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Big Water, Everyday Water: A Sociotechnical Perspective

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Introduction

> My family relies on water and in some way takes the ease with which we can obtain this lifeblood for granted. We wash, clean, drink, cook with, run around with water in our bodies everyday without thinking twice about it. We yearn to live with views of it. We save to holiday by it or in it. We drive for hours to picnic or sunbathe near it. We transport ourselves upon and over it with ease. We should be reminded of its value. (Kylie, Blacktown, diary)

Water's ubiquity in everyday life is eloquently expressed by Kylie (pseudonym), a young mother of two who lives in Western Sydney. Almost as ubiquitous in discourses on water is the contradiction played out in the quote between the concluding sentence— invoking the official view of water as having some general and abstract 'value' of which ordinary people need reminding (presumably by authorities)—and the earlier statements, which clearly indicate that Kylie herself needs no reminding of the practical, social, material, and aesthetic values water embodies in her family's shared life-world.

Kylie was one of twenty-five diarists from a total of almost 160 Western Sydney residents (including 126 questionnaire respondents) whose water habits and attitudes were studied in the collaborative research project *Everyday Water: Values, Practices, Interactions*, from which this paper arises (Sofoulis *et al.*, 2005; Allon & Sofoulis, 2006, forthcoming).[1] This research was undertaken in 2004–2005, in partnership with the developers of a new housing estate in Western Sydney. It aimed to benchmark current community attitudes towards water in the region, and suggested possible strategies for increasing uptake of new water conservation technologies by prospective residents. Along with semi-structured interviews and a short tick-box style questionnaire, it developed the 'Water Diary', a written and photographic journal with guided

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and open-ended exercises, kept from one to four weeks. Householders were asked to draw on their own 'expert knowledge' of everyday life, as well as to draw on memories, observations and reflections on their own experiences and water habits, to provide a multi-dimensional picture of 'water culture' as meaningfully lived, as well as insights into the enablers and barriers to further changes in water use practices.

Environmental psychologists often point out a gap between people's attitudes to conservation or the environment, and their actual conservation behaviours. Although heightened awareness is a poor predictor of behavioural change (Barr, 2003; Lam, 2003), efforts are still made to bridge this gap through information campaigns about resource scarcity and environmental values. The *Everyday Water* researchers rejected the tacit ascription of ignorance, hypocrisy or moral laxity to 'aware' individuals having trouble putting conservation values into practice. We suspected more significant obstacles to water-saving practice lay in cultural conventions about water use and the technologies and infrastructures that support them.

Any cultural researchers venturing into the landscape of research and policy about urban water consumption in Australia—as I hope more will do—could not help but notice the dense fog obscuring most of the areas where research on consumption activities would be expected: the realms of popular culture and everyday life, those messy, productive, and resource-consumptive sites where people collectively reproduce, negotiate, perform and mutate identities, affinities, meanings, rituals, pleasures, and significant practices in social assemblages that include a wide array of material objects, media and technologies with their own social (or anti-social) trajectories. The only features discernable through the fog are the looming masses of populations consuming water by the gigalitre, or the little bundles of attitudes, anxieties, opinions, values and preferences called 'individuals', who are randomly encountered in close-ups of the consumer markets they constitute.

This fog has formed through particular histories and discourse conventions, such as the old modernist insistence on purifying the division of non-human and material sciences from sciences of the human, leaving the latter with just the intangibles of impulses, values, thoughts and meanings, and ignoring the impure hybridisations of meaning and matter, the heterogenous assemblages of human and non-human rudely proliferating in the middle ground (Latour, 1993). There is the related convention granting all authority on matters of natural resource management to experts such as engineers, chemists, resource economists, climatologists, and ecologists in the approaches Shove labels 'environment centred' (2003, Ch. 1). Of historical relevance is the political and academic legitimacy gained by population management sciences from the early twentieth century well into the post-war period (Rose, 1985; Blackman & Walkerdine, 2001, especially Ch. 2). Long-established approaches such as behavioural, perceptual and consumer psychology, and 'hard' quantitative social science methods, including demography, offer natural resource managers the comforting familiarity of large-scale statistical data sets and models, and have consequently been overused by resource experts seeking knowledge of human factors. The clouding of the cultural domain is an outcome of these various tendencies,

which entrench the persistent methodological error of imposing either individual or whole-of-population explanations and solutions onto intermediate-level collective processes of continuously evolving habits and expectations.

But climates shift and fogs can lift. As hot winds of drought and prospects of permanent water shortages appear on the horizon, water authorities start accepting their core business is no longer limited to the technics of supply, but expanding to include the management of water demand; that is, how and why people use water. The limits of conventional approaches are becoming more apparent. One natural resource manager confessed he found large-scale demographic approaches unsatisfactory for understanding domestic consumers because they produced 'only averages', and gave grey and indistinct pictures of ways of life and values embodied in a variety of consumption patterns. A number of resource consumption studies reveal the poor predictiveness and feeble correlations between people's resource use patterns, and standard macro-sociological variables such as educational level, socio-economic status or voting preference. Marked variations in water use can be found in neighbouring census districts, or between dispersed census districts having similar socio-economic and demographic population profiles (Eardley *et al.*, 2005, p. 49, p. 53), whilst our research found some of the most avid water-savers were also vehemently 'anti-green' (Sofoulis *et al.*, 2005, p. 26).

A cultural approach would understand water consumption patterns as embedded in the meaning-laden contexts of everyday life, and arising from cultural and social conventions. Of value are the democratic principles of cultural studies' theories and methods, e.g. open-ended interviews and written exercises, that let people express their own ideas and theories about the significance and utility of their changing consumption practices. This can uncover unexpectedly salient factors —like the link we found between childhood country experience and DIY water recycling efforts—to provide better sets of variables for larger, quantitative studies (which still have their uses). Importantly, cultural research could apprise resource managers of the diversity and complexity of socio-cultural formations (cf. Ang & Cassity, 2004), and the reservoirs of resourcefulness, resilience, citizenly spirit and creativity lurking in niches within population statistics, and so contribute to finding demand management strategies that encourage rather than suppress cultural diversity in responses to shared problems.

While this paper's general concerns are with the contributions cultural approaches might make to understanding and helping find solutions to a 'water crisis', its specific goals are more modest. Close to its original form as a talk, it is an excursion to map selected features in a field worthy of further investigation and future interventions by cultural researchers. The next section briefly outlines (after Shove, 2003) a sociotechnical perspective on relations between users, technologies and large systems. There follows a discussion of the *sociotechnical* system here called Big Water, and how domestic users get blamed for water practices the system encourages and services. The final section examines how water restrictions are leading some users into small-scale heroics to resist the 'saver-unfriendliness' of standard domestic water fittings in efforts to recapture water for their gardens.
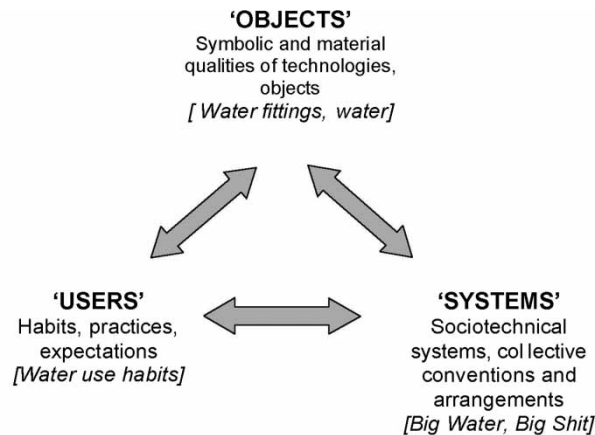
The Sociotechnics of *Everyday Water*

The problem with researching—or transforming—everyday water use is precisely its everydayness; so normal it retreats into the background of awareness as part of *inconspicuous consumption* (Shove, 2003, p. 2). This consumption is not readily disclosed in the opinions and attitudes surveyable by questionnaires, but involves an almost wordless 'practical consciousness' (Giddens, 1984; Tudor, 1995) of actions and interactions normalised as part of quotidian habits and routines. Who normally entertains an attitude about a tap, a drain, or a sewage pipe? Change in water use habits would not just require information, but more importantly the de-routinising of normal habits and the learning new ones. The first steps here can involve becoming aware of one's routinised habits and interactions, retrieving them from the wordless background of 'practical consciousness,' and subjecting them to scrutiny and reflection. In this respect, our water diaries worked as a minor 'water demand management' tool, with several participants recounting their resolve to save water after the exercise, with one participant later reporting that his water bill had halved. Other paths of de-routinisation include conversation and debate amongst householders and neighbours, or through experiential learning about alternative water use systems—for example by overseas or rural experiences, or perhaps visits to displays of new technologies or housing designs.

   The task of 'de-fogging' the cultural domain in discourses on water consumption is greatly assisted by a *sociotechnical* perspective concerned with material dimensions of social life, and what are sometimes awkwardly called 'naturecultures' or 'objects [or technologies]-discourses-natures-societies'.[2] The *sociotechnical* perspective defines 'society' to include both human and non-human elements that are 'bound together in networks [and] are at the same time, constituted and shaped in those networks' (Bijker & Law, 1992, p. 13). Through interview questions and diary exercises asking people to map and comment on interactions with water, and interactions with other people around water sites at home, the *Everyday Water* research explored:

- Water as a socialising agent: how water use habits are part of childhood training and amenable to later change and re-socialisation; how domestic water fittings enable or prohibit different kinds of social interactions, and 'script' certain kinds of users and actions (as well as suggest resistant counter-scripts);
- Water as a socialised actor that appears and performs in human dwellings according to technologically, culturally, politically, historically, geographically specific formations;
- Water supply systems and fittings as 'baked in' with condensed expressions of social relations, power, will and fantasy, and subject to historical contingency.

The mutually shaping and co-evolving relationships between users, technologies and large-scale systems of water can be envisaged with the aid this diagram, adapted from Elizabeth Shove's excellent study of everyday consumption, *Comfort, Cleanliness and Convenience* (Shove, 2003):

'OBJECTS'
Symbolic and material
qualities of technologies,
objects
[Water fittings, water]

'USERS'
Habits, practices,
expectations
[Water use habits]

'SYSTEMS'
Sociotechnical
systems, collective
conventions and
arrangements
[Big Water, Big Shit]

Three dimensions of sociotechnical co-evolution.
Adapted from Elizabeth Shove (2003) *Comfort,
Cleanliness and Convenience,* Berg. p. 48

In illustrating how a set of arrangements for resource use arise from mutually formative interactions between points of the triangle, Shove's diagram helps to pinpoint the unidirectional character of interactions studied in conventional water user research. Utilities have researched how the users perceive the utility and the quality of its 'product', but not how systems and policies have already defined users and their roles in certain limited ways. They study how users adopt particular technologies and water services, but not how experiences of these have shaped (or re-shaped) customs and expectations in everyday life. They categorise users by socio-economic and demographic indicators or psychological 'type', but do not examine how these social identities have been formed and maintained in interactions with water, household plumbing and the large-scale water and sewage infrastructures servicing them.

Shove points out how the expert-dominated 'environment-centred' discourse on conservation inquiry is principally concerned with predicted supply and demand of future resources, calculated in terms of global or national figures (2003, p. 4). People appear either as 'the aggregate consumers of socially anonymous resources', or as individuals targeted by information campaigns to help them '"see" the environment in what they do' (2003, p. 7), and make conscience-driven 'green' consumer choices for fittings that maintain current lifestyles in a somewhat more sustainable way (2003, p. 5). But these approaches, Shove argues, ignore the habits, expectations and practices of everyday resource consumption, and the social and cultural dynamics driving up resource demand, including increasingly desynchronised lifestyles in metropolitan centres (loss of siesta, weekends, 'normal' working hours), which require more climate control, lighting and telecommunications systems, so people can organise and keep up with family and work commitments (2003, p. 3). A creeping

globalisation of U.S. standards of cleanliness, defining sweat as unacceptable 'stink', is another factor leading people to wash themselves and their clothes more frequently. (Shove, 2003, Ch. 7, esp. p. 126).

Everyday Water researcher Marnie Campbell could not disguise her incredulity at how much washing one participant did each day:

> MC: Do you truly do four loads? Wow!
>
> Laura: Yes! I mean, I've got teenagers. There's a change of clothes every day, at least three times a day. Different outfits and what-have-you, and going to uni. It's constant. It's constant.

Diversification and sub-compartmentalisation of people's lives into different activities and sites requiring different styles of self-presentation escalates demand for laundry and bath water (Shove, 2003, p. 129). One of Laura's children might wear exercise gear, then have a shower in the morning before changing clothes for university, and later don a uniform (often laundered daily) for a part-time retail or food service job for the afternoon or evening, before showering again and transforming into a club creature at night. Profligate 'inconspicuous' water consumption can proceed even under conditions of severe water restrictions, which target 'conspicuous' outdoor water uses or users (lawn, garden, paving, car). Laura's oldest daughter willingly obeyed these outdoor water restrictions, but took long showers with the attitude, 'I don't care! I've got to wash myself!'. This example shows that changing one water practice (like switching from a hose to a bucket for car washing) does not impact upon other practices or challenge other norms. It indicates how cultural, generational and workplace values around self-presentation and cleanliness can be important determinants of domestic water consumption, and supports Shove's critique of resource policies that leave unquestioned normalised habits and expectations about cleanliness.

Shove argues for the relevance and necessity of social and cultural studies 'that set "the environment" aside as the main focus of attention' and instead study people's actual habits and expectations, and 'how new practices become normal' (Shove, 2003, p. 9). For significant changes in resource consumption, patterns do not arise from individual psychology or 'information about resources, but from the big, and in some cases, global swing of ordinary, routinized and taken-for-granted practice' (Shove, 2003, p. 9). For example, not long after severe water restrictions were imposed in Sydney, the etiquette of toilet flushing was widely debated on talkback radio. This kind of public discourse about normally unspoken habits around privacy, sanitation and waste may contribute more to long-term change in water use habits than do 'emergency' water restrictions.

A *sociotechnical* perspective is no substitute for psychologies detailing obstacles and enablers of personal change, or the complex negotiations between subjects and the social formations in which they are caught, but it does highlight a different pathway for change. Instead of idealistically assuming practice is a direct product of values, or that information pumped into a person changes their behaviour, this perspective suggests values could change as a result of practice, and reminds us that

practices and values can operate somewhat independently (a feature of adaptiveness as well as hypocrisy!). A 'gap' between values and practices may arise simply because the available technologies and systems are inimicable to alternate values. These notions raise questions about fostering environmental sustainability in culturally diverse societies. Do we really need a common set of 'green' or conservation values in order for change to occur, or is it enough to normalise new techniques? How much does it matter what motivates people to participate in sustainability initiatives? A particular conservation practice could be rationalised in terms of global environmental consciousness, local interests, habitual parsimony, a desire to conform with the neighbours, wanting to act like an Australian, wanting to re-institute thriftier habits of the old country, or because the kids nagged about it. The key is changing the practices: involving bodies and materials in variant everyday routines. Values and social affiliations may—or they might not—'regroup' in constellations shaped by experiences in and of the new practices, and conversations about them.[3]

Cultural and *sociotechnical* approaches like Shove's or our own are somewhat unusual in social research on water, though becoming less so (for example, Strang, 2004, Swyngedouw, 2004a, 2004b; Kaika, 2005). Yet participants in our study could readily identify water's active role in shaping social life and everyday interactions, as illustrated by the opening quote and the following comments on different ways the increasing technological mediation of water use can affect social interactions:

> I've just had the kitchen redone, and I deliberately didn't put in a dishwasher because I knew how much water a dishwasher used, and it wasn't necessary. [...] Without a dishwasher, it forced people to gather around the sink and wash up and do it together, wipe dishes together. [...] and I found it was a family—like sitting at a table eating a meal together. (Alf, Carlingford, interview)[4]

> [W]ater and the way it is distributed play a vital role in mainly the daily activities of people, eg: in urban areas water is readily available and easy to access compared to rural areas where water must be fetched from tanks, daily distilled and recycled. In poor countries people need to go to public wells and walk for distances to fetch water; in these cases fetching water will lead to more social interactions. As technology advances I believe there would be less social interactions, as accessing water will be made more and more convenient. At the moment, there is very little social interaction involved with accessing household water as there are many outlets all over the house. (Marina, Emerton, diary)

The Sociotechnical System: Big Water

Since 1950, Sydney's population has doubled, while the per capita consumption has trebled, to become one of the highest in the world. Drinking quality water is supplied for all urban uses—very little water is recycled—and much primary and secondary treated sewage is discharged into the ocean. Responding to the release of a major regional water study (HNRMF, 2004), a Sydney newspaper feature reported that 'suburbs had been built with no regard for the fact that Australia is the driest inhabited

continent on Earth' and that 'Worst of all, say experts, Sydney residents have been encouraged to believe that at the other end of their taps is an endless supply of water' (Woodford, 2004). But rather than blame the users for wasteful suburban and plumbing designs, water managers need to recognise that the fantasy of endless supply has been 'baked into' (Cockburn, 1992; Cockburn & Ormrod, 1993; Cockburn & Furst Dilic, 1994) the very systems that deliver domestic water.

'Big Water' is the name I give (a term inspired by Anderson's *Big Science*, 1982) to Australia's dominant *sociotechnical* system for municipal water supply, where a centralised public or corporatised utility pursues large scale engineering projects—dams, pipelines, central sewage treatment plants—and assumes almost complete responsibility for the supply of drinking quality water for disposal after all-purpose, one-time use. Big Water's history is confluent with the myths of heroic Australian nation-building through Big Projects like electricity grids, a nuclear reactor, or the Snowy Mountains scheme, an engineering triumph (and an ecological disaster) now mythologised as the birthplace of an Aussie multiculturalism forged in sweat and ice (see also Allon, 1994; Byrne, 1998; Smith, 2004).

In the late nineteenth and early twentieth centuries, the Irish engineer Charles Yelverton O'Connor was the quintessential modern hero—engineer with ambitious designs for Big Projects. After engineering railways in Ireland, New Zealand and Western Australia (where he also designed the Fremantle Harbour) in the 1860s–1890s, O'Connor worked on the Kalgoorlie Goldfields pipeline. Costing two-and-a-half-million pounds sterling for a state population of just 100,000, this 557 km pipeline was a utopian project to dam rivers and catchment areas around Perth and deliver water via a then 'state of the art' system of pipes and pumps to the mining industry and related towns (Casellas, 2004). The Australian Big Water dreaming was articulated at the 1903 opening ceremony by the Premier John Forrest, who declaimed:

> Future generations, I am certain, will think of us and bless us for our farseeing patriotism, and it will be said of us, as Isaiah said of old, 'they made a way in the wilderness and rivers in the desert' (Quoted by Casselas, 2004).

O'Connor, victim of public and parliamentary approbation for the pipeline project, which was widely considered 'foolhardy and a waste of public money', infamously ended his own life less than a year before the pipeline's completion, leaving in his suicide note instructions for finishing one of the weirs feeding the pipeline.

For the history of Big Water is also the history of big dams, a fad in the nineteenth century tradition of the Grand Project that peaked in the mid-twentieth century in Australia, as well as abroad, where, as part of aid and development programmes, they were often spectacular concretisations of colonial and/or dependency relations. Like many other suburban Australians, as a child in the 1960s I was taken on family excursions and group picnics to various dams in catchments beyond the city's periphery (in my case, Perth, Western Australia). Dams are tremendous feats of technoscience and engineering and grand poetic expressions of human power and will. The dam's very giganticism (Heidegger, 1977, p. 135),

and the huge potential force of the dammed up water behind it, invite awed contemplation of technical expertise embodied and exalted to something like a force of god or nature: a technological sublime (Marx, 1965; Nye, 1994, esp. pp. 136–142). The dam and its attendant aqueducts, pipelines, treatments plants and so on, through to the household tap that gushes water on demand, is an assemblage that exemplifies the epochal modern project of technology and instrumental rationality, as Heidegger delineates in his essay on 'The Question Concerning Technology' (1977). A hydroelectric scheme on the Rhine is one example of how part of the world, such as a flow of water, can be turned into a calculable quantity of resource, such as hydroelectricity (Heidegger, 1977, p. 16) and becomes part of the *Bestand*, the standing-reserve or 'resource well' (Zimmerman, 1990), available for mobilisation by complex and large-scale energy, transport, communications and delivery systems, and 'switched about ever anew', to serve an ever more extended logic of supply (Sofia, 2000).

Nowadays, big dams have lost much of their allure, as they are acknowledged to have obliterated downstream riverine, estuarine and coastal lives and human livelihoods (Roy, 2001; Laurie, 2004). The *Water and Sydney's Future* report (HNRMF, 2004) is one of many studies calling for dammed water to be allowed to flush river systems to support life downstream. Ensuring environmental flows to help restore health in the major Murray–Darling river system was an important part of the 2004 National Water Agreement, which, following calls from the Wentworth Group of Concerned Scientists (2004), granted the river status as a licensee entitled to its own water allocation.

Many still imagine Big Water to have a future as grand as its past, as new ideas for heroic water supply projects bubble up, and old ones regularly recycled. Gigantic energy-hungry desalination plants are envisaged for both the dry state of Western Australia and for thirsty New South Wales. These would supply a small percentage of urban water while producing greenhouse emissions that add to the global warming, producing drier climates and water shortages in many parts of Australia. Opponents of the giant plants argue the strain on existing drinking water supply could be more effectively reduced by further lowering water demand, and recycling water—popular options not currently supported by most states or the current federal government. The 2004 West Australian state election campaign was dominated by water issues, including the controversial proposal for a giant pipeline, or a cheaper membrane-covered canal to channel water down from the state's far north to the metropolitan area over 1,000 km away (Armstrong, 2004). The ghost of C. Y. O'Connor still walks. Entrenched in Australian media habits of dismissing calls for environmental caution as products of a putative hippy anti-growth movement, West Australian journalist Andre Malan (2004) diagnoses opposition to the Kimberley–Perth pipeline as coming from 'ready-made moaners . . . on permanent standby to pick holes in every new project', and symptomatic of the widespread 'fear that West Australians may one day start to think big again'. This 'ambitious project', Malan claims, 'is not half as daunting' as 'building C. Y. O'Connor's pipeline', and moreover:

> Such a grand-scale project would do more than simply deliver water to Perth. *It would help the process of nation building* by providing a common sense of purpose, and could also be used to open up new areas of the state for agriculture and other development. (My emphasis)

Of course, it is no news to cultural studies scholars that Big Water projects like dams and pipelines are part of colonial and nation-building processes and ideologies, often destined to serve mainly business interests. But what is worth noting is that whilst discourses of nation-building, heroic 'pluck' and so on are prevalent in the stages from circulating proposals to officially opening the project, once the systems are integrated into everyday use, the big dreams retreat into the seemingly neutral and taken-for-granted background. Fantasies of abundant water in the midst of scarcity stop being topics of wonder and discourse, and are literally 'black-boxed' into unobtrusive metropolitan systems, standard domestic water fittings, and daily household routines. The Biblical dream of rivers flowing in the desert becomes the banality of the suburban yard, whose thirsty plants and lawns pay colonial homage to the English 'gentleman's park and garden' (Giblett, 2004; Mulcock & Trigger, 2004). Management and upkeep of the completed work is turned over to a bureaucracy overseeing a technical and engineering corps, in a socio-technical system that is supposedly (but given its history, never in actuality) free of the political and ideological agendas that rationalised the Big Water dreaming in the first place.

Another side of Big Water, or, depending on particular municipal arrangements, its close relative, is 'Big Shit'. In an analysis partly convergent with the ideas elaborated here, though with more attention to issues of bodies, ethics, obligation, and citizenship in a city that notoriously pumped out untreated sewage just offshore from its iconic Bondi Beach, Gay Hawkins examines the socio-technical, political and cultural aspects of how modern urban societies manage human waste while reshaping norms of cleanliness and the aesthetics and ethics of social life (Hawkins, 2001, 2004). She notes that the private bathroom was only made possible by a whole 'culture of engineering and plumbing, massive infrastructural plants and sewerage treatment works'[5], and that:

> Plumbing has altered the disciplines of bodies, the ways we manage and map them, experience them as clean. It has been at the heart of shifting discourses of cleanliness and definitions of personal purity; what we might call the flowering of the 'hygienic imagination'. It has also been fundamental to distancing us from any direct role in managing our own waste. Mass plumbing made distance and rapid separation from shit widely accessible. (Hawkins, 2004, p. 9)

Recalling Shove's co-evolutionary triangle in the light of these accounts of 'Big Water' and 'Big Shit', we can appreciate how Hawkins' analysis illuminates aspects of co-evolution between large-scale systems, technologies and user expectations. Massive public infrastructures and almost invisible domestic technologies support discourses and practices of hygiene and cleanliness as part of users' self-presentation as metropolitan citizens, but at the same time, these infrastructures and fittings flush away users' responsibilities for water's post-supply fate.

Use, Responsibility and Blame

Almost all responsibility for managing water supply and protecting us from encountering (or worse, re-encountering (Hawkins, 2004)) our waste has been delegated to—or usurped by—the Big Water/Big Shit systems. Reliant on these infrastructures for managing supply and waste, users are left with the remnant responsibilities of simply *using* this water to maintain desirable standards of cleanliness about their home and person, and keeping alive the nation-building Big Water dream in their backyard oasis.

The household water meter is emblematic of this distribution of responsibility in the system–user relationship. Designed to a template from the steam age, with dials and numbers housed in a casing affixed to the main water inlet somewhere outside of the house, it reports on water usage through an interface, using units most householders find incomprehensible. Indeed, the device was never intended to provide householders meaningful information about their everyday water consumption, but rather, to be read periodically by a technician who records the information for the utility's billing and statistics departments. More useful to users would be separate meters for indoor and outdoor water, low-cost legible flow meters in the kitchen, bathroom and laundry, and charts and guides—rather like calorie counters for weight loss programmes—listing how much water is consumed for different tasks and by different types of fittings and appliances. Following McLuhan's dictum that the message of a medium (or technology) is the 'change in scale, pace and pattern' it introduces into human affairs (McLuhan, 1964, Ch. 1), the message of the water meter is about presenting water in its taken-for-granted abundance as a 'utility', part of the inconspicuous background of urban life. In exchange for being inextricably entangled with Big Water via the meter, the meter-reader, water bills, pipes and drains, users receive the security and abundance of an ever-flowing supply, the comfort of an all-accepting drain, and the convenience doing nothing to maintain water supply except pay the water bills. The water meter, that quietly clicking sentinel in the front yard, reminds users that responsibility for water supply and monitoring of use has already been delegated to Big Water.

Big Water is not keen to shed the responsibility it so heroically shouldered. The more water people save, the less money a corporatised utility makes from selling it. Demand management strategies such as new systems for waste water reclamation and recycling would, if pursued, shift the balance of responsibilities away from Big Water's centralised systems and disperse it to businesses, communities and households seeking medium and small-scale sustainable solutions.[6] In Sydney, the water utility's monopoly over effluent has been legally challenged by a company wanting to reclaim effluent the utility discharges at sea, and treat it in a low-water, neighbourhood sewerage treatment and water recycling system.[7] Big Water seeks to retain its historical monopoly on waste, and resists the emergence of new 'meso-water' enterprises, but, as the last part of this paper recounts, it cannot stop 'small water' users from reclaiming water before it is lost down the sewer.

Drought, water shortages, and longer term climate change are perturbing the conventional distribution of responsibilities between Big Water, 'meso-water', and 'small water' users in Australia, though the character of these changes varies across states and regions.[8] In Sydney, the state government responded to ongoing lack of rainfall in catchment areas and historically low levels of water stored in dams by declaring a 'water crisis' and imposing restrictions on domestic water users, in particular, the 'non-human' users of gardens, cars and paving (although government and business users were not subject to restrictions.) Although Big Water's infrastructure was created to supply drinking quality water to meet demands for cleanliness, flushing toilets, and green suburbs, in a 'water crisis', domestic users are suddenly saddled with blame for this situation. They are castigated for being enthralled by the fantasy of endless supply embodied in the water faucet; criticised for lacking detailed knowledge of water used in different household processes (not that this information is easily available), and expected to make sacrifices in the amenity of their yards—quintessential icons of Australian suburbia—as their cherished gardens died.

Sydney's water restrictions are a demand management instrument that works by mandatory and enforceable prohibitions on certain uses, users, techniques, technologies, and times of use. Fines are imposed for infractions, 'water police' cruise suburbs, and neighbours are encouraged to report on each other. Although restrictions explicitly prohibit certain *uses*, they also implicitly script roles and identities for *users*. Users are thoughtless water-wasters, incapable of making choices about what uses to economise on, and need regular reminders of penalties. Users live in isolated households, not communities. Socially and culturally undifferentiated, users are all subject to the same restrictions put on them, irrespective of whether they have an outdoor area, or what they use it for. All users work at times and shifts that allow them to water the garden on the permitted days and times, when their gardens also happen to need watering. (Or, users are wealthy enough to install permissible underground automatic drip irrigation systems.) Users have no feelings worth considering when their gardens die or their cars get filthy. However, they are free—like Laura's daughter—to consume as much water as they wish indoors to maintain personal and socially expected standards of cleanliness.

Several months into water restrictions, the utility ran some TV ads giving statistics on how much water all of Sydney would save if people did one less load of washing a week, or showered for one minute less a day. These ads were unusual in recognising the hypertrophied standards of cleanliness that ratchet up water demand, but they remained anchored in the typical environment-centred discourses of conservation. Using big numbers applying to the whole 'catchment community', not to a wash cycle or a proportion of weekly household use, and without a human or a water fitting in sight, they presented a predominant image of a screen full of clear moving water— H_2O, the socially anonymous resource.[9]

The *Water and Sydney's Future* report (HNRMF, 2004) released during the height of the 'water crisis' strongly dis-endorsed further Big Water projects of new dams and pipelines, and made the clear point that 'the cheapest and most lasting method'

of reducing the need for piping water from distant catchments is 'the reduction of consumption through demand management' (HNRMF, 2004, p. x). Demand management options included pricing, regulatory and technical measures, such as penalties for wastage, restrictions, new urban building codes, rebates for water efficient appliances and retrofits, water recycling and onsite treatment systems. Of these, water restrictions are the quickest, harshest, and cheapest form of demand management, since blaming the user requires no change in the technical, social or political aspects of water management, and no reallocation of public funds—just a propaganda campaign to effect a shift in emphasis in the users' role from non-responsible individual customers, to an obedient or punishable population of citizens.

Without mentioning how they might proceed, the report calls for immediate implementation of 'broad and targeted education programs' (2004, p. x; p. 60) that 'emphasise the scarcity and true value of water and methods for saving water'. This is another user-blaming tactic where experts tell users what broad environmental values they should hold, but avoid dealing with both the material barriers to change posed by the current designs of technologies and systems, and the cultural barriers of customs and habits. By contrast, people we surveyed in Western Sydney were generally not interested in environmentalist abstractions, but sought practical knowledge of how much water different appliances used, where to get hold of the technologies they'd heard about (previously known only to alternative technology and self-sufficiency advocates), what would best suit their household, and financial and technical assistance to acquire them.

Resistance at the Saver-unfriendly Interface

The *Everyday Water* fieldwork commenced as domestic users were adapting to stringent new restrictions. We found most people were interested in—and a few obsessive about—saving water. Just over half the participants were already attempting recycling of shower, bath and laundry water by do-it-yourself methods with buckets and hoses, but they were not yet prepared to outlay money for new water conservation technologies.

Not all householders are in thrall of the illusion of endless supply, especially not those who have lived in or visited rural Australia, or grew up or travelled in countries where water is scarce:

> [On the farm] they would have to think about turning on the tap and using the tap water. Here, it's just automatic. You turn the tap on, the water's there. (Amy, South Penrith, interview).

Significantly, almost all of the diarists and interviewees undertaking DIY recycling efforts had rural or overseas experience, and a positive statistical correlation was found between recycling efforts and childhood farm experiences amongst questionnaire respondents. Such experiences could be cultural resources in support of urban water innovation.

The tap and the drain, with their attendant pipes, are 'user-friendly' water interfaces designed to fit in unobtrusively into the house to permit minimum responsibility and

maximum convenience for users. In many bathrooms, the shower is in a separate stall with an open and unpluggable drain. Such fittings epitomise the technological and socio-technical arrangements delegating practically all responsibility to the Big Water and Big Shit systems. These 'user-friendly' interfaces are 'saver-unfriendly', designed for using and wasting water, not for conserving, reclaiming or reusing it.

When water users subvert the 'baked in' user scripts and attempt to become water savers and recyclers—if only to 'save the environment' of their beloved gardens—the 'saver-unfriendliness' of standard fittings is all too apparent. The drain becomes the enemy of the DIY recycler, requiring small-scale heroics to prevent used but fairly clean ('grey') water from flowing down it. A number of people were very interested in ways to collect shower, bath, and laundry water, and several diarists photographed bathrooms with buckets in them. Participant Kit explains his system:

> So, I shower with two buckets in the shower, so I generate two buckets of water and my wife will generally generate one or one and a half, something like that. So that gets carted out and put round trees and that sort of thing. (Kit, Glenbrook, interview)

A more convenient alternative solution to buckets would be to have this water collected and diverted into a storage tank for reuse elsewhere. One water conscious couple, Geoff and Jean of Riverstone, felt they could not do much more to save water unless they had some different technology:

> . . . for instance, if we had a storage tank that we could put grey water into, and then a pressure pump to use it for things like washing the car, or something like that, instead of using the hose on occasions when we have to wash the car, or hose down garden furniture or whatever. (Jean, Riverstone, interview)

An estimated 17% of Sydney's household water is used in the laundry—likely more in households with young children or teenagers and machines churning through over ten loads of washing weekly. Taking water in through the tap and pumping it out down the drain without any human intervention, automatic washing machines have progressively reduced the scope for humans to interrupt their cycles (Shove, 2003, pp. 143–144). These convenient, labour-saving and user-friendly appliances become inconvenient, labour- and time-intensive, saver-unfriendly obstacles to those who would seek to reclaim and reuse their rinse water.

Laundry water is highly 'socialised', and serves standards of contemporary cleanliness through a multi-industry assemblage (fabrics, powders, machines, media). But diarists' maps of interactions with or near water revealed the laundry as an interactive desert. Exceptions were the few old-fashioned launderers with complicated washing rituals, and the recyclers, who sometimes formed bucket brigades to capture washing machine water. Participants envisaged 'an easy attachment to connect a hose to washing machine waste water hose to lead outside and water garden', but the solution was not always simple. Alf, a retiree, found his own DIY solution involving a hose didn't work, because it siphoned out water before the machine could fill up. He had to stand there connecting and disconnecting it at different parts of the cycle in a set-up that was highly

inconvenient, in the Shovian sense of depriving the user of control over their movements in space and time: 'I can't stand there for 25 minutes waiting to catch each one . . .'. He had heard on talkback radio about 'a special suction-type hose that you can fit on your washing machine' available at a shop in a distant northern suburb that sounded like just what he needed, 'But I can't find out who makes it or where to buy it [the special hose] from.'

Buckets are a temporary and awkward solution to DIY recycling that only work for those with the capacity to lug them around:

> And I am not pumping water into buckets. I have a friend who has nine buckets in her laundry and she buckets all her water out of her washing machine and puts it on her plants. [. . .] But [if] there is a device that you can get, and if you were to put that in and the government were to give you a reduction on your rates, that wouldn't be such a bad idea. (Heather, Toongabbie, interview)

The theme of wanting government help or incentives to acquire more convenient water-saving technologies was widely shared:

> MC: . . . what do you think would make it easier for you to save water?
> Jan: Well, I think if there were some systems . . . put in place by the councils or whatever. You know, the recycled water that you can use externally, or some sort of system that you pay to have put in to get your washing machine water out and stuff like that. (Jan, Mt Pleasant, interview)

The inconvenience encountered when resisting the user scripts built into saver-unfriendly technologies enables people to specify with precision what functions they need new technologies to perform, even without knowing details of those technologies or where to obtain them. But most people shared Heather and Jan's expectations that governments or water authorities ought to provide financial and technical assistance to install new conservation technologies. Although many Western Sydney residents have home entertainment units costing significantly more than rainwater tanks or recycling systems, most are currently unwilling to pay up-front for water technologies to replace or add to working fittings. The official rhetoric of crisis encourages temporary coping strategies, not investment strategies. Householders tend to perceive domestic water fittings as direct connections to large-scale infrastructures, and likewise see water-saving innovations at home as part of a more general water management strategy, for which governments and utilities are conventionally responsible. While this view is partly fostered by the limited rebates available on some domestic retro-fittings like low-flow showerheads, more generally, governments and water authorities define 'infrastructure' as everything except the pipes and fittings between the water meter and the sewerage main, for which householders are deemed financially responsible. To break this deadlock, the systems would need to accommodate users' expectations, and implement finance schemes (such as micro-credit, more subsidies, and time payment) so users could defray initial costs. But this implies changing the scope and definition of infrastructure from large-scale heroics to including small-scale solutions for which both users and utilities would be co-responsible.

Conclusion

The current water crisis in Australia is not just a crisis of low rainfall and climate change, but also a cultural and socio-technical crisis where technologies, natures and cultures are all in flux. Stress is placed on all points of the co-evolutionary triangle (Shove, 2003, p. 48), especially the humble domestic users, who are blamed for living with systems and technologies designed to deliver the sublime illusion of endless supply, and who are expected to shoulder moral, financial and practical responsibility for saving water, despite over a century of governments and utilities usurping that responsibility in the name of modernity and progress.

The idealist assumption of the 'environment-centred' approach is that water use practices will change simply by educating or persuading users about the value of water, as though they were ignorant of it. But attaining sustainability goals will need more than campaigns to re-engineer user psychologies, or promote technological innovations that provide the same services with slightly less environmental damage. Changes are needed in relations between all three dimensions of the co-evolutionary triangle: the large scale socio-technical systems, the objects (water, and water technologies), and the habits and expectations of users. Ultimately this involves major shifts in accustomed ways of life and neighbourhood aesthetics, a reversal of some of the modern trajectories 'baked in' to our existing water systems, and redefinitions of what counts as water infrastructure and the distinctions between private use and public responsibility.

Workers in industries for watering technologies are losing their jobs. A national current affairs programme shows a museum curator in a hardware store buying the iconic three-armed orange 'Canberra Sprinkler' as a future historical artefact (McEwen, 2004). By the time we city-dwelling Australians have filled in the pools, ripped up the lawns, waited years for the native plants to inch their way up, installed our grey water recycling system, laid down the drip irrigation and rainwater storage tanks, bladders or walls, installed the solar-powered pumps, and perhaps a composting toilet, and are regular attendees at our local water and sewerage management committee, stopping by afterwards for a soak in the neighbourhood hot tub (since we may no longer have our own) . . . well, by then we will be part of a quite different everyday water culture, a different neighbourhood aesthetic, and a very different way of life. One-size-fits-all water restrictions and top-down education programmes about water scarcity are not enough to foster such radical degrees of socio-technical change, or ease disruptions and rearrangements of users' daily household practices around water, while managing potential disharmony, conflict of water values and practices, senses of loss, dislocation and grief for ways of life passing that are felt as our former techniques of water use become historical curiosities, and new kinds of water services and social interactions around these arise in their place. Applied cultural research could well play a very useful role in facilitating these cultural innovations towards water sustainability.

Notes

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[2] Such terms were in circulation at the conference *Taking Nature Seriously* at the University of Oregon, February 25–28, 2001, where Donna Haraway, Don Ihde and Andrew Pickering were keynotes. Debates among these individuals and Bruno Latour on details of socio-technical approaches are explored in Ihde & Selinger (2003) and Ihde (2002). For other terms describing socio-technical hybridity see also Haraway (1985, 1991, 1997) and Mike Michael (2000); for geographers on naturecultures, see Harrison *et al.* (2004).

[3] Thanks to discussions with Roger Attwater about 'communities of practice', to help me clarify the points in this paragraph.

[4] Of the 52% of *Everyday Water* questionnaire respondents who did not have a dishwasher, one third gave the reason that they 'preferred family wash-up', compared to a quarter specifying cost, and a fifth each water consumption and lack of space.

[5] Hawkins cites Dominique Laporte's *History of Shit* (MIT Press, 2000), Mary Poovey's *Making a Social Body* (University of Chicago Press, 1995) and Osborne's 'Security and vitality: drains, liberalism and power in the nineteenth century' (in *Foucault and Political Reason*, eds A. Barry, T. Osborne & N. Rose, University of Chicago Press).

[6] There are various models of how responsibility might be redistributed. In one 'hybrid' model (Davey, 2002, p. 7), 'responsibility for the [onsite wastewater] system performance is shifted from the individual user to the utility providers or accredited and regulated service providers' and the ideal situation is one where the decentralised system is 'managed in such a way as to be invisible to the user', as with present centralised sewage systems.

[7] This story was covered by Australian Broadcasting Corporation in 'City Limits', *Four Corners*, broadcast 18 October, 2004. Similarly in Western Australia, a company, Agritech Smartwater, accuses the state government and water utility of stonewalling their detailed proposal to build a cheaper, less environmentally damaging and more energy-efficient alternative to an ocean water desalination plant; available at: http://www.agritechsmartwater.com

[8] For example, the largely desert state of South Australia recycles a much higher percentage (19%) of its urban water compared to other states, while Western Australia's Water Corporation reports it has undergone a 'paradigm shift' in its approach to water management and has imposed less punitive water restrictions than in Sydney, encouraging diverse strategies for water saving, including offering rebates on domestic grey water recycling systems (Bowmer, 2004, pp. 30–33).

[9] 'Go slow on the H_2O' is Sydney Water Corporation's standard slogan for water restrictions campaigns, but other than those who quoted this, the only person who referred to water by its 'socially anonymous' name 'H_2O' was a diarist with a professional water background, judging by her well-informed four page disquisition outlining key issues and an alternative water plan for the Sydney catchment area.

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