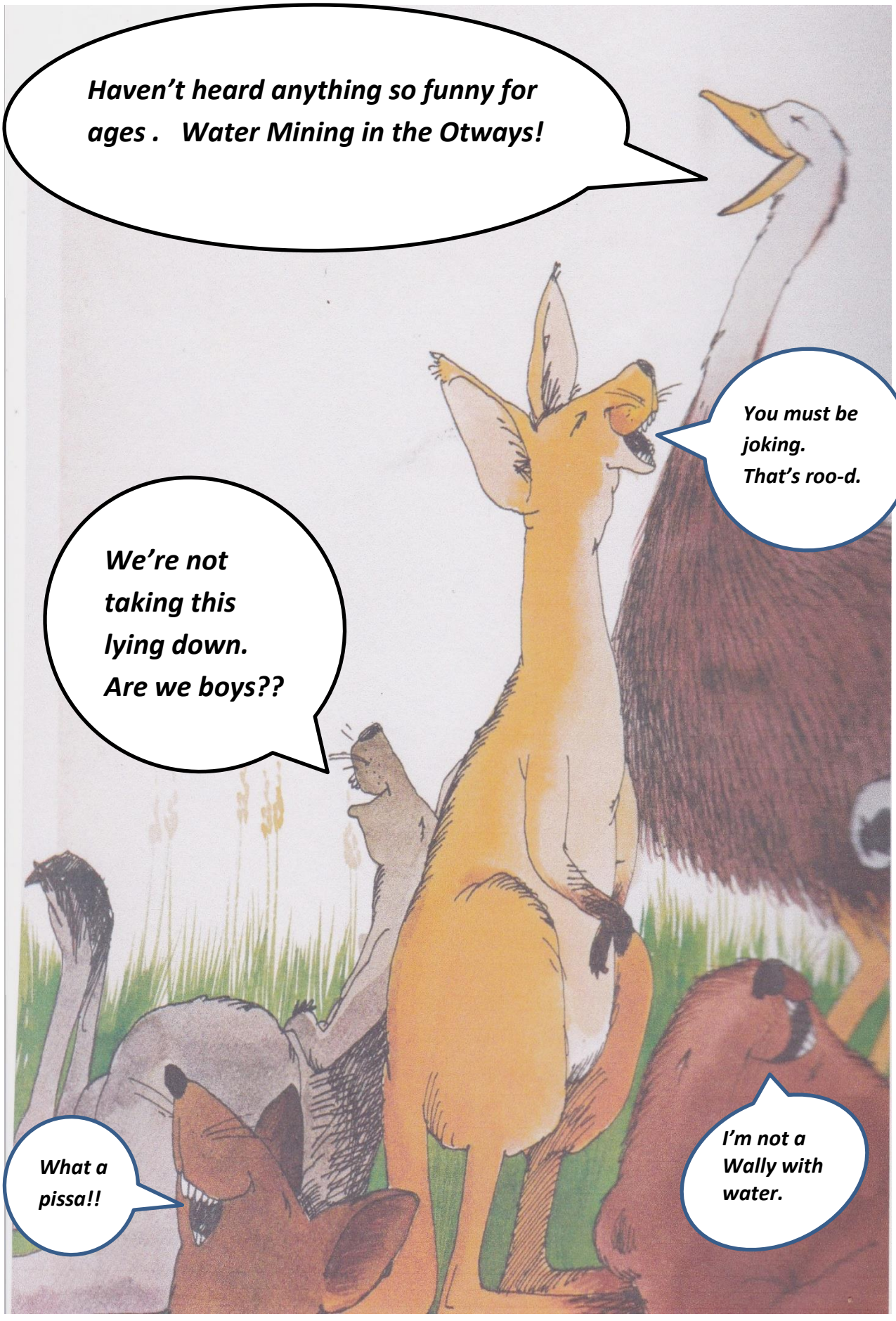

You can turn a blind eye to it but the mining of groundwater is no laughing matter.
OW Book 46


Haven't heard anything so funny for ages . Water Mining in the Otways!
You must be joking. That's roo-d.
We're not taking this lying down. Are we boys??
What a pissa!!
I'm not a Wally with water.

VARIOUS WORKING GROUPS.

October 2013 the Barwon Water Groundwater Reference Group (CRG) was formed as part of the renewal of the Barwon Downs Groundwater Extraction licence.

February 2018 the Corangamite Catchment Management Authority formed a Working Group to look at FLOWS in the Barwon River.

Late in 2017 Barwon Water ran several Community Consultation Stakeholder Workshop as a part of the licence renewal process.

2 | Colac Herald, Wednesday, March 14, 2018

Call for more analysis over aquifer pumping

A Gellibrand resident says Barwon Water needs to engage with the right experts in its bid to develop a plan to rehabilitate sites affected by groundwater pumping.

Barwon Water has initiated a "working group" of community members and key stakeholders to help design a remediation plan for Boundary Creek and Yeodene Swamp.

But Land and Water Resources Otway Catchment member Andrew McLennan said he believed the plan needed a "high level of scientific" research and analysis to address issues caused by groundwater pumping.

Barwon Water general manager strategy and partnerships Kate Sullivan said the creation of the group followed a series of community and stakeholder workshops in late 2017 to identify community outcomes and priorities for Barwon Water's Barwon Downs borefield groundwater licence renewal application.

Southern Rural Water granted Barwon Water its current licence to use groundwater in 2004 and it is due for renewal in June next year.

"During these workshops, the community placed significant importance on rehabilitating Boundary Creek and Big Swamp to improve stream flow and water quality, with the goal of returning the creek to a healthy ecosystem," Ms Sullivan said.

"We are looking forward to working with the community and key stakeholders to apply their valuable knowledge, alongside a range of technical experts and information, to develop the remediation plan," she said.

Barwon Water released a statement last year saying pumping of the Barwon Downs borefield had affected water levels and no-flow periods of Boundary Creek and that over the past 30 years was responsible for two thirds of the reduction of the base flow from the aquifer into Boundary Creek.

A Barwon Water spokeswoman said this had increased the frequency and duration of no-flow periods in lower reaches of Boundary Creek, but said there was no predicted impact to vegetation outside the Boundary Creek catchment as a result of groundwater pumping.

Barwon Water general manager strategy and partnerships Carl Bicknell also said in the statement that studies were underway to assess the effect of a range of alternative borefield operating regimes on flows in Boundary Creek and measures to address the issue of acid water release from Big Swamp into Boundary Creek.

Mr McLennan said he believed the pumping of the borefiled had caused acid sulphate soil contamination, fish kills, vegetation loss and drying of associated wetlands.

"There are so many issues, it's not an easy fix," Mr McLennan said.

"There needs to be a lot more investigation of how to fix the problem and at this stage it's not going to be an easy or cheap fix; it's a tall order to expect the community to hopefully fix the problem.

"I am a little bit concerned that Barwon Water needs to engage the right experts, because the scale of this issue is of a world-class size.

"They have engaged with the community on various levels and unless Barwon Water engages the right people to come up with satisfactory solutions; we don't think there will be a satisfactory solution."

Mr McLennan said LAWROC had engaged with Southern Cross University to investigate acid sulphate soils at the Big Swamp.

The *Herald* reported in 2014 that Southern Cross University's professor Richard Bush revealed findings of his research into the swamp, which showed a pH level of 1.45, which is more acidic than vinegar.

"They need to spend some serious money and start to take heed of what the experts are saying," Mr McLennan said.

"At every engagement we've talked to Barwon Water, we've had lots of engagements but at some stage talk is cheap, you need action to resolve some of these issues."

Further information on how to apply to be part of the working group is at www.barwonwater.vic.gov.au

March 2018 Barwon Water set up a Big Swamp Wetlands and Boundary Creek Remediation Working Group.

OTWAY WATER BOOK 46

Barwon Water's Groundwater Licence Renewal Community Reference Group, Final Report.

(13 April 2018)

Introduction

Barwon Water's groundwater extraction licence for the Barwon Downs Borefield at Gerangamete is up for renewal in 2019. In October 2013 as one aspect of this renewal process, Barwon Water formed a Community Reference Group (CRG). This Group met on a regular basis and dealt with many complex past, present and predicted issues. Late in the process of public consultation several lengthy, informative, open and hotly debated forums and community stakeholder workshop information nights were conducted.

In an email 21 February 2018 Managing Director of Barwon Water, Tracey Slatter had this to say… "***As you correctly point out Barwon Water has developed a proposed management plan based on outcomes the community identifies as important for the next licencing period. The plan aims for uus to work with our community and stakeholders over the next 15 year journey and will include the three phases of remediation, adaptive yield assessment and long term sustainable operation.***"

The Community Reference Group (CRG) concluded its work and penned a unanimously endorsed final report in April 2018. This Book contains this report and some of the relevant documentation.

The following covering letter was emailed off to Barwon Water,

13 April 2018, 17:53.

Ms J Plummer

Chair

Barwon Water

P O Box 659

Geelong VIC 3220

Dear Jo

As Chair of the Community Reference Group appointed by Barwon Water in October 2013, I have pleasure in presenting the report of the committee's deliberations, which have covered 23 official meetings, 6 broader community information sessions and a number of additional meetings.

The members of the CRG thank Barwon Water for the opportunity to take part in such a deep process of engagement – we have not always agreed, but our disagreements have led to better outcomes both for the community and for BW. BW's staff and consultants have been prepared to explore the areas of concern we raised. We appreciate their openness, their professionalism and their friendship over the journey. We also note with pleasure that new spirit of openness and genuine listening with have come through with recent changes at BW.

As a committee, we agreed to be bound by Chatham House rules, ie that the subject matter discussed in the Committee was available to be shared more broadly, in fact as broadly as possible, but that the deliberations within the committee and any matters which were noted as "in confidence" would remain private. This was adhered to, and it was successful in getting further discussion in the community.

We wish to draw the Board's attention to issues which are beyond the licence application but which we believe to be of general benefit. First, in-depth investigation of the potential use of the aquifer for storage and recovery of high surface water flows to augment the natural storage capacity of the aquifer; second, to ensure that Southern Rural Water revise the current permissive consumptive volume for the aquifer to ensure that Barwon Water remains the only licence holder.

We also request that this report be forwarded to SRW at the same time as the proposed licence application so that the views of the CRG be taken into account, and also to demonstrate the extensive nature of community engagement which Barwon Water has undertaken.

We look forward to presenting this material to the Board in the near future.

Sincerely

Jan Greig, Chair CRG.

The following report was also sent with the 13 April email to Barwon Water.

REPORT OF THE COMMUNITY REFERENCE GROUP ON BARWON WATER'S LICENCE RENEWAL APPLICATION FOR THE GERANGAMETE BOREFIELD – APRIL 2018

SUMMARY

1 *The CRG supports the renewal of Barwon Water's licence.*
2 *The CRG supports the approach taken by Barwon Water to a 3-phase implementation of any future production pumping at the borefield.*
3 *The CRG believes that all test pumping and production pumping (BW's phases 2 and 3) should be suspended for the period of the proposed licence renewal.*
4 *The CRG recommends that the licence volume for the licence renewal period be restricted to a maximum of 100 Ml per year for maintenance purposes only.*
5 *The CRG wishes to ensure that if phase 2 and/or 3 pumping is permitted in the proposed licence period, strong licence conditions as set out in in this report be attached to any such pumping.*
6 *The CRG hopes that any such strong conditions would endure beyond any licence renewal, so that, if the implementation of phases 2 and/or 3 were to take more than 15 years, certainty can be ensured without the need for such extensive and costly interventions at subsequent licence renewal intervals.*

SECTION 1 – FINDINGS AND RECOMMENDATIONS

1.1 The starting point – the current licence and a story of regulatory failure

The licence under which Barwon Water operates is regarded by the CRG as being a failure in several very important aspects. It has been generally concluded that the licence was based on limited knowledge. The reasons for that inadequacy are relevant to the new licence application and need to be heeded with this application. For example the intergenerational and precautionary principles were ignored and there was no allowance for adaptive management.

In 2002 when the examination of licence conditions took place, little heed was taken of the numerous expert and specialist reports dating back as far as 1984, all indicating there were risks and dangers to granting a licence for groundwater extractions over 1500 ML/year, being the most conservative estimate of recharge in the various reports undertaken to that date.

The compensation flow, for Boundary Creek, provided in the resulting 2004 licence was inadequate. The licence did not explicitly require its effectiveness to be assessed, or provide for remediation if the flow was found to be inadequate. Result: compliance, but serious adverse impacts. Failure of the licence to ensure adequate compensation flows and provide sufficient monitoring and associated remedial measures, is an example of failure of the structure of the licence to allow for adaptive management. In addition, the need for the compensation flow to be provided from the previously independent Colac supply exacerbated the need for augmentation of that supply

The precautionary principle cannot deal with "unknown unknowns", but it may have established markers where further examination was required. The sad story of Big Swamp could not be

described as other than a perfect storm, but there were times when intervention could have changed a very bad outcome, eg after the fire, and after the soil disturbance. With the knowledge of the day, these markers should have led to more examination of the potential for an acid sulphate event. The outcome may or may not have changed, but sufficient warnings were in place and community concerns at the time ameliorated to a degree. The failure has been very difficult for the local environment, the community and relations with Barwon Water.

Earlier studies questioned the capacity of the borefield to deliver the licence quantities. The licence quantity extracted, combined with recent extensive metering, monitoring and modelling has revealed serious drawdown across the Lower Tertiary Aquifers. These aquifers have failed to recover and drawdown continues to spread. Again, poor monitoring, not responsive and no adaptive management.

Impacts in adjoining catchments indicate that the area of influence requiring monitoring should have been increased in line with this ever-expanding drawdown area of influence. This area of monitoring must be maintained until the point of negligible impact has been observed.

1.2 Inadequacies in present position

The most recent presentations from Jacobs to the committee in relation to the modelling raised a number of concerns which need to be addressed over the coming period, but which are not blocks to this committee recommending that the licence be renewed. In fact the renewal of the licence is necessary for a number of the issues to be resolved:

Impact on the Gellibrand and tributaries. It is considered that the network of bores monitoring potential impacts on the Gellibrand system is inadequate and should be extended and monitored until drawdown is negligible. Furthermore, the period of monitoring has been too short to allow understanding of the impacts in the long run of pumping on the Kawarren and Gellibrand area. The most recent presentation from Jacobs indicated medium and high impacts on pressure in various stretches. This was reported by local farmers early in this process (Robert Maxwell in particular) and was greeted with some scepticism by external sources. ***How these pressure changes translate to surface impacts requires more work and must be a licence condition at renewal. Unsatisfactory impacts (past, present, potential or actual) must be investigated and triggers preventing long term damage included in the licence. Nested bores in the earth structures above the Lower Tertiary Aquifers would provide an early warning system detecting long term risk and should be a licence condition.***

Stem of East Barwon. Similar to the Gellibrand in that the most recent model runs exposed medium and high pressure drops. Similarly, the changes need to be much better understood and this needs to be a licence condition, together with a trigger to prevent long term damage. ***A whole of catchment approach is required.***

Boundary Creek. ***The problems associated with Boundary Creek have been well recognised as a serious concern: Big Swamp, flow problems in lower reaches, failure of compensation flows, riparian zone problems, stock and domestic requirements of the farming community and community outrage must be addressed.*** *The CRG members do not want to see this happen in other areas within the drawdown area of influence.*

Acid Sulphate Soils. The Inland Acid Sulphate Soils Working Group should be reformed including community representation and reporting. ***Knowledge of and understanding the management of potential and actual acid soils due to reduced pressure caused by pumping is necessary within the area of drawdown influence.***

Climate Change. There remains a continued disquiet from the committee members about the long run effects of climate change. ***It is recommended that the model underlying the work to date be reviewed and updated at 5 year intervals to account for changes to rainfall, recharge and other significant data such as the buffering capacity of the aquifers as they recover, and be reported and explained to the community to ensure that it remains broadly within accepted values for climate variability.***

BW Policy Change. Barwon Water's Board has adopted a policy position of not having water restrictions more frequently than 1 year in 20. ***The CRG regards this as poor policy in times of climate uncertainty, and believes that the broader urban community would accept more frequent restrictions if climatic or weather conditions required this, given good education.***

The role of aquifer storage and recovery. In the future, these aspects require more comprehensive examination by Barwon Water than has been evident to date. ***The CRG encourages Barwon Water to undertake a full examination of this possibility with a view to using the aquifers as an evaporation-free storage as a way to ameliorate the effects of pumping.***

Community engagement. Community participation has been either non-existent or inadequate in the past. The CRG commends Barwon Water for recent reforms, including this committee and the Colac based community meetings. ***This engagement must continue beyond the tenure of current Board and executive, and conditions must be in place for this to happen. A licence condition should make specific reference to this requirement.*** *This committee has gained deep knowledge of the borefield. It would be in the interests of everyone if at least some of the committee members were to continue in some sort of advisory capacity so that this knowledge is not lost, and that ground which has been thoroughly covered does not have to be repeated.*

The CRG notes the concern of the wider community expressed in meetings in Colac and the expressed view that all pumping should cease until the aquifers have recovered their pre-pumping levels and that environmental repairs have taken place and proven successful. A broad view was also expressed that no future pumping should take place at all.

The economic costs and benefits of alternative water sources have not been explained adequately to this committee or the community. The environmental impacts of each appear to be particularly badly dealt with, and financial outcomes for Geelong ratepayers have appeared to play the major role in decision making.

1.3 Fundamental principles which the CRG endorses

This committee supports the renewal of the licence, with substantial changes to its conditions.

No pumping for water supply purposes is to be permitted until sustainable recovery is evident*. After each pumping event since the inception of the borefield, the aquifers have not re-filled before pumping has recommenced. The estimate for full recovery with no further pumping has been given*

to us as 'between 30 and 70 years'. If recharge is so slow, and each significant pumping event effectively lowers the semi-permanent level of the aquifers, this is "mining" the aquifers, and is not sustainable.

The aquifers have been seen as an emergency reserve for urban users in the past – to be used as a last resort to get Geelong through difficult and hard times, regardless of adverse impacts on the rural community and the environment*. There is no longer as great a need as Geelong has other alternative sources of water such as the Melbourne-Geelong connection and the desalination plant. The most recent pumping event in 2016 lasted 4 months and took over 3200 ML from the aquifers when no restrictions were in place. This is an example of inappropriate use of the aquifers. It needs to be clearly understood and explained to the community that Geelong's unfettered reliance on this borefield is no longer realistic. This contributes to the deeply held view that* ***pumping must not be permitted unless Geelong is on stage 3 restrictions.***

The precautionary principle is at the core of good management of this borefield. This has been inadequately heeded in the past, but must be the cornerstone of the future. An example of this approach could include analysis of the impacts of fire on the Big Swamp beyond acidity – for example to examine the potential for heavy metal or other pollution and contamination of either the aquifer or downstream flow. Another example could be whether flowpaths towards areas such as Deans Marsh and Kawarren have been impacted.

No pumping should be allowed from the aquifers, except for maintenance purposes, until it is proven that remediation works in the catchments impacted have been successful. In addition, all long term impacts in the Barwon River and Gellibrand River catchments must be thoroughly understood, with past, present and potential impacts taken into account. This must be communicated with and understood by affected communities. Specific remediation plans must be developed with measurable performance results and implemented as licence conditions.

Independent verification and validation of modelling is essential. *Lingering and deep-seated scepticism of the independence of the modellers from Barwon Water is evident in the community. While this committee has some variance in its opinions, SRW is seen as a guardian of standards of independence and the means for independence to be assured. The adequacy of all supporting studies needs to be reviewed and verified, for example, the past and present vegetation studies, to ensure that it is not just the modelling but the inputs to the modelling which receive due attention.*

Adaptive management principles must be embedded in the licence such that amendments must be allowed in the period if circumstances require it. One possible example of this is BW's phased approach to testing and use of the aquifer, but it needs to be extended to cover climate change or any deleterious effects of pumping on the environment which may be difficult toidentify and/or quantify with current knowledge but which become apparent through monitoring or experience over the licence period.

Community engagement – Barwon Water is to be commended on its recent willingness to involve the broader community in water management policies and in communicating its willingness to be open to community concerns, whilst recognising its primary role is to provide a safe, reliable, affordable water supply within acceptable environmental outcomes. ***Continuation of this new attitude must be given emphasis so that it survives any change in the management of BW in the future.*** *Licence*

requirements for reporting to the community as well as to SRW are one way to ensure that this happens. It is strongly recommended that specific reporting criteria be adopted for key measures of interest to the community, and that reporting to the community should include routine written material and regular 6 monthly community meetings. It is strongly recommended that the Colac Otway Shire have a representative attend these meetings.

SECTION 2 REACTION TO BARWON WATER'S PROPOSED LICENCE CONDITIONS

BW has indicated a 3 phase program in relation to the operation of a licence renewed from 2019. This is broadly supported by the CRG, but deep concern remains in relation to timing and the capacity of Barwon Water to achieve significant required milestones to progress between phases over a 15 year period.

Phase 1 envisages no pumping, but a continuation of outstanding work to cover both gaps in knowledge and agreed works. This is fundamentally the same as the proposed licence conditions proposed by the CRG above. Phase 2 envisages a test pumping regime, with the use of the borefield as a water supply system allowed for in Phase 3.

Phase 2:

Specific outcomes must be met for the CRG to be confident that Phase 1 objectives have been met and reported to the community, and SRW must agree that the work is complete and effective before progressing to Phase 2. They are:

That all remediation works on Boundary Creek have been completed, including Big Swamp, monitoring at McDonald's Dam, stock and domestic supply and riparian zone issues, and have been demonstrated to be effective (eg that pH levels at the inlet to McDonalds Dam are not higher than below Big Swamp);

That time lags associated with the perimeter of the drawdown zone are reliable and impacts from past pumping especially on the East Barwon and the Gellibrand and tributaries are fully realised and that no long run damage is either apparent or predicted;

That a clear understanding of where the recharge water to the Lower Tertiary Aquifer is coming from, that the movement between all earth structures above the aquifers is established, and that there is clear understanding of the movement of any salinity, acid and heavy metals through these structures.

That the licence will be cancelled if there are future events with consequences like the Big Swamp acid spill on the Barwon or Gellibrand Rivers or tributaries. *The CRG's clear majority view is that if these conditions are met, that movement to Phase 2, test pumping, should be allowed. All effects of previous pumping must be identified and adverse aspects contained and the aquifer is confirmed as stable. The minority view is that no pumping other than maintenance should be allowed for the licence period, in line with the Colac community meeting's express view. It is also the view of the CRG that if no test pumping is to be allowed in this licence renewal period, these conditions must be met in any future licence renewal before test pumping can commence.*

It is also the view of the CGR that preconditions to any test pumping should be imposed, in particular:

That the risks and dangers of any test pumping be explained:

That the need for test pumping is clearly explained and that predicted outcomes including the amount of water to be pumped, the drawdown and recovery levels and the time to be taken for recovery, are specified before the event, and metered, monitored and reported after the event;

That the aquifer's resilience is demonstrated by its return after pumping to pumping levels observed before the pumping event with no net loss of pressure. This is most important as it would demonstrate that the aquifer was not being "mined". Past pumping has resulted in at least a semi-permanent decline in aquifer levels after each pumping event, and in no case has the aquifer returned to its pre-event level, resulting in a long term and continual decline;

That if long run damage is potentially an outcome, especially in relation to the Gellibrand or East Barwon systems, that all test pumping ceases.

It is the CRG's view that it is unlikely that Phase 1 and Phase 2 can be completed within the renewed licence period. If it is determined that all requirements of Phase 2 have been met and that Phase 3 can be implemented, it should be borne in mind that community reaction is likely to be very negative in the Upper Barwon and Upper Gellibrand areas.

At its most generous, the committee views BW's proposal as unachievable for production use of the borefield, with any degree of satisfaction being given to the precautionary principle. It is the CRG's advice that Phase 3 should be deferred until the following licence renewal, however if it is to take place, the following licence conditions should apply:

That Schedule 1 be amended such that water must not be pumped unless Geelong is on Stage 3 restrictions;

That annual use cannot exceed 4000 Ml, that the maximum use over the licence period must not exceed long run recharge over that period which was estimated to be 24000 Ml by the most conservative estimated available rather than the Jacobs figure, but this can be verified over the test period by observed outcomes, and is consistent with the precautionary principle.

That after any pumping event, the return to the aquifer level prior to that pumping event is achieved before the aquifer can be pumped again, ie a steady state is achieved;

That, if at the end of the licence the level of the aquifer has continued to decline, these volumes shall be halved.

As a minimum, the maximum volume over the licence period must be reduced to reflect the intent of BW's stated position.

See page **20**.

Overall, the committee is satisfied with BW's stated intent, but the reality of the figures proposed for the licence do not reflect this intent, and there is great unease about the achievability of the proposal as put forward by Barwon Water

See pages11 to **12**, for the three Phase proposal.

A HAPPY ENDING IN SIGHT?

Towards the end of 2017 and after four years of numerous meetings it appeared that the function of the Community Reference Group was coming to a conclusion. The 28 November meeting was to be the second last, with one more meeting planned for February 2018. Then it was anticipated that the CRG would require two more meetings to finalise and write its report. Also, another community stakeholder open public meeting was planned for December 2017.

At the conclusion of the 28 November meeting a sense of achievement and satisfaction that a successful outcome for the local communities and environment was achievable. Phase 1 with no pumping, remediation and continued monitoring during the recovery period, was welcomed. Barwon Water estimated full recovery of the aquifers would be between 20 and 70 years. When Phase 1 objectives had been achieved it appeared that moderate test pumping in Phase 2 was appropriate to test the aquifer's ability to recover with mild pumping, and to determine what sustainable levels of pumping could be implemented with climate change taken into account. Phase 3 would then proceed based on a comprehensive evaluation of the Phase 2 data results.

The following minutes from the 28 November Community Reference Group meeting reflect much of this sentiment (see pages 14-19).

However, the euphoria was not to last.

Barwon Water

Minutes

Barwon Downs Groundwater Community Reference Group

Date:	Tuesday 28 Nov 2017	Time:	4.00 pm – 7.00 pm	Location:	COPACC
CRG	Jan Greig (Chair), Doug Chant, Hans Fankhanel, Malcolm Gardiner, Robert Maxwell, Robin Povey				
Barwon Water	Kate Sullivan, Peter Morgan, Jared Scott, Jo Lee, Craig McTaggart				
MosaicLab	Nicole Hunter				
Apologies:	Henry Bongers, Gavin Brien, Rhys Bennett, Kate Vallence				

Agenda item	Welcome

1. Henry Bongers, Gavin Brien, Rhys Bennett and Kate Vallence were apologies for the meeting.
2. The minutes from the previous meeting were confirmed and nothing further was added.
3. Jan requested to add another agenda item to this meeting which was to address Hans' email.

   Hans explained to the CRG that the group needed to critically review the Jacobs report detailing the modelling of the three scenarios under the varying climate change conditions (known as the predictive impact assessment report) as part of the licence renewal process.

   It appeared to Hans that Barwon Water has put aside this report in preference to responding to broader community outcomes identified at the previous Barwon Downs licence renewal community and stakeholder workshop. Hans reiterated that any recommendations put forward by the CRG should be based on modelling results as all the technical work and input from the CRG to date was intended to improve the accuracy of the predictive model. There was agreement with Hans' concerns.

   Kate advised that Barwon Water is committed to continuing this journey with the broader community, however the modelling is an equally important input into the licence application.

   Hans questioned whether going to the Barwon Water Board would lock in a decision regardless of the modelling outcomes. Kate stated that the session held by the Board was a strategic workshop, not a decision report, therefore no decision was made other than to agree that the approach for the third community and stakeholder workshop was the right approach.

   The CRG believes that they have a greater understanding of the technical work and outcomes than the broader community and that their role should be to resolve any outstanding technical issues and integrate the technical work with the broader community outcomes. Jan questioned what the role of the CRG going forward is. Nicole stated that we will revisit this at the end of the meeting.

   Malcolm questioned when the licence application will be submitted. Kate responded that we want to get the process right and involve the right people instead of rushing the application to meet a timeframe.

   Jo advised that the next draft of the modelling report would be available before Christmas. Jo said the delay in issuing the report to the CRG was the need to redo all the post processing and analysis based on a revised reduction of volumetric entitlements.

Action items	**Person responsible**	**Deadline**
1. BW to circulate draft predictive impact assessment report before Christmas	Jo	25 Dec 2017

Barwon Water

Agenda item	Overview of Barwon Water responses to the community outcomes

1. Nicole gave an overview of the workshop, and purpose which is to:
   - Review the community outcomes and Barwon Water's proposed actions.
   - Provide feedback on Barwon Water's proposed actions.
2. Kate introduced Barwon Water's overall management approach to delivering on the nine community outcomes. She clarified that the management approach is still in a draft phase and that we would welcome feedback to further refine things before the community workshop next week.

   Kate stated that internally we have spent many hours, have had challenging conversations and pushed the boundary to test different ways in how best to deliver on the community outcomes identified. A big part of this shift in mindset was to look at reducing the reliance on the borefield as a standby source.

   At the highest level Barwon Water generally agrees with the outcome expressed by the community and we have worked very hard to identify the right actions to achieve these.

   - Kate confirmed that we had committed to Southern Rural Water that we would cease pumping other than for maintenance activities until the licence renewal is resolved.
   - Kate then outlined that during phases 1 and 2 of the management plan going forward Barwon Downs will be shifted to last priority source instead of first priority where it currently sits. If Barwon Downs is shifted to last priority, modelling indicates that use of the borefield is unlikely to be triggered during this period unless there is an event outside of our control, for example, an unpredicted climate event.
   - Phase 1 of the management plan is centred on remediation of Boundary Creek, in particular the swamp. Barwon Water will not pump until the remediation works is complete. Based on the success on phase 1 Barwon Water will then move to phase 2 which is an adaptive yield assessment. Barwon Downs will still remain the last standby source in this phase however using the precautionary approach, a low test pumping regime will commence. A supporting monitoring program will be in place based on an adaptive management framework to observe responses from the environment. Following phase 2, the management plan will move to the final phase of operation up to the long term sustainable yield.

   Jan questioned on what success would look like in each phase. Kate explained that this is yet to be determined.

   The CRG were supportive of the management plan and the approach going forward, however had the following comments:

   - That the remediation plan should be designed with the community
   - That an expert other than Jacobs should be used for refining the remediation plan
   - Whether West Barwon could be used for a scheme to artificially recharge the aquifer
   - Whether the West Barwon entitlement could be used for summer flows in the Barwon River
   - That a good definition of sustainability is needed and it needs to be agreed to with the community. Robin agreed that sustainability is an ill-defined concept, and needs to be clear on what the community wanted.
     Hans stated that pumping should only be equal to what is sustainable once the borefield has recovered. And that the resource over a 100 year period is healthy.

     Malcolm stated that there is a good example of a nationally agreed definition of sustainable for groundwater management.

Agenda item	Overview of Barwon Water responses to the community outcomes
• Climate change needs to be accounted for	

Agenda item	Barwon Water's proposed action and CRG responses

1. Jo explained each Barwon Water proposed action in detail. They included:
   - **Interactive engagement with the community**
   - **A precautionary approach to managing the borefield**
   - **Developing and implementing a remediation plan for Boundary Creek**
   - **Establishing an adaptive monitoring program**
   - **Building knowledge and trust in the science with the community**
2. Jo and Jared described each community outcome and explained which of the proposed actions would meet each outcome.
3. Interactive engagement with the community

   Jo stated that Barwon Water is proposing to establish a Barwon Downs Working Group, noting that there will be things outside of Barwon Water's control and outside the remit of the Working Group such as the delivery of environmental flows in the Upper Barwon which is led by the Corangamite Catchment Management Authority.

   Jan stated that this is what the CRG wanted from Meeting 1. The whole group was supportive of this action.

   Jan expressed that consultation with the community should happen before an event (for example, pumping the borefield) and not after.
4. A precautionary approach to managing the borefield

   Hans commented that the five yearly reviews need to be flexible, e.g. if climate change impact changes. The CRG agreed reviews need to be more flexible.

   Jan said that the licence should be a 15 year licence, with a five year rolling average and not exceed the recharge rate.

   Doug stated that Barwon Water needs to sell to the community what we are trying to achieve, and put operational trigger points in place. Robert agreed and said that we need bore recovery trigger levels.

   Robin questioned if the monitoring bore and trigger bores will be built in to the licence. Kate responded that we are proposing that these actions will be built into the licence.

   Malcolm stated that this all comes back to trust, as who will know when things go wrong?

   Jan stated that Gavin would have said that the borefield should not be pumped unless there are restrictions in Geelong.

   Robert asked if we can extract water in the Otways during the wetter months to recharge the aquifer. Peter stated that we have Bulk Entitlements that we have to follow and this would not be easy to achieve. Malcolm said that this could be part of the SWS review, that Barwon Water to investigate if this is possible.

   Malcolm said that if we get stage 1 right, then the rest of the actions will be easy, as the community will be happy.

Agenda item	Barwon Water's proposed action and CRG responses

5. Developing and implementing a remediation plan for Boundary Creek

Malcolm questioned "What are we remediating" and thinks the scope is too narrow and should include other catchments. Loves Creek should be captured in the remediation plan.

Malcolm wanted the CRG to consider that the swamp could be split into three distinct areas. Malcolm stated that the worst of the acid sulphate soils is at the upper end of the swamp and that pumping has dropped the water table and that pressure has dropped 10.5m.

Robert stated that the aquifer should be "filled" so that the swamp overflows.

Robin thinks that Barwon Water is not responsible for everything in the catchment, and thinks that there should be a link to problems that Barwon Water has caused. Jan agreed that to the extent that the environment has been affected by pumping then Barwon Water will remediate. All agreed and said that data should be used to define Barwon Water causes.

All agreed that the remediation plan needs more detail, particularly around defining what we are remediating and that a consultant other than Jacobs should be used.

6. Establishing an adaptive monitoring program

The CRG agreed that the monitoring program needs to cover the whole of the catchment, especially for surface water flows.

The precautionary approach needs to adjust according to modelling data.

Peter mentioned that the borefield will move to last priority of the standby sources during the first 2 phases. The data collected in phase 1 and the low rate testing in phased 2 will be used to further inform the long term sustainable yield in phase 3. Hans said that pumping as the last resort and needs to be told to the community.

Hans thinks that the 5% level of service is unrealistic now with climate change. The group questioned if this is unrealistic or relevant. Peter stated that it is possible that this could be changed, however, any change would require comprehensive customer and community consultation across Barwon Water's service area.

Robin stated that this is an economical issue (e.g. the high cost of desalination water).

7. Building knowledge and trust in the science with the community

Jo said that all technical reports will be submitted to SRW who will run an independent review process. This review is unlikely to be done by Jacobs.

Hans thinks that small mistakes in the technical reports don't affect the integrity of the document. Malcolm believes that the mistakes are not acceptable. Robin expects professionalism from Jacobs.

Jan stated the platypus conservatory did a platypus study 15 years ago. Carl has a copy of this study and this should be used as a baseline.

Hans said that there is opportunity to work with other groups, like local Landcare Groups.

8. There was discussion that Barwon Water cannot commit to letting the groundwater levels recover to pre pumping levels as this would take over 50 years.

Jan stated that the CRG recommend that Barwon Water examines the potential for Managed Aquifer Recharge. Malcolm reinforced that this to be a licence condition.

Doug believes that the water in the aquifer belongs to Barwon Water, however the environmental side of things are the issue. He would like to see the groundwater levels restored to full levels to improve community and environmental outcomes. Managed Aquifer Recharge may be a way of realising this and could be cheaper than desalinated water.

Agenda item	Barwon Water's proposed action and CRG responses

9. Refer to the document attached which outlines the feedback from the CRG on both the community outcomes and the proposed actions.

Agenda item	Whole group reflection

1. Jan would like the group to reflect on what was written in the workshop today and what issues the CRG had raised in the very first meeting. For example, the Gellibrand catchment is a current gap.
2. Barwon Water will circulate the notes from this workshop and will undertake a cross check to see what gaps there are from the first meeting. The CRG are to review and provide any comments back to Barwon Water by Monday next week so that it can be fed into the broader community workshop.
3. Jan defines success as 'No more acid events into the Barwon River / no fish kills'. Hans thinks success are a set of outcomes that happen. Kate said that we can't control some actions, but Jan thinks that there are ways to measure success even if the outcomes are out of Barwon Water's control.
4. Malcolm thinks that since we won't pump, that for the first five years while we remediate we ask for a licence no longer than this. Kate stated that this is essentially what we are proposing but we're recognising that there is a longer journey.
5. Jared stated that for the Anglesea borefield that the principles of monitoring and assessment is referred to in the Bulk Entitlement, but the detail of the monitoring and assessment plan is included in a separate document.
6. There is group preference to have the CRG gaps fed into the licence application.

Action items	Person responsible	Deadline
1. Barwon Water to circulate the notes to CRG from this workshop with gap analysis completed. CRG to review and provide feedback.	Jo / CRG	04 Dec 2017

Agenda item	*Next steps and close*

1. There was discussion on next steps which is summarised below:
   - The draft predictive impact assessment report will be circulated to the CRG before Christmas
   - The next CRG meeting will be in early February 2018 and will include a presentation on the draft predictive impact assessment report to allow adequate time for CRG members to review the report in detail. Robin requested a summary of the report to be provided. Malcolm and Hans requested a hard copy of the report to be posted out.
   - There will be another meeting (or two) for the CRG to finalise their recommendations based on all technical information and community outcomes. This will also be an opportunity for Barwon Water to provide an update on the drafting of the licence conditions.
2. Kate asked the CRG what their thoughts were on the direction and Barwon Water's proposed actions going forward.

   The change in Barwon Water management is huge and the outcome now would never have happened six months ago. Malcolm agreed that the change in Barwon Water administration has changed the whole process 180 degrees. The CRG are happy with the overall direction and approach for the licence renewal.

Barwon Water

Agenda item	Next steps and close	
3. Meeting closed at 6:55pm.		
Action items	**Person responsible**	**Deadline**
1. Barwon Water to circulate the draft predictive impact assessment report	Jo	25 Dec 2017

The Community Reference Group (CRG) meeting of 6 February 2018 was scheduled to discuss the Predictive Impact Assessment report and the water extractions conditions that this report found could be sustainably applied for the next 15 years. A two page email sent to CRG members as a lead into this meeting included the proposed renewal licence water extraction conditions (see pages 20-21) that Barwon Water was considering as reasonable following the results of Jacobs' modelling pumping scenarios. Personally, I was aghast and could not believe that this recommended pumping regime was anything but a practical joke of doubtful merit.

Jo Lee "CRG meeting 6 Feb 2018." 25/01/2018 1/2

Hi all,

Hope you all had a good break over the festive season.

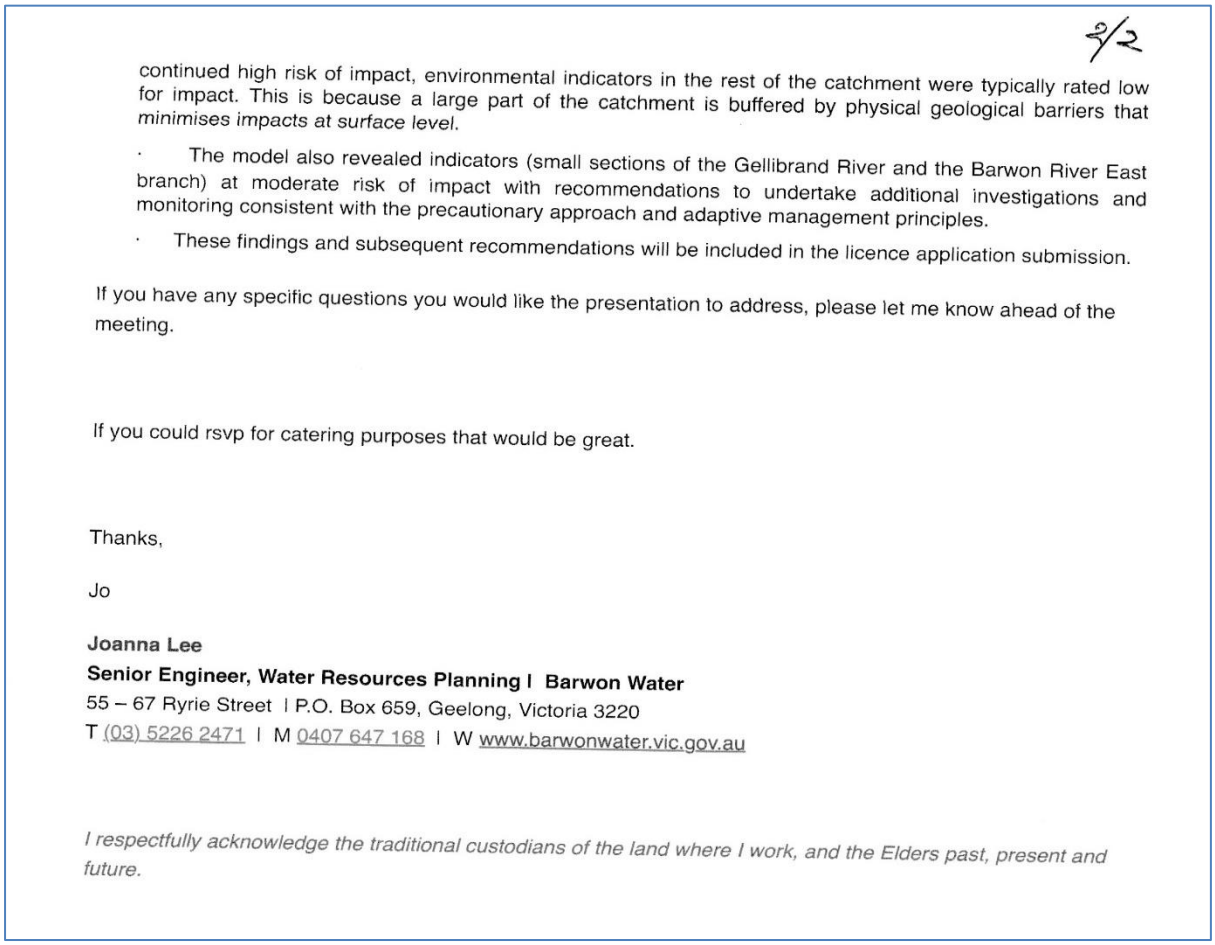
We are keen to schedule our next meeting on **06 February at 4.00pm – 6.00pm at COPACC** to present and answer questions you may have on the predictive impact assessment report.

As promised, below is a summary of the report.

- The draft report considers potential impacts to environmental indicators caused by groundwater pumping over a 50 year time horizon (2017-2067) under different climate change scenarios.
- A risk assessment methodology was applied to identify environmental indicators sensitive to impact based on nationally recognised Ministerial Guidelines for Protection of Groundwater Dependent Ecosystems. This methodology supports Barwon Water's intent of progressing with a precautionary approach in the next licence period.
- The baseline used to compare the potential impacts of different pumping regimes is no pumping at all (i.e. 0ML extracted).
- Recharge to the aquifer is expected to decline by 10% in future as a result of lower rainfall.
- The model predicted no comparable difference in impact to environmental indicators between a constant (4,000ML/year) and intermittent pumping regime (similar to how we operated the borefield during dry periods but with the proposed reduced volumetric entitlements listed in the table below). Predicted impacts will be either similar to, or less than impacts that have occurred in the past. Results from the risk assessment overestimates potential impact to environmental indicators.

Condition	Current Licence	Proposed Licence
Maximum daily rate (ML)	55	45
Maximum annual rate (ML)	20,000	12,000
Maximum 10-year rate (ML)	80,000	N/A
Maximum 15-year rate (ML)	N/A	60,000
Long term (100 year) extraction	400,000	N/A*
Licence duration	15	15

- Regardless of future pumping, reach 2 of Boundary Creek is predicted to take 20-30 years to recover from historic pumping in terms of baseflow contribution (not including any remediation works).
- While the model highlighted areas that are at high risk, or in the case of reach 2 of Boundary Creek,



2/2

continued high risk of impact, environmental indicators in the rest of the catchment were typically rated low for impact. This is because a large part of the catchment is buffered by physical geological barriers that *minimises impacts at surface level.*

- The model also revealed indicators (small sections of the Gellibrand River and the Barwon River East branch) at moderate risk of impact with recommendations to undertake additional investigations and monitoring consistent with the precautionary approach and adaptive management principles.
- These findings and subsequent recommendations will be included in the licence application submission.

If you have any specific questions you would like the presentation to address, please let me know ahead of the meeting.

If you could rsvp for catering purposes that would be great.

Thanks,

Jo

Joanna Lee
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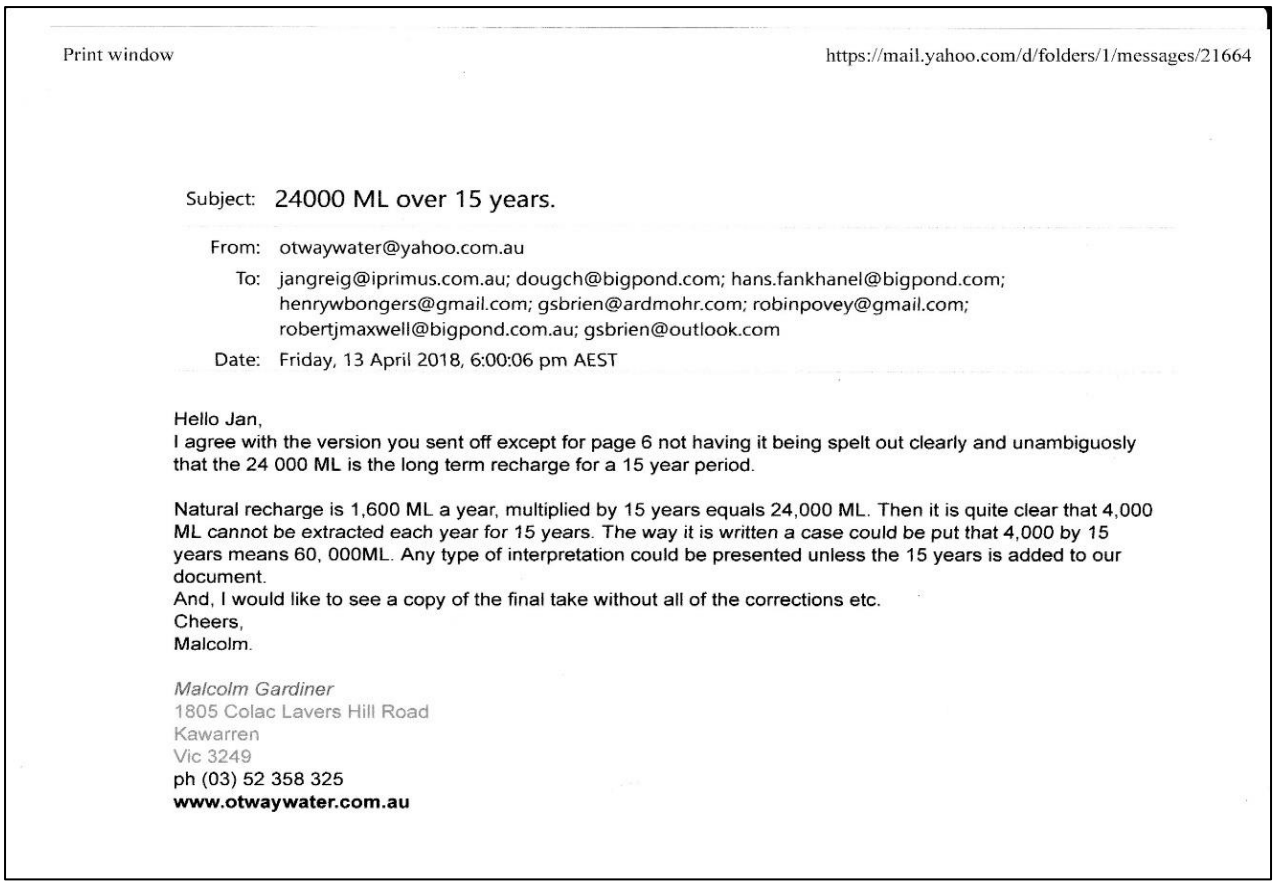
I respectfully acknowledge the traditional custodians of the land where I work, and the Elders past, present and future.

Under the Water Act all groundwater licences are up to 15 years and it was no surprise that Barwon Water would ask for a licence covering this time period.

In the recommendations being made by the CRG on page **12** it was accepted by the Group that the "***licence period***" was for 15 years and under this time restraint the "***long run recharge period***" was in effect the same as the licence period. At the very last minute, in an effort to emphasise this fact a change was asked for before the CRG recommendations were sent off to Barwon Water, the following email was sent to the Chair of the Community Reference Group.



Print window https://mail.yahoo.com/d/folders/1/messages/21664

Subject: 24000 ML over 15 years.

From: otwaywater@yahoo.com.au

To: jangreig@iprimus.com.au; dougch@bigpond.com; hans.fankhanel@bigpond.com; henrywbongers@gmail.com; gsbrien@ardmohr.com; robinpovey@gmail.com; robertjmaxwell@bigpond.com.au; gsbrien@outlook.com

Date: Friday, 13 April 2018, 6:00:06 pm AEST

Hello Jan,
I agree with the version you sent off except for page 6 not having it being spelt out clearly and unambiguously that the 24 000 ML is the long term recharge for a 15 year period.

Natural recharge is 1,600 ML a year, multiplied by 15 years equals 24,000 ML. Then it is quite clear that 4,000 ML cannot be extracted each year for 15 years. The way it is written a case could be put that 4,000 by 15 years means 60, 000ML. Any type of interpretation could be presented unless the 15 years is added to our document.
And, I would like to see a copy of the final take without all of the corrections etc.
Cheers,
Malcolm.

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The Most Disturbing Part of Barwon Water's Proposal(see page 19)…

What was extremely surprising and disappointing to note was that Barwon Water was seeking a maximum annual rate of water extraction of 12,000 ML, with a maximum of 60,000 ML over the life of the licence.

The 1995 comprehensive and extensive report(Witebsky) summarising the 1987 to 1991 stress test pump of the Lower Tertiary Aquifers below the Barwon Downs Borefield, determined that the "safe" and sustainable extraction level was around the 1500 to 1600 ML/year mark. This would equate to approximately 24,000 ML over 15 years and would also have little if any impact. This report also suggested that the maximum that could be pumped out in any one year was 4,000 ML. This matches up with the suggested rate being proposed by Barwon Water for the 2019 licence. However, that equates to a total extraction of 60,000 ML over 15 years. Past experience has shown this to be disastrous just as extractions around the 12,000 ML/year have proved to have unacceptable impacts.

The 1995 report also made it quite clear that the data compiled during the stress test pump, indicated that even at 4,000 ML/year there would be observable impacts. In fact, as far back as 1984 similar recommended extraction levels predicted impacts.

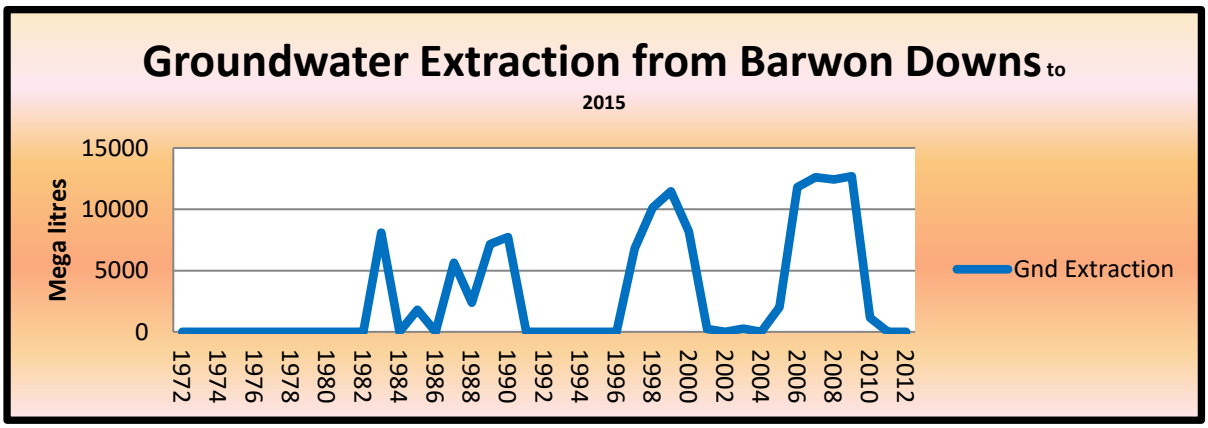
However, it is doubtful that 34 years later these recommendations would still be applicable today. Especially, when it was a commonly held view by city based decision makers, natural springs, soaks and some creeks were of little economic value and should be better utilised.

"***It may be that many of the springs in the area are not utilised and of no ecological significance and can therefore be considered as a waste of resource.***" (Lakey R., May 1984: Gellibrand Groundwater Investigation , Kawarren Pumping Test Pump. Department of Minerals and Energy).

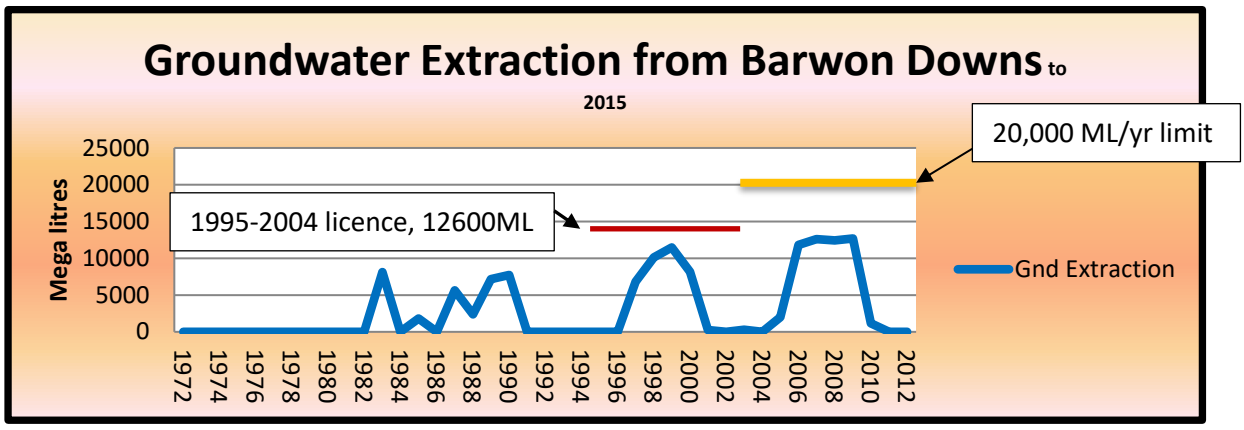
The 1995 report continued by stating that any extraction over 4,000 ML/year should be accompanied with an Aquifer Storage and Recovery program. These recommendations were made at a time when Climate Change was in its infancy and was not taken into account when calculating the extraction, recharge and recovery rates. An Aquifer Storage and Recovery program has never been implemented.

Despite Barwon Water's dismissal of these earlier findings, the most disturbing aspect of the proposed extraction of a 12,000 ML/year limit is the fact that extractions could continue as they have in the past. Even though Barwon Water had an extraction licence issued in 2004 allowing a maximum of 20,000 ML/year, at no stage had these levels ever been extracted. During the Millennium Drought of the early 2000s, Barwon Water extracted an average of 11,000 ML/year of the 20,000 allowable. For Barwon Water to make a concession reducing the renewal application down from the present 20,000 ML/year to 12,000 ML/year, is ***no concession at all***. Extractions of 12,000 ML/year would ensure catastrophic impacts would continue unabated reaching nightmarish proportions

This graph shows the extractions up to 2015.



The graph below, indicates the current licence limit and shows how much more could have been extracted.



Even though requested by the CRG in 2017, modelling scenarios above an extraction rate of 4,000 ML/year were never conducted and this seems incredible considering that over the life of the borefield many of the extractions have exceeded 4,000 ML/year. Asking for a renewal of a yearly extraction of 12,000 ML and not running a modelling sequence for this volume, is astounding.

However, when all was said and done the Community Reference Group met several more times and finalised the recommendations as set out on pages 6-12. I believe the recommendations make an extremely good report, reflecting the communities' wishes, but also including compromise allowing Barwon Water to proceed with its licence application in a constructive and responsible manner.