable | 35.5 |
| a number grading system | 19.8 |
| a star-rating system | 17.9 |
| the degree of treatment it has received | 16.7 |
| an alphabetical rating system | 15.3 |
| the processes by which it was treated | 14.5 |
| type of pollutants in it that have been treated and reduced | 13.8 |
| **the source and/or previous use of the water (i.e., reclaimed wastewater)** | **11.2** |

**The public thinks we should use this** → uses for which it is suitable

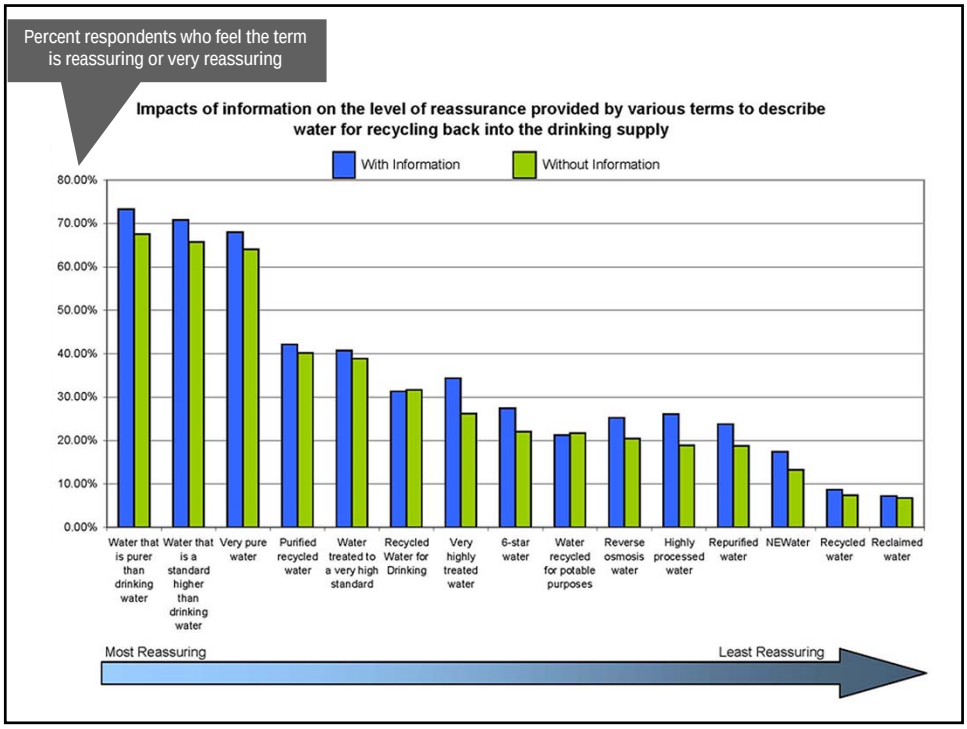
**The water community tends to emphasize this** → the source and/or previous use of the water (i.e., reclaimed wastewater)

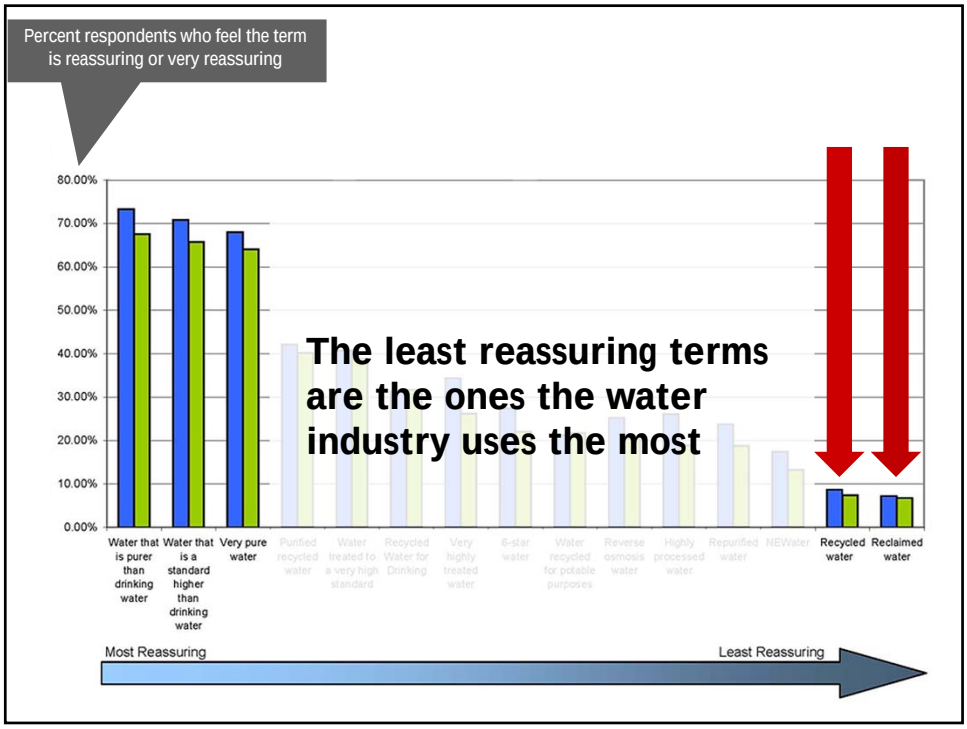
Water professionals currently describe effluent quality by the degree of treatment it has received (primary, secondary etc) but less than 17% of the respondents found this helpful

## Selected questions from the survey

# The question was:

- *Several names have been suggested for the water produced at the reclamation plant that is as pure as modern technology can make it, for recycling back to the drinking supply. Please rate the terms that you consider would most positively reassure the public of its safety and high quality.*


Percent respondents who feel the term is reassuring or very reassuring
Impacts of information on the level of reassurance provided by various terms to describe water for recycling back into the drinking supply
With Information
Without Information
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Water that is purer than drinking water
Water that is a standard higher than drinking water
Very pure water
Purified recycled water
Water treated to a very high standard
Recycled Water for Drinking
Very highly treated water
6-star water
Water recycled for potable purposes
Reverse osmosis water
Highly processed water
Repurified water
NEWater
Recycled water
Reclaimed water
Most Reassuring
Least Reassuring


Percent respondents who feel the term is reassuring or very reassuring
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
The least reassuring terms are the ones the water industry uses the most
Water that is purer than drinking water
Water that is a standard higher than drinking water
Very pure water
Recycled water
Reclaimed water
Most Reassuring
Least Reassuring

**Selected questions from the survey**

# The question was:


- *What does the phrase "Recycled Water: Do Not Drink" mean to you?*
  - *Recycled water is NEVER for drinking*
  - *Just the recycled water in the vicinity of the sign is not for drinking*

**Selected questions from the survey**

# The answer was:

- The phrase **Recycled Water: Do Not Drink** means that reclaimed water should **NEVER** be used for drinking to over half the survey respondents

## Words that reassure and deter


- All derivatives of the word pure – 'purer than', 'very pure', 'purified' – have great power to reassure people that water is safe
- Conversely the words wastewater and sewer have great power to dissuade people from using recycled water
- People are not particularly opposed to reusing water that has been used by humans
- They are broadly opposed to the stigmatizing word *sewer*

## Information helped

- Information increased understanding of the terms used to describe water and wastewater treatment processes
- It increased understanding that there are different qualities of water that can be reused for different purposes
- It increased willingness to drink water that was known to be used before

Information ⇨ Understanding ⇨ Acceptance

# Qualitative Focus Group Research

## Qualitative Focus Group Research

- Focus group meetings were held in Santa Clara Valley Water District/City of San Jose, Tampa and Perth

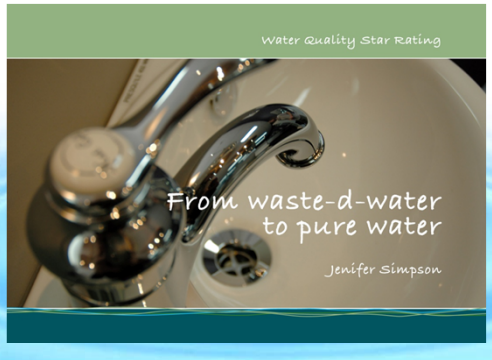
## Qualitative focus group research

- Focus groups meetings are facilitated conversations
- The objective is get people talking in a safe, non-judgmental environment in order to get candid feedback on a specific topic



## Qualitative focus group research

- The same agenda and vocabulary were used in all presentations
- All participants were given a copy of the *From waste-d-water to pure water* booklet that included the star rating (the Perth attendees received the booklet by mail in advance of the meeting)



## Focus group investigations explored the following issues

- Did the AWWA video on all types of water reuse, a personal tutorial and/or the interactive information from the NEWater Visitor Centre help people understand and become more accepting of water recycling?

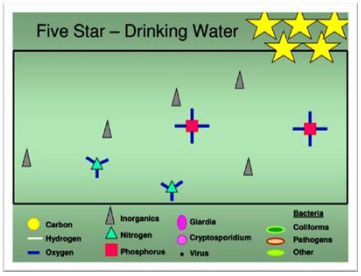


## Focus group investigations explored the following issues

- Does the knowledge that water purer than drinking water can be produced raise the expectation that this quality of water should be available for all uses?
- Is it true that 'the community doesn't want to know and doesn't have time to learn about water science'? (AWA Rain Gauge, 2007)

## Focus group outcomes

- The presentations received positive comments, particularly the personal tutorial *From waste-d-water to pure water*
- The graphics from the NEWater Explorer program were noted to clearly communicate how membranes work to protect public health





## Focus group outcomes

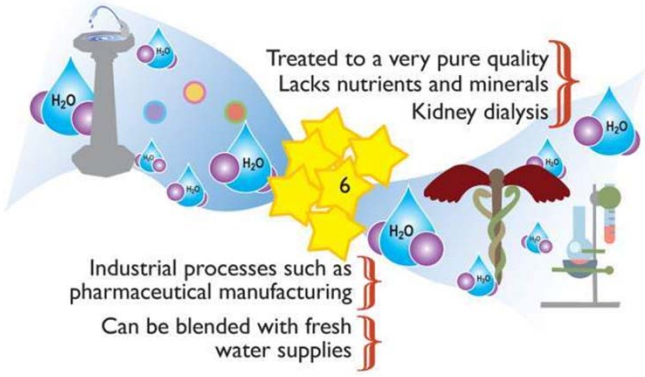
- There was an obvious link between the clear presentation from a knowledgeable presenter coupled with a visual, interactive explanation of the technology and the attendees' understanding of water science and their acceptance of water recycling

## Focus group outcomes

- The attendees responded more positively to being provided with a greater depth of information about water, as opposed to the general video whose aim was to explain reuse and establish that the industry may be trusted to provide various qualities of recycled water
- Generic information was regarded as marketing and mistrusted

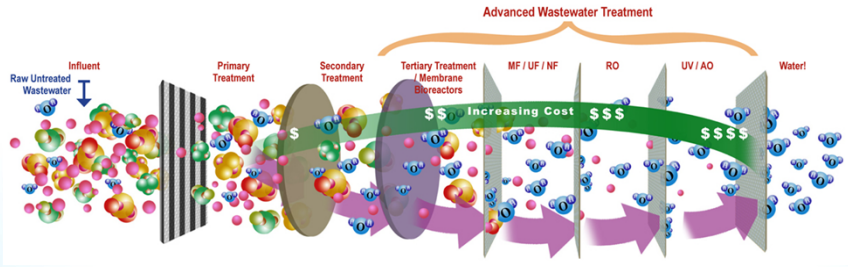
Branding without information may not be the answer

## Focus group outcomes

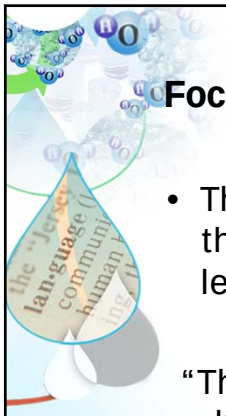



- It was clearly demonstrated that knowledge that water can be made purer than drinking water (6-star quality in the Australian research) did not make people want that water for all uses

## Focus group outcomes




- Most of the attendees were conscious of the cost and energy requirements needed to provide high quality water



## Focus group outcomes

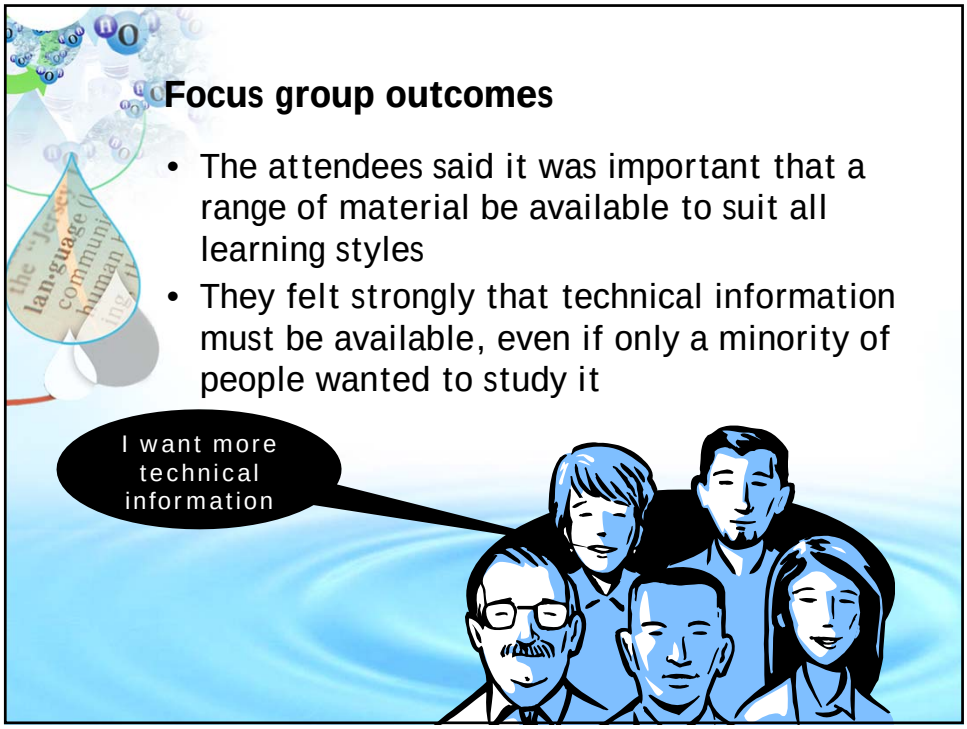
- The very positive responses showed that the audiences were very interested in learning and talking about water

"The public generally doesn't wish to know, nor has the time to learn the detailed science involved in indirect potable reuse."
(AWA Rain Gauge 2007)

DISPROVEN

## Focus group outcomes

- The attendees said it was important that a range of material be available to suit all learning styles
- They felt strongly that technical information must be available, even if only a minority of people wanted to study it



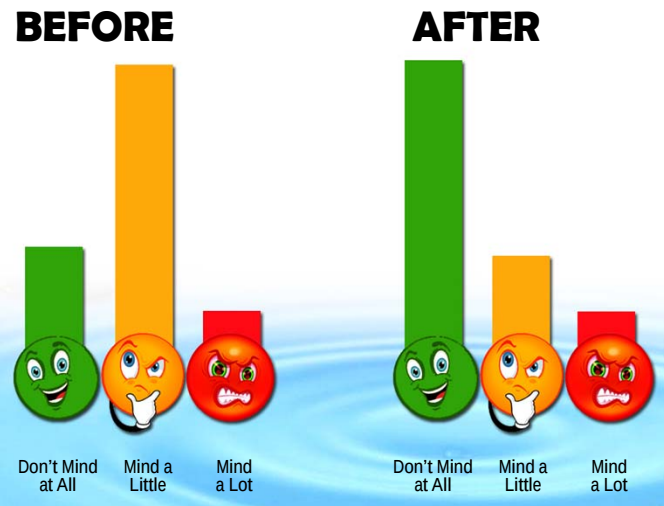

## Focus group outcomes

- Technical information should be ‘simple enough to understand yet technical enough to trust’

## Focus group outcomes

- Participants in Perth who had time to study the information before the meeting were particularly appreciative of the benefits of having the information provided in a simple and easy-to-understand manner
- Information should be available on all the options available for managing water (for example: conservation, desalination, reuse)
- Cost was an important issue for many

## Focus group outcomes




*Thanks to Loretta Lohman's survey research in the 1980s for identifying the three categories of degrees of objection to drinking reclaimed water.*

## Focus group outcomes


- A few people in each focus group location expressed concern about pharmaceuticals and hormones in drinking water
- None had heard of the term micro constituents
- It became apparent that the participants did not differentiate between the concentration and impact of these chemicals in the environment and their presence in drinking water

## Focus group outcomes

- They were not aware that detected concentrations decreased as water quality increased
- Participants felt that many websites have alarming information about chemicals in water, particularly in reclaimed water, but none put the issue in context for them


•Purpose and need for the research
•Methodology
•Research Findings
•Conclusions and Recommendations


Conclusions

## Conclusions

- The community's knowledge of water science, particularly wastewater, is low
- Increased knowledge improves understanding and acceptance of reclaimed water

Information ⇨ Understanding ⇨ Acceptance

## Conclusions

- Words matter!
  - Stigmatizing words such as sewage and wastewater deter people from accepting reuse whereas positive words, especially 'pure' and its derivatives, enhance acceptance

## Conclusions

- The terms used to describe water quality are imprecise and used inconsistently

Wastewater
Contaminants
Emerging Pollutants of Concern
Activated Sludge Plant
Toxins
Sewage
Pipe to pipe
Effluent
Preliminary/primary/secondary/treatment
Recycled wastewater
Toilet to tap
Maximum contaminant limits
Direct/indirect potable recycling

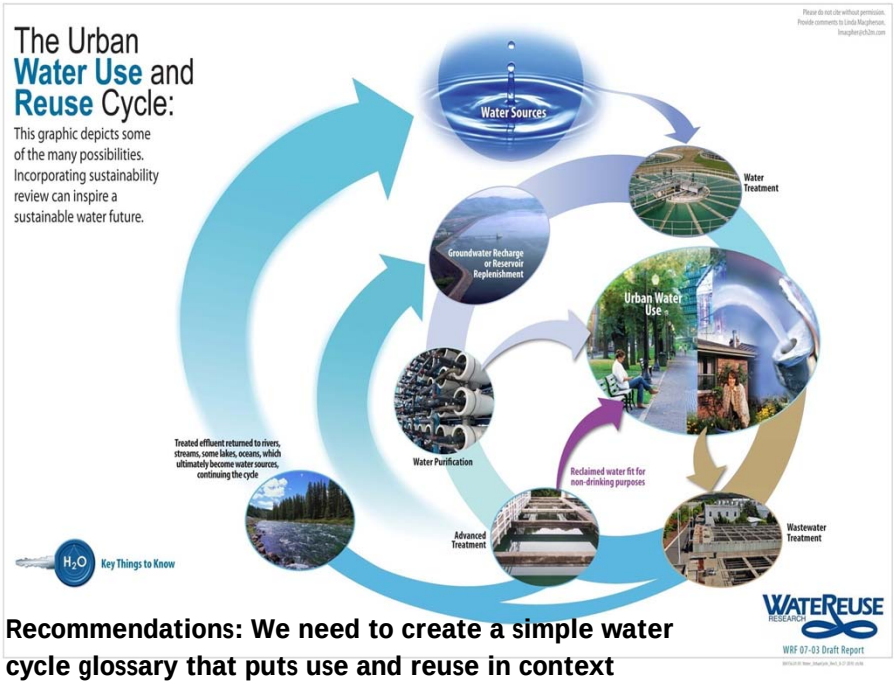
## Conclusions


- Words currently in use describe water quality by its history, its source, and degree of treatment, but the community relates to what the water can safely be used for
- The phrases water recycling and reclaimed water are used to refer to all qualities of water – they don't differentiate between suitable uses

# Recommendations

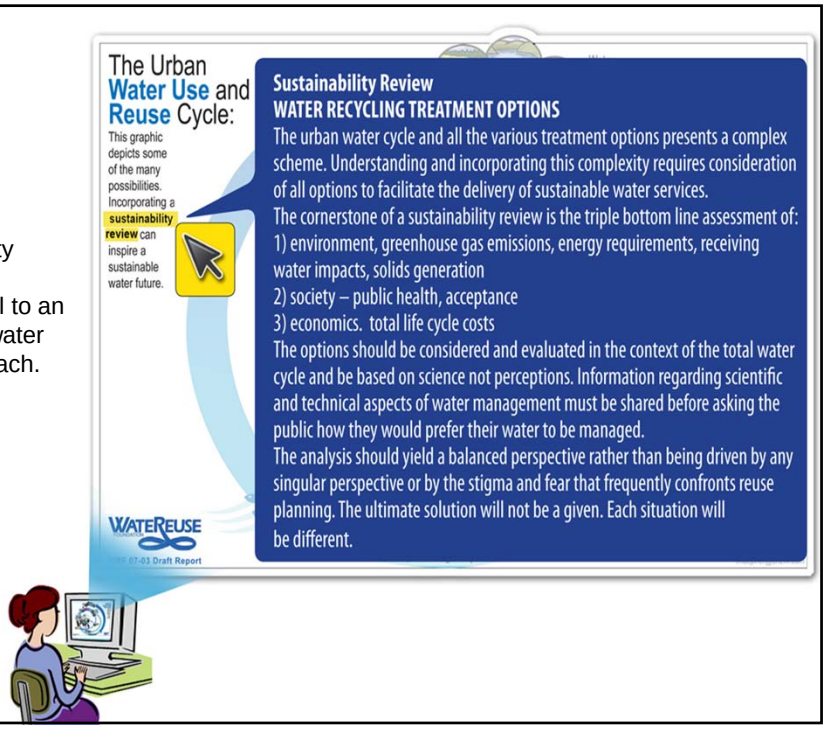
## Recommendations: Information is a key component of building trust

- We need to provide "information that is easy enough to understand but technical enough to trust!"
- The material should:
  - be simple, graphic, fun
  - be interactive with positive language
  - provide the ability to drill down into the technical information – for those that want to

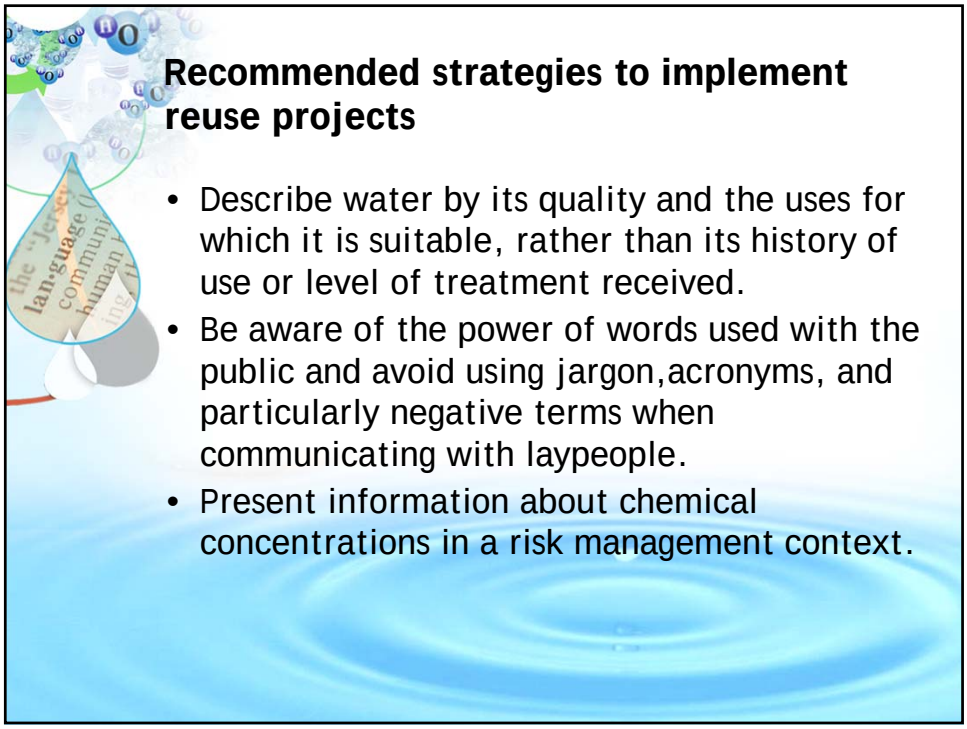


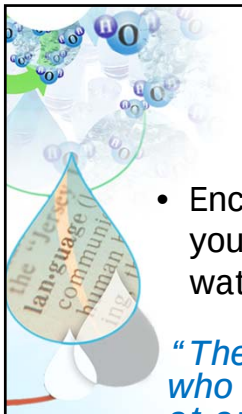

**Recommendations: We need to create a simple water cycle glossary that puts use and reuse in context**

Sustainability Review is fundamental to an integrated water cycle approach.




Recommendations for achieving public acceptance and avoiding controversy
• Provide information that is interesting and engaging, and is simple enough to understand but technical enough to trust.
• Focus public education efforts on the whole water cycle, the role it plays in our world, and how it relates to emerging water management decisions.
• Recognize that public acceptance is equally important as technical merit–and treat it as such.
• Develop more dynamic communications programs and strategies.
• Work across water sectors and with other professions to enhance trust and foster public acceptance.
• Work with the media, educational institutions, and others to broaden understanding about water.
• Be proactive with the media.


Recommended strategies to implement reuse projects
• Describe water by its quality and the uses for which it is suitable, rather than its history of use or level of treatment received.
• Be aware of the power of words used with the public and avoid using jargon,acronyms, and particularly negative terms when communicating with laypeople.
• Present information about chemical concentrations in a risk management context.

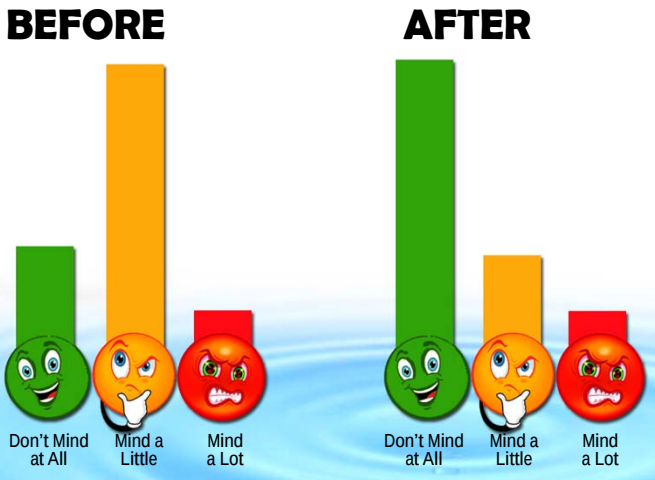


- Encourage your members (and yourself) to think about the WHOLE water cycle!

*"The 'clean water suppliers' and the 'others who treat wastewater' can no longer remain at arm's length; they have to accept that they are dealing with a single resource that cycles through a complex of quality phases, all of them interlinked."*

- Bruce Durham, EUREAU Water Recycling and Reuse Working Group

**Forget about convincing the Mind a Lots – they don't change their mind…**
*even with information!*




Thank You!