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CHANGING COMMUNITY ATTITUDES TO POTABLE RE-USE IN SOUTH-EAST QUEENSLAND

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ABSTRACT

The climate of Australia is characterised by extremes. Record floods interrupt record droughts at irregular intervals so that water is unevenly distributed. The traditional way of managing water resources by dam storages is no longer acceptable. Community consultation in SE Queensland has shown that a majority of people object to the disposal of sewage effluent into our environmentally sensitive waterways and favour re-use. The concept of potable re-use has largely been community driven and is now being seriously considered. An on-going information and awareness program is being implemented. The Queensland State Government is forming a Water Re-use Strategy and a policy on potable re-use, the support for which is increasing. © 1999 Published by Elsevier Science Ltd on behalf of the IAWQ. All rights reserved

KEYWORDS

Potable re-use; need; constraints; consultation; education.

INTRODUCTION

The climate of Australia is characterised by extremes. Record floods interrupt record droughts at irregular, unpredictable intervals so that the availability of water is unevenly distributed both in space and time. Southeast Queensland is one of the wetter areas of Australia. A ridge of mountains running north south behind the coastal strip is responsible for causing much of the precipitation and also the rain shadow that exists to the west. The rainfall pattern is highly variable; the average rainfall has little meaning. Generally the rain falls in the summer, with floods often associated with cyclones - but floods have been experienced at other times of the year too. The driest period is usually in spring, September-October-November, when we look for thunderstorms to break up long periods without rain.

The town of Tewantin, in Noosa Shire, where records have been kept for more than 100 years, is close to the coast and therefore not subject to such extremes of climate as places further inland. But it still has considerable variation; for example, the average total rainfall for the year is 1699mm but the range is from 511 mm in 1902 to 3,062 in 1898. The average monthly rainfall at Tewantin for February (a 'wet' month) is 234 mm; the highest recorded for the month, in 1993, was 1,229 mm; the lowest, in 1983, was just 20 mm.

The traditional strategy to manage this difficult climate has been to build dam storages. However, building new dams is becoming ever more expensive as the easier and closer sites have been exploited. The remaining sites are becoming increasingly populated and developed; community resistance to dams and

interbasin transfers is high. We are also facing up to the ironic situation where the hinterland valleys being dammed have a significantly lower rainfall than the coastal areas they are serving.

The problem of a shortage of water is at one end of the water management pipeline in SE Queensland; pollution of our sensitive waterways is at the other.

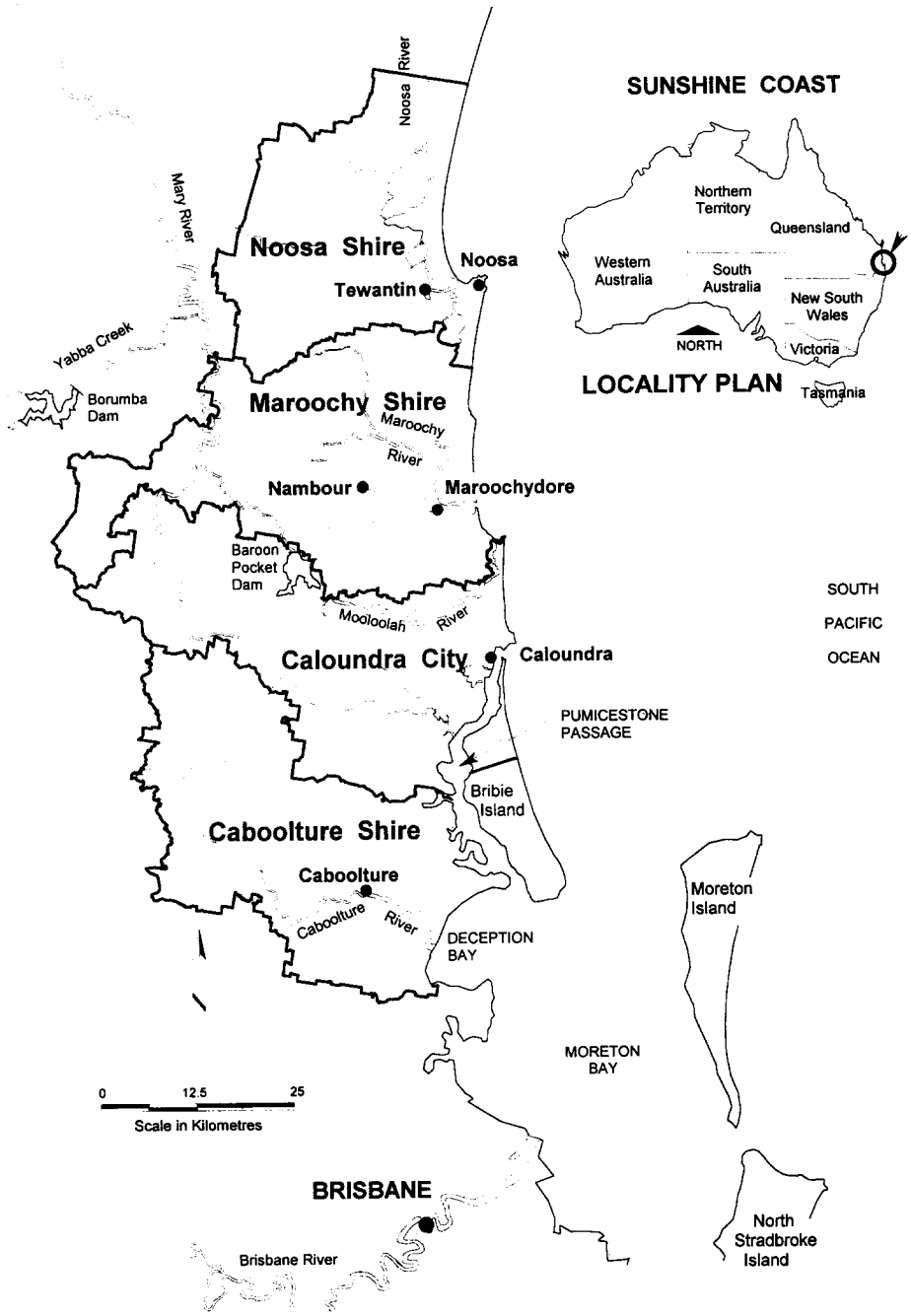

Figure 1. Queensland Sunshine Coast.

A large part of the coastline of SE Queensland, such as Morton Bay, Wide Bay, Pummicestone Passage, is confined and environmentally highly sensitive. These areas account for much of our fish-breeding habitat and their condition is already causing concern. Many of the seagrass beds have disappeared together with the dugongs that graze them. The well-being of the dugong population is used as a measure of the health of our coastal waters.

Although agricultural run-off is responsible for some of the environmental damage, the contribution of the urban centres is significant. The discharge of effluent to a waterway, as well as being looked upon with disfavour by the community, is discouraged by the imposition of increasingly strict discharge licenses.

RE-USE AS A SOLUTION TO WATER MANAGEMENT PROBLEMS

The strong opposition by the community of the Sunshine Coast to disposal of effluent into a waterway is fueled by highly publicised examples of inadequately treated sewage being discharged through ocean outfalls; the community regards ocean disposal as even more unacceptable than disposal to a river. They are in favour of re-use but not generally sufficiently informed to be able to decide how it should be done.

There is limited opportunity for industrial re-use in the area. There is little heavy industry that could potentially use recycled water.

The climate, nature of the soils and crops grown, availability of suitable land and its cost, and the cost of transportation mean that land disposal or re-use is limited to a small number of opportunities which have little impact on solving either of the problems. Most of these have already been exploited. There is also a concern that the sugar cane industry in areas close to urban development where the effluent is generated may not be viable in the long term. The cane fields might one-day be growing houses instead and the land for effluent disposal would no longer be available.

Because of the cost of headworks and the variability of the climate, dual reticulation is also seen to have limited application.

Returning highly treated effluent to the water supply could however solve both of the water management problems.

THE ACCEPTANCE OF POTABLE RE-USE IS COMMUNITY DRIVEN.

Wastewater management studies in various shires in SE Queensland have had varying community consultation components, from none at all to well-conducted, open studies in which there were no preconceived ideas as to the outcomes. Some previous consultations of the DID (Decide, Inform, Defend) variety had been undertaken in the region and had resulted in skepticism and hostility in the community so that later studies have been carefully designed to ensure that the community's voice has been heard, its suggestions investigated and its concerns addressed.

The demand that potable re-use be considered in the area first arose in 1993 as a result of an investigation into new dam sites on the Mary River which flows northward in a valley behind the coast. The project, which was to provide water for coastal development, raised considerable hostility in the community who peered over the ridge to see their fellow citizens in the neighbouring catchment wasting much of their water and using the rest to pollute the waterways.

Their demand that re-use should be considered seriously fell on deaf ears and government authorities used many excuses to avoid taking the issue further – 'it's too expensive'; 'there are no guidelines', 'the technology is new and unproven', 'they would be sued', 'it would be a health risk' and, most frequently, 'people won't accept it'.

The Government was accused of hypocrisy. It clung to a belief in the 'Miracle Mile' - sewage effluent, however minimally treated which has been in a river, for however short a time and regardless of the amount of diluting flow (if any) in the river, is considered suitable for turning into drinking water because it has

traveled the Miracle Mile. Incongruously, highly treated effluent, that has had the benefit of advanced modern technology and sophisticated monitoring, is not.

This attitude did not give the community the impression that their water managers had confidence in their own technology.

This initial investigation into water resources created a great deal of interest and energy that resulted in some of the community becoming well informed. Conservation and community group initiatives to provide information and education have subsequently played an important role in some of the consultations.

COMMUNITY CONSULTATION IN NOOSA

A well-run and open consultation was conducted in 1993 in Noosa, a 'fashionable' tourist destination, as the Council's sewage treatment plant was nearing its design capacity (Playford *et al.*, 1994). The consultation attracted a lot of attention that was heightened further by some transport problems over Christmas (when many tourists arrive in Noosa). This resulted the sewage spills into the river becoming national headline news and a new word to describe sewage which doesn't quite make it to the treatment plant, 'noosage'.

Many people responded to information days organised by the local environment council and community groups and this resulted in a significant section of the community becoming well-informed and accepting potable re-use. The community's preferred options were surveyed by the community consultants at a public workshop and by questionnaire (see appendix). The results showed clearly that the people who had attended information days and public workshops and were more informed could accept a wider range of options than those who had been informed by the questionnaire could. It was also apparent that some people would never accept potable re-use.

	Public Meeting	Questionnaire
*Indirect potable re-use	0%	7%
Land disposal	11%	22%
**Disposal to Burgess Creek	33%	32%
Direct potable re-use	56%	39%

* Indirect potable re-use (returning highly treated effluent to the supply dam) was not considered to be an option by the consultants because of the highly eutrophic condition of the dam. Subsequently they have decided that our dams are so eutrophic that the addition of nutrient-reduced effluent would have insignificant impact

** Current practice

The Council rejected the option of potable re-use by one vote. Some of the decision-makers were uninformed and the debate in Council revealed an embarrassing lack of knowledge and illogical thinking.

A NEGATIVE EXPERIENCE IN CABOOLTURE

Caboolture Shire Council also needed to upgrade its sewage treatment plant, but unlike Noosa Shire Council, it did not undertake any community consultation (Kinhill, Metcalf & Eddy 1996).

The present plant discharges into the Caboolture River which in turn discharges into the shallow, confined and environmentally sensitive, Deception Bay. The plant is situated quite close to the water treatment plant that treats water from a weir on the river, just downstream of the town.

A strategy was suggested to treat the sewage to potable standard. While it was being monitored it would be discharged to the river but when the council and community were confident with its quality, it would be mixed into the weir. The final plan to pipe it directly to the treatment plant would resolve the anomaly of the clean water becoming polluted before it was cleaned up again. The scheme had the advantages that it augmented the water supply and protected the river and bay from pollution.

It was economically viable, when compared to the other option of putting in a 8 km pipeline to take the less-well-treated effluent to the tidal zone of the river (which still left some environmental doubts) as government subsidies would be available for this option, but not for the pipeline.

The lack of a consultation in Caboolture Shire resulted in a strong reaction against potable re-use by one Councillor and a small, but vocal, minority of the residents, and the downfall of the Mayor. A subsequent consultation, which was really a marketing exercise, did not succeed in changing opinions, although it revealed that the number of people involved was very small.

The water renewal plant is being constructed but it has been renamed the Environmental Protection Plant. It will be producing potable quality water which will discharged to the river.

THE CALOUNDRA/MAROOCHY STUDY

The most recent study was a joint exercise between Maroochy Shire and Caloundra City Councils. The study was undertaken to form a strategy to manage the sewage from its rapidly increasing population which is expected to rise from 67,000 to 280,000 in Caloundra and from 110,000 to 420,000 in Maroochy in the next fifty years.

The study was open – it was managed by a steering committee that included representatives from the Environment Council, the Development Industry and Government Agencies as well as Councillors and Council staff. Importantly, there was no suggestion that a preferred outcome had been identified.

A community consultation (The Rowland Company, 1996) was run concurrently with the engineers' investigations. In Phase 1 a broad perspective of options was considered and these were short listed in Phase 2 so that the engineers could concentrate on those which were more appropriate to the area and its climate. The short-listed options included disposal to a waterway, which, although not favoured by the community, is the present disposal method, and potable re-use. Discharge to land was not included as it was found to be impractical.

The community consultation part of the study involved wide publicity, over 60 focus group workshops and a statistically valid telephone survey. More than 4000 people were involved in the study in some way.

The outcome of the study was a clear message that the majority of the community that had participated in the study considered the option of re-use required further serious investigation. Even more clear was the message that they were in favour of potable re-use only providing that it could be clearly demonstrated that it would be safe and that no adverse health impacts would arise. Both Councils simultaneously and unanimously adopted a strategy to continue to investigate the option and, importantly, to support a community education program. A final decision as to whether to proceed with potable re-use or to build another dam will not be required until 2003.

There has been mainly a positive response to the announcement but also some negative feedback - this from a few, but again vocal, members of the community some of whom have political aspirations and see the issue as being ideal for an election campaign platform.

FURTHER DEVELOPMENTS

Since this decision by the two Councils there has been a great deal of activity.

Water Education Project

The Australian Water & Wastewater Association, in partnership with the Sunshine Coast Environment Council, has received funding from the Federal Government to develop a Water Education Program. The program will be trying to address the big gap in our knowledge of the water cycle, that of wastewater, what is in it, how it can be treated and monitored, and how reliable are these techniques. Its approach will not be to `market' the concept of potable re-use but rather to provide people with knowledge and understanding so

that they have an informed opinion. Much of the material for the program will be developed from the AWWA published book, Water Quality from Wastewater to Drinking Water, to even Better (and the Dilemma of Water Quandary) (Simpson and Oliver, 1996).

The program will avoid describing the quality of effluent by the amount of treatment it has received; its quality is what matters, not its history. It will be aimed at all ages and groups in the community and recognise all learning styles. Only a small proportion of residents are sufficiently motivated to come to meetings; the others have to be reached in more subtle ways. Two of the problems that will need to be addressed are the reluctance of water managers to consult with the community about future water supplies (which results in the community being unaware of the need for re-use), and some gaps in our knowledge of some of the health issues.

It is recognised that terminology is of critical importance; the water industry seems to have a penchant for negative terminology. The word 'disposal' has almost gone from our vocabulary (we now discharge water if we absolutely can't reuse it), wastewater re-use is seriously under threat (it should be just water re-use), and the use of words to describe water re-use, such as inadvertent and planned, indirect and direct re-use, are being questioned. The community input into the way we use words relating to water is important to enable a lateral look at concepts that have been taken for granted by the industry since its inception.

Further funding has been received from the Caloundra/Maroochy Strategic Wastewater Management Study; this will be used to trial and deliver the program in the two affected shires.

Negotiations are also underway to attract some funding for a demonstration plant. It is envisaged that this will be relatively small so that it can be transported to various sites and used by both Councils. As well as being an education tool it will be used to identify the optimum treatment process.

Waste Recycling Strategy

At the same time the State Government has a new initiative called Queensland Water Recycling Strategy (Queensland Department of Natural Resources, 1998). Its name immediately caused cries protest – Water Re-use Strategy has been suggested instead. It involves an Inter-Departmental Steering Committee, four Technical Advisory Groups (TAGs) and an Independent Reference Panel. Altogether more than 70 people are directly involved.

The strategy, which will be developed over three years, is aimed at maximising the use of urban, industrial and rural effluent. It will be looking at all opportunities for water re-use and the use of stormwater because it is recognised that 'greater use of this resource has the potential to relieve pressure on the natural environment and support opportunities for increased economic development.'

CONCLUSION

Expanding population and limited availability of water supplies in SE Queensland has promoted a serious investigation into the feasibility and acceptability of potable re-use. The community has indicated that it is prepared to consider potable re-use provided that it can be demonstrated that the technology is safe and reliable and that their health will not in any way be compromised.

An education program is being developed which will be focussed on water quality in order to overcome the negative image generated by the terminology of the water industry. It will enable the community to have an informed opinion based on sound knowledge.

It appears that the greatest hurdle to the acceptance of potable re-use will be from those professional members of the industry who have a negative attitude to re-use. If the professionals have doubts about the technology and their ability to make it work, it will be difficult for the community to have the necessary confidence.

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APPENDIX 1. NOOSA COASTAL SEWERAGE STRATEGY – NOVEMBER 1994

Option A: Disposal of clean effluent to Burgess Creek

- New treatment plant with biological nutrient removal, filtration and disinfection
- Disposal to Burgess Creek following treatment equal to best in Australia

Public Health

- Disinfection by ultraviolet will prevent bacteria and viruses entering creek and surf

Environment

- Nutrient concentrations in the creek will decrease
- Nil or minimal impact on ocean
- Not reusing as per options C and D will increase need for dam(s) on the Mary River

Cost

- Lowest capital and operating costs because
- least treatment processes
- No increase in current charge is expected.

Option B: Pasture/crop irrigation with clean effluent

- Treatment as per Option A
- Pipe to 1,500 hectares of land for pasture/crop irrigation
- Disposal to Burgess Creek in wet weather

Public Health

- Sufficient disinfection provided to protect against public health risks

Environment

- Overwatering of poor soil could cause salinity

Costs

- High pumping costs
- Costs partly offset from pasture/crop income
- Net increase in current charge of around $130 p.a.

Option C: Re-use of water via Lake Macdonald storage

- Additional treatment processes to Options A and B
- Pump clean water back to Lake Macdonald
- Disposal to Burgess Creek in wet weather when Lake is overflowing

Public Health

- Carbon filtration and ozonation will achieve suitable nutrient and microbiological standards required for re-use
- Quality of water would be many times better than current flow into the Lake

Environment

- Residual concentrations of phosphorus in the water will increase risk of blue/green algae blooms in Lake
- Re-use will avoid the need to obtain this water from the Mary River

Cost

- Additional treatment processes and pumping to Lake Macdonald results in high capital cost for infrastructure
- high pumping costs
- Costs partly offset by water supply savings
- Net increase in current charge of around $130 p.a.

Option D: Re-use of water directly into the water supply

- Highest standard of treatment of all Options to produce drinking water
- Pipe to existing water mains
- Disposal to Burgess Creek of part of the flow, particularly during wet weather

Public Health

- High standard of treatment (including reverse osmosis) will ensure no adverse health impacts
- Pilot trials with extensive monitoring prior to commencing re-use.

Environment

- No adverse environmental implications
- Re-use will avoid the need to obtain this water from the Mary River

Cost

- High standard of treatment results in high capital cost but lower than options B and C
- Moderate operating costs
- Costs partly offset by water supply savings
- Net increase in current charge of around $70 p.a.