



OTWAY WATER BOOK 26

Comments on the Barwon Water Report prepared by SKM, Ecology Australia & Latrobe University, that was conducted in 2012, Barwon Downs Monitoring Program.

Cover photo is the Big Swamp.
Below is Boundary Creek.



Comment on a report

**prepared for Barwon Water
by SKM, Ecology Australia &
Latrobe University, 2012.
Barwon Downs Monitoring
Program.**

DRAFT

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INTRODUCTION

The Licence to extract water from the Barwon Downs Borefield is due for review in 2019. It is Barwon Water Authority's intention to apply for a renewal of this licence. Last year, in 2012, Barwon Water began to prepare its case. The "...**overarching objective of a successful licence renewal...**" would appear to be the driving force behind all endeavours. It would also appear that this drive is aimed at the down playing of past history and as far as possible to the exclusion of all other considerations detrimental to achieving a licence renewal.

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This Book 26, makes comment on the 2012 SKM, Ecology Australia & Latrobe University report that had to be acquired under the Freedom Of Information Act. This report is the first stage in this process of review and promotes a Barwon Downs Monitoring Program that best suits the overarching objective. A program that will hopefully, from Barwon Water's point of view, satisfy Southern Rural Water's acceptance as sound grounds on which to reissue the groundwater extraction licence.

Unfortunately local community stakeholders appear to have been omitted from this process up to this stage. More alarmingly there appears to be scant recognition of past data collection and experiences. If it is the intention of this monitoring program to set new benchmarks on which to evaluate future performance of the borefield impacts without recognition and or evaluation of past impacts, then this is most unsatisfactory from an environmental, social and agricultural aspect. Making a fresh start, ignoring and failing to evaluate past data and local community concerns gives a skewed impression that things are not as bad as they really are. Each successive new datum of benchmarking starts at an elevated level of impact.

What is most alarming in regard to this process of review and licence renewal, is the fact that Barwon Water sets the agenda, selects who will be involved in the process and only seeks consultant's advice supporting the case for renewal.

The New Barwon Water Base Case Monitoring Program.

The overall aim of the “Barwon Downs Monitoring Program, Monitoring Review, Final 1, 28 August 2013” report was to...

“Provide additional monitoring data and subsequent analysis required to support the licence renewal process.”

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It is extremely hard to understand why Barwon Water would exclude the experience and knowledge of local community stakeholders when preparing a revised monitoring program for the Gerangamete (Barwon Downs) Borefield. In this instance local community stakeholders are defined as landholders within the area of drawdown influence from the extraction of groundwater at the Barwon Downs Borefield. As a consequence the review of the monitoring, modifications and recommendations are well established by the time local community consultation is even attempted. Is this too late? Is the agenda already set? Some would argue this is the case. Whatever the result of such a discussion it is clear that many mistakes in this 2012 report could have been avoided if local community input had been called for in the initial preparatory stages of this report.

As a follow up to the 2012 report, and sometime in early 2013, Barwon Water prepared and let out Contract No. 000534, titled. **“Barwon Downs Monitoring Program Work Package 1 Desktop Assessment, Panel Consultant Request For Proposal.”** This work was to be finalised by 17 May 2013 with *“...the overarching objective of successful licence renewal.”* The successful applicant of this contract was to review the SKM, Ecology Australia & Latrobe University 2012 report as part of the contract.

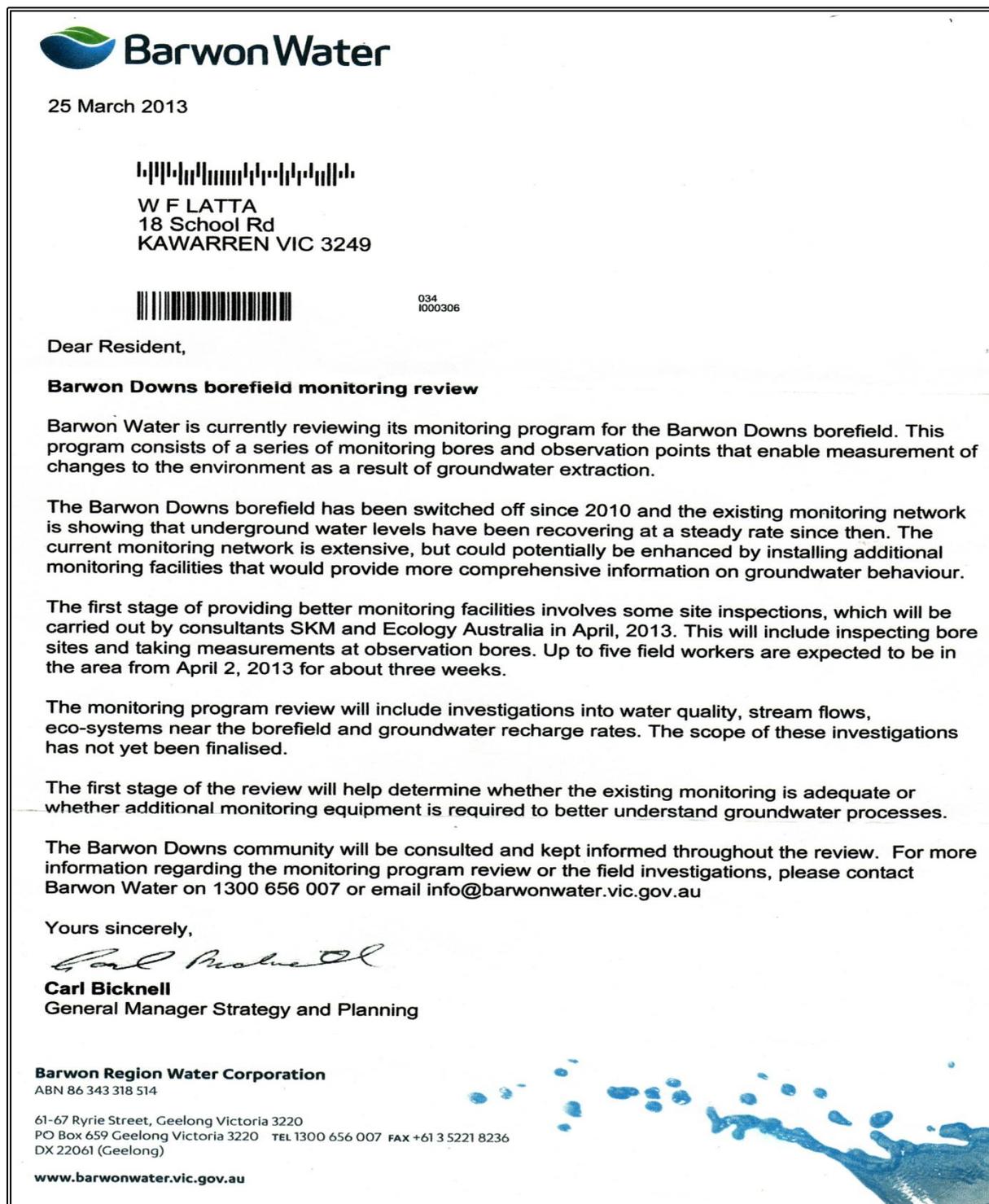
Contract No. 000534 stated, *“A review of existing Barwon Downs monitoring programme was undertaken in 2012 in preparation for licence renewal in 2019. This review (undertaken jointly by SKM, Ecology Australia and Latrobe University) highlighted gaps in the existing monitoring program that may hinder successful licence renewal.”* The contract continues... *“A detailed desktop assessment is now required to finalise the scope of the new monitoring program. It is assumed that installation of new monitoring sites/assets and major field activities will commence in the 2013/14 financial year.”*

The agenda is set; local community input not sought and the Contract report to be finalised by 17 May. Under FOI this 17 May report has been denied because it is still in draft format. It should have been finalised as per the contract, but is apparently still in draft form?

Timeline regarding these reports and contract.

- 2012 SKM, Ecology Australia & Latrobe University complete recommendations for a “Base Case,” revised Barwon Downs Monitoring Program.
- Early 2013 Contract No 000534 is let out to the successful bidder to conduct a follow up report based on the SKM, Ecology Australia & Latrobe University 2012 report.
- April 2013 site inspection done as part of Contract 000534 (See letter below).
- 01 May 2013 draft format is due for Barwon Water consideration.
- 17 May 2013 finalised report due.
- By 25 October 2013 the finalised report unavailable – still in draft form.

In March 2013 a Kawarren landholder received this letter...



It is most likely that this letter was informing residents of proposed visits to the Barwon Downs area as a result of **Task C**, as outlined in Contract No. 00534, "**Undertake site assessment.**"

Why Wayne was sent this letter is a mystery to Wayne as he lives in the adjoining Groundwater Management Area some distance from the Barwon Downs area.

Considering that the brief of Contract No. 0005634 required the finalisation of a report by 17 May 2013 a request was sent to Barwon Water asking for such a copy. As expected the request had to go through the FOI process. An FOI sent and dated 22 July 2013 included such a request. However, 45 days later the request was denied accompanied with an explanation.

“The third report requested in your application and emanating from Contract No. 00534 is currently in draft status and being finalised. Under the FOI legislation, documents in draft form on the date an FOI application is received are exempt under the Act.”

“A Barwon Water employee will be in contact with you after the 1 November 2013 to advise when this document will be finalised and a copy forwarded to you.”

(Barwon Water Ref: FO79152, dated 9 September 2013.)

It would appear that **Task F** stating this report had to be finalised by 17 May 2013 has been changed. Perhaps **Task E** in the contract headed, **“Preparation of draft and recommendations”** that had to be completed by 01 May 2013, has held up the process.

To further emphasise the lack of local community involvement in the planning stages of this review process, **Task B** of the Contract No. 000534, **“Undertake information compilation and analysis”** included this...

“Compile and assess available resources (existing reports, aerial maps, hydrogeological data such as pump test analysis, bore and geophysical logs, hydrographs, overlays etc)...”

No mention of tapping into local community expertise and in fact none is known to have taken place.

17 October 2013 the Barwon Downs Groundwater Community Reference Group met for the first time. Was this the first time local community was able to have input into the process? It would appear so. It would also appear that the agenda had been set. As the following comments regarding the 2012 report unfold below, it will become apparent why it is a shame and a pity that initial local community input was not sought.

The 2012 SKM Base Case Report Barwon Downs Monitoring Program.

The following commentary on this report focuses on the material as pertinent to the Boundary Creek region including the Barongarook High recharge area.

Page 2 of the SKM 2012 Report.

On this page it mentions that *“Potential risks to the environment were identified, and, as a result, conditions in the licence (2004 licence) were put in place to mitigate any unacceptable impacts known at the time.”*

Unfortunately this is not the case. Not all known potential and actual risks were acknowledged and of those identified not all had conditions in the 2004 licence to mitigate any unacceptable impacts known at the time.

1. The PAV (Permissible Annual Volume) to be extracted had been recommended in 1995 and accepted in 1999 at 4000 ML/year. The licence issued in 2004 allowed

- 20 000 ML/year extraction.
2. Any extraction over 4000 ML/year to included artificial recharge. No provisions made.
 3. Vertical leakage from layers above the EVF were determined by SKM as a major recharge of the aquifers being pumped from. No provisions were made to measure the impacts this may cause. Vertical leakage data collection recommendations had been made on numerous occasions – no conditions evident in the licence.
 4. To best understand the connectivity between aquifers and recharge processes relating to salinity studies, SKM in 1995, was recommending nested bores as best practice. SKM states that nested bore hydrographs are better at revealing connectivity between shallow and deep water aquifers much better than single bores in a location. This was not reflected in the licence conditions.
 5. Boundary Creek had run dry on numerous occasions coupled with,
 6. the fact that SKM had determined the critical level when this would happen was when the water table level in Yeo 40 dropped below 158 mAHD. The licence did reflect this with a trigger level of 158.5 mAHD in Yeo 40 requiring the release of supplementary flows down Boundary Creek. Unfortunately, the licence conditions did not take into account a review condition if this was unsuccessful. Boundary Creek had dried up on numerous occasions and local community experience had concerns over the length of time the creek took to begin flowing after substantial rainfall. No condition applied to the licence to investigate this or revise the mitigation proposals until the licence was to be reviewed fifteen years later in 2019. The success of the supplementary flow regime has been abysmal.
 7. The Upper Barwon Landcare Group warned of numerous other creeks being affected. No provision was made in the licence to study these.
 8. The top end of the Big Swamp had dried out and caught fire. Only possible when the water table dropped below 158 AHD. Information at the time coupled with the creek running dry, indicated and had shown that something was seriously wrong upstream of the Stream Flow Gauging Station on Boundary Creek. No provision was made to seek the cause of this dilemma.
 9. The acid level readings in Boundary Creek had dropped dramatically and were reflected in the water testing at the Stream Flow Gauging Station. This risk/happening was ignored and consequently no provision was made in the licence conditions.
 10. Boundary Creek would cease flowing over the summer period unless there was substantial rainfall. The cause of this was not to be investigated and so provide a basis for better protection and provision of mitigating measures to prevent unacceptable impacts.
 11. Even when Boundary Creek commenced flowing the water was not palatable to cattle until there had been considerable flushing flow through the system. Some recognition of this was reflected in the licence conditions and resulted in supplementary water being released from the Otway to Colac Pipeline into Boundary Creek. Best practice at the time would have included a review process of the suitability and success of this arrangement.
 12. The peat in the Big Swamp caught fire in 1997 and again in 1998. This was identified as a risk and ignored.

13. Platypus and large fish were decimated especially in the lower reaches of Boundary Creek. This was not acknowledged or recognised and therefore no provision was made.
14. Control plots for a flora review process due in 2009 were chosen at locations inside the drawdown influence. Best practice for selection of control plots ignored.
15. The 1990 flora, fauna and fish study results conducted by Barwon Water were flawed from the outset. (1988 Tunbridge fish study overlooked. Nellie Shalley local community experience and knowledge ignored. Belcher and other researchers unaware of previous pumping history.) These and the follow up studies in the early 2000s were based on doubtful 1990 results. Best practice not employed and as a result licence conditions unable to reflect appropriate conditions.
16. Local community members on the review committee at the time, wanted a 5 year licence review. No provision made and at the time was seen as best practice but was also seen as unacceptable to Barwon Water in regard to infrastructure expense required for such a short period. Best practice compromised.
17. The SEPP for groundwater (S 107, 1997) best practice was not reflected in the licence conditions.
18. The SEPP for surface water (S 160, 2003) was also not reflected in the licence conditions. The principles including precautionary, accountability, intergenerational equity, conservation of biological diversity appeared to be given scant recognition.
 - a. Warnings that many of these principles should be taken notice of came in the form of discussions and recommendations from Smith, Stanley, Farmar-Bowers, Witebsky, Nellie Shalley, Doug Chant , the CCMA, the Upper Barwon Landcare Network and the Gerangamete Flats Landcare Group.The provision of environmental flows as outlined in this SEPP was largely ignored, if in fact it was even referred to. The licence contained no environmental flow component.
19. Best practice local water management expertise and knowledge largely ignored.
20. Data collection and benchmarking pre 1991 largely ignored.

Page 3

Page three explicitly states that the Gerangamete Groundwater Extraction Licence issued by Southern Rural Water in 2004 covers "... **protection of stock and domestic use and protection of flows in the Barwon River and tributaries.**" "**Conditions of the licence also take into account mitigation of any unacceptable impacts.**"

This 2004 licence may have had these intentions but in practice this is not the case. S & D has not been protected and flows in the tributary Boundary Creek, have been reduced to nil during the summer and drought periods. Alarming, this 2012 document makes no mention of Stock and Domestic concerns.

This page also states that SKM, Ecology Australia and Latrobe University have addressed community interest adequately by developing a revised monitoring program. How this can be done without consulting the community is beyond belief.

Page 4

This page discusses the provision of additional monitoring data collection and subsequent analysis required to support the licence renewal process. The emphasis in the "brief" being

directed towards those things required to ensure the licence is renewed. The review should be looking at all parameters to determine *whether* the licence should be renewed and if so by how much. A balanced review process is required.

Page 5

This page states “*The primary issues that drive community concerns can be related to environmental impacts (both perceived and real).*”

Page | 11

The page then goes on to list the concerns and states that these concerns are a key driver of the monitoring program. How the local community concerns can be listed when there has been miniscule consultation is beyond belief. To those farmers along the lower reaches of Boundary Creek the primary issue is the decline in a secure summer and drought water source that can no longer be relied upon.

Page 6

This page states that the concerns regarding surface waters is “*..currently expressed as an environmental concern.*”

So out of touch it is laughable. Another major concern is Stock & Domestic (S&D) supply.

Page 7

The use of the word “potential” throughout the text and linking it with issues or impacts gives the impression that past impacts cannot be proven or substantiated. This is often not the case. Many of the impacts can be substantiated with data that is already available. Additional data and expense would only confirm what is already discernible. There is sufficient data available to ascertain the cause(s) of most of the impacts.

To state that engaging with stakeholders and the local community prior to implementation of the revised monitoring is like trying to close the door after the “horse has bolted.” The stakeholders most affected in the borefield area – the landholders/locals – should have been involved pre the preparation of this 2012 SKM, Ecology Australia and Latrobe University report.

Page 8

Acknowledgement of changes in groundwater flow directions as a result of groundwater processes is interesting and involves one of the concerns that does not appear to be covered in this document or the new monitoring program. One aspect of this changing groundwater movement being affects experienced on adjoining groundwater systems.

Page 10

“*...the monitoring program will need to identify criteria that define when an unacceptable impact occurs.*” The impacts that have already occurred need to be confirmed and local community experience is that these impacts are unacceptable. Benchmarking and making a fresh start from 2013 is not be acceptable. Past impacts, valuable and pertinent data should not be forgotten.

“*Criteria are currently available for most of the potential impacts but those that affect ecosystems are unlikely to have been developed using sufficient rigorous data and methods to be acceptable to the community and the regulators.*” What has SKM been doing for 30 years of consultation over the Barwon Downs Borefield? The “on ground grass

root” observable impacts that have already taken place within the area of residual drawdown are not acceptable to the local community and whether rigorous data and methods have been developed is little comfort to the landholders and environment impacted.

From page 11 on it would appear that the authors live on another planet. Not consulting with the local community has resulted in a multitude of inaccuracies or at the very best could only be described as huge differences in opinion.

Table 1, Pages 11 & 12 sets out Likelihood of unacceptable impacts occurring and availability of suitable impact criteria.

There are seven rows of Potential Impacts in Table 1. Five of these impacts require comment and the comments are shown in red. If local community input had been called for such glaring differences may have been avoided.

Potential impact	Likelihood of impact occurring	Likelihood impact is unacceptable	Impact criteria available	Potential sources for impact criteria	Is a review of criteria required?
Reduced surface water availability for existing diverters	Mod to High	Mod to Low	No	SRW may have diversion limits for streams in the project area	Yes
	High	High	Yes	Stock & Domestic	
Reduced surface water quality for existing diverters	Low to mod	Low to mod	Partial (for ecosystems only, not for water users)	Unlikely that limits have been defined for surface water diversion	No
	High	High	Yes for both	Available	Yes
Pressure on aquatic ecosystems	Mod to high	low	Yes	EPA has general guidelines for water quality changes but these are not specific to the ecology in the individual streams	yes
	High	High		Available	
Pressure on terrestrial ecosystem	Mod to High	Low	No	Sensitivity of vegetation to change in groundwater level is not defined. Unlikely that any drawdown limits based on vegetation stress will have	Yes

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				been defined.	
	High	High	Yes	Available	
Increased risk of peat fires	Mod	Mod	No	Unknown	Yes
	High	High	Yes	Known	

Page | 13

Page 12

Point 5.5, 1.

In this section the new monitoring program is being designed to identify the relative contribution of changes or variables that will result in impact. They are listed as land use changes, groundwater extraction and drought. It would appear that no consideration has been given to the possibility that past data is sufficient enough to ascertain impacts already occurring. The argument being, that data already collected can adequately determine the reasons for impact.

This page refers, on several occasions, to future potential impacts and the development of impact criteria, but as is true of the whole document, there does not appear to be any recognition of impacts that have already been caused. Local community knowledge can specify impact criteria without having to make a fresh start.

This page also discusses a monitoring program that will “...*characterise all groundwater processes to a sufficient standard that will enable impacts to be estimated to a reasonable level of accuracy.*”

And states, “*The monitoring program will be required to differentiate between groundwater changes, characterise groundwater process that lead to impacts, and identify criteria that define when unacceptable impacts occur.*” What about the impacts that have already taken place and the data available to determine the causes? What has Barwon Water and its advisers, SKM, been doing for 32 years in relation to developing an adequate monitoring and management program? Any proposals being made in this document are not new science.

The compiling of a Total Water Balance should have been one of the first studies to be completed decades ago and would have given managers of the water resources at Barwon Downs a clear understanding of what resources were available for allocation. A Total water Balance has never been done and is still not recommended.

Page 13

“*The monitoring program should identify which rain gauge best represents rainfall in the groundwater recharge areas.*” Why this has never been done is astounding and especially so when the Pennyroyal gauging station that was used in the 2008-09 Flora Survey, is some considerable distance from Barongarook High. This would have been an appropriate time to look at a better site or sites. To look for one appropriate site as suggested in this document shows a complete lack of local knowledge of rainfall patterns in the area. Perhaps, local community rain gauging abilities, data and expertise could be used to determine accurately rainfall on the recharge area(s).

Stating that land use practices past, present and future is likely to be a complex process requiring detailed analysis seems quite strange. Local community involvement would be

able to adequately and accurately provide the raw data. This should not be a complex mission and surely SKM is capable of analysing the raw data with some relative ease and expertise.

Page 14

Table 2, Data Required to characterising groundwater change.

Page | 14

This table contains much of the same . Some of the “Highs” should be “Lows” and some of the “Nos” should be “Ask for and tap into the local community resource.”

The last two paragraphs on this page appear to be contradictory.

“Existing hydrogeological data in the Barwon Downs region is sufficiently detailed to characterise the groundwater processes that lead to impacts on the availability of groundwater for Barwon Water and other groundwater users.”

The aquatic ecology of the Big Swamp before it was destroyed, was a groundwater user. Farmers downstream of the Big Swamp used this same water making their farms viable over summer, drought proof and a valuable source for fire fighting water. Why this same hydrogeological data cannot be used to determine aquatic, terrestrial and impacts on farming enterprises is most baffling. This next paragraph creates the dilemma.

“The processes that lead to impacts on aquatic and terrestrial ecology are understood at a conceptual level, but there is insufficient hydrogeological data to characterise the processes to a suitable standard to assess the potential impacts.”

Page 15

“The current conceptual model of groundwater flow assumes negligible groundwater flow occurs between the aquifer and the overlying aquitard. This assumes that changes to groundwater flow would have a negligible effect on stream flow where the aquifer is confined (aquitard area). Although there is a high probability that current stream flow is only slightly affected by changes to groundwater, groundwater flow is very slow in aquitards. There is a potential risk that stream flow may be affected in coming years. Measuring water levels in the aquitard is necessary to assess the risk of changes to groundwater reducing flow in streams where the aquifer is confined.”

What an amazing paragraph.

- Recommendations to measure water levels in layers above the Eastern View Formation have been made numerous times since 1986 as written by Farmar-Bowers in 1986; Barwon Water’s flora and fauna studies in the early 1990s; Witebsky in 1995; Barwon Water studies done in the early 2000s leading up to the Barwon Downs groundwater extraction licence review; one of the panels reviewing the Barwon Water 2004 licence renewal; Gardiner 2007 and Barwon Water’s flora survey 2008-09.
- SKM stated in one of its reports leading up to the 2004 licence renewal that the Barwon Downs Borefield was sustainable and that a major source of recharge to the EVF was from water held in the layers above the points of extraction. Some clarification is needed explaining how this 2012 conceptual model that assumes negligible flow between layers, was arrived at.

- SKM have always maintained that there will be flow effect on streams depending on the amount of extraction. Over 10 000 ML/year extraction during the latest drought is well above the 1 500 ML/year no effect level, determined by Witebsky, and indicates a major flow effect.
- Whether referring to stream flow above the confined aquifer or where stream flow crosses the unconfined aquifer it gives the wrong impression to state “...*there is a high probability that current stream flow is only slightly affected by changes to groundwater.*” Extensive data is available that places serious question upon the correctness of this statement when referring to Boundary Creek.
- Rick Evans of SKM in his fellowship in 2006 wrote that stream flow impact can be observable within hours but may take decades to manifest.
- In the same study Rick quote Boundary Creek as a creek that dried up one year after groundwater extraction. If this was in 1984, and every indication that this was the event, then the following 1000 odds days that Boundary Creek has been dry since, despite 2 ML/day of supplementary flow release, is a much more than a slight effect.
- One can only wonder what the long term holds, as the layers above the EVF vertically leak downwards and provide replenishment and sustainability to the extraction bores below.

This page throws up another interesting dilemma for Barwon Water and SKM. Boomerang Swamp, a swamp of state significance, was left to its own devices for survival on the recommendations to the 2004 review panels that it was self contained and sitting on a perched swamp. SKM are now stating that there is no data currently available to make this assertion. The Boomerang Swamp has been devastated and is now a marginal Actual Acid Sulfate Soil site.

Page 16

Table 2 continues.

Why there is very limited data currently available for subsidence raises some serious questions. What has the subsidence monitoring since the 1980s been measuring? If this section of the 2012 report is to be believed, why hasn't better monitoring and data collection been done? Why were the subsidence trigger levels included in the 2004 licence of such low value? What does it mean that there is very limited data currently available? And, what has happened to the data that has been collected going back to the 1980s?

Page 16-17 goes on to discuss the hydrological (surface water) data.

One can only shake one's head and wonder if the Boundary Creek mentioned in this section is the same one that flows through Yeodene into the Barwon River.

To state that after 30 years of data collection that it is incorrect or at best requires correction, is an astounding statement.

Assuming the data requires correction it has not been made very clear how correction of this data will achieve what is being proposed here. Also how the supplementary flows released from the Otway to Colac Pipeline play a role in this adjustment is unclear. During summer the supplementary flows do not even reach the Yeodene Stream Flow Gauging Station. The flow disappears straight into the depleted EVF under the Big Swamp.

Pages 17-18, Potential Acid Sulfate Soils (PASS).

The assertions made in this section of this report may very well be correct, however, the omission of any kind in relation to **Actual** Freshwater Inland Acid Sulfate Soil having occurred in the area, is most apparent.

“The decline of groundwater levels may lead to potential acid sulfate soils (PASS) drying out if the groundwater at these sites is connected to the aquifer under stress.”

In the early 2000s SKM designated that the Big Swamp area is a discharge point for the EVF. To maintain flows in this section of Boundary Creek the water table needed to be kept at 158.5 metres AHD. The water table has been below this level for years. Supplementary flows released into the system disappear into this groundwater depleted area. The Big Swamp is a peat swamp and is now an Actual Acid Sulfate Soil Site, returning an analysis with the distinction of being one of the worst top three in Australia.

Page 18, Reduced surface water availability.

The regulator Southern Rural Water (SRW), may well want to *“protect their customer base”* but no one appears to want to protect the rights of Stock & Domestic (S&D) users. Throughout this whole document the omission of any reference to S&D is glaring.

Page 20

LAWROC Landcare Group has already commissioned a fish survey of lower reaches of Boundary Creek to confirm values and current condition of the stream. This was a low cost operation requiring a low effort to obtain the data, not a “High,” as designated in this report.

Page 20, Increased Pressure on Terrestrial Ecosystems.

“The extent to which terrestrial ecology in the Barwon Downs area is dependent on groundwater and its sensitivity to the decline in groundwater levels is unknown.”

It should be known, as Farmar-Bowers flagged the possible dependency links way back in his 1986 report. Barwon Water at the NREC hearings in the late 1980s stated that Farmar-Bowers’s recommendations aimed at forming credible baseline data had been implemented. This was not the case. The 21 000 ML stress test pump commenced in 1987 without any of his recommendations being implemented.

Page 21 Reduced groundwater availability

“There are very few, if any existing groundwater users in the region. Although it is unlikely to be an issue, it is recommended that a database search be conducted.”

This is old school type thinking. In this day and age and considering State policy regarding Beneficial Uses linked with the accepted fact that there is a definite connection between perennial streams and groundwater, this statement has to be seriously challenged. Groundwater Dependent Ecosystems (GDEs) and S&D from summer streams rely on groundwater discharge. One of the reasons that there is often an over allocation of water resources is that some water has been accounted and allocated twice. Once as groundwater, and again as surface water. A Total Water Balance would clarify this.

Page 21 Reduced Groundwater Quality

The Barwon Downs area is a hot spot for surface salinity impacts and it would appear that the recommendations in this report are suggesting to examine only the aquitard layer above

the EVF and no further up the profile to the surface. It would also appear that little to nothing is known about any of the layer profile above the EVF. This should have been done decades ago as recommended. Perhaps it is not too late. However, to state *“Monitoring of groundwater salinity from the pumping bores at Barwon Downs have shown a slight decline in salinity since the start of operation since 1986 indicating that the risk of reduced groundwater quality is low.”*

This statement portrays an unacceptable picture when considering:

- As mentioned earlier in the 2012 report impacts on and through the aquitard and layers above may take a considerably long time to manifest as the water in these layers leak down into the EVF. This likelihood has never been studied but recommended numerous times.
- The layers above the EVF, under normal conditions, are partly replenished from upward pressure from the EVF below.
- No salinity data collection was stipulated in the licence for the layers above the EVF,
- Any surface salinity data collection by DEPI has been downgraded and in many instances ceased.
- No testing of what the salinity levels are in the lowest section of the EVF. In other words, is the EVF sitting on a salty slug?

This section once again mentions Potential Acid Sulfate Soils and completely disregards the fact that the Big Swamp is an **Actual** Acid Sulfate Soil site producing considerable acid, heavy metals and metalloids that have to be regarded as pollutants if discharged into the outcropping EVF that the Big Swamp is sitting over. Petrides and Cartwright suggested that the groundwater extracted at Barwon Downs was something like 20 000 years old. If this is the case then the water at the borefield should maintain its quality for some considerable time to come before any pollution impacts eventuate at the borefield. No component of the revised monitoring program makes any allowance for this to be studied.

Page 22 Increased Fire Risk

No mention is made in regard to the likelihood that as the layers above the EVF leak their water into the depleted EVF below, that the surface summer influence will come earlier and stay longer.

No mention has been made of spontaneous combustion in drying peat or spotting from fires outside the peat perimeters. This 2012 report recognises that drying out peat is a hazard and that,

“This in turn, increases the risk of forest fires which can have disastrous impacts on the surrounding national parks.”

No mention of risk to humans and or infrastructure has been made except for this statement,

“Colac’s water supply will be under threat.”

If local community knowledge is to be believed it would appear that if a Big Swamp peat fire where to escape creating an uncontrollable wild fire the borefield infrastructure would be one of the first things to be burnt to the ground, shortly followed by the rest of the Barwon Water infrastructure in the area as the fire races to the coast.

Page 23 Monitoring and Evaluation Program.

The rest of the 2012 document outlines a suggested “Base Case” monitoring program and discusses its applicability and chances of securing a renewed licence. Any item or data collection that is deemed to be less likely to achieve this licence approval appears to be categorised to the lowest rating. This is not such an unusual occurrence. When attempting to achieve a goal those things that are counterproductive are naturally given less significance, if they cannot be avoided altogether. *“The full detail of the monitoring program is presented as a table in Appendix B.”* This is approximately the same that Appendix B was sent. The 2012 report, under FOI, arrived as a hard copy and it is assumed that it was provided in full. However, Appendix B could only be scrutinised with a magnifying glass. No attempt was made to do this.

There are a few observations in the readable text regarding the Base Case that can be made that indicate once again that the omission of local community involvement has led to strange statements.

- Determining land use change past, present and future has been given a very high cost and is to be assessed indirectly. However, land use change will play a very important role. *“...the effect of land use change is the residual impact after groundwater extraction and drought are taken into account.”* Unless land use change is calculated directly and accurately there is always the chance that components of groundwater extraction or drought impacts could easily be incorrectly attributed to land use change. That is, any residual impact that is not attributed to groundwater extraction or drought will be automatically attributed to land use change. Local community could provide a low cost and accurate account of land use change, given the chance.
“A very preliminary estimate of costs to include all land use changes into the Base Case is in the order of \$1M.”
“Due to its high cost, complexity, and moderate to high risk of providing inconclusive results it (is) not recommended that a detailed assessment of land use change be included in the monitoring program.”

The term that comes to mind here is that land use change will be the “sacrificial lamb” for all unaccounted residual impacts.

- The tree diagram on page 25 should have TOTAL WATER BALANCE at the top of the tree. Local community assistance and cooperation with this would be crucial.

Throughout the presentation of the Base Case there is only one scant reference to local community involvement.

The SKM, Ecology Australia & Latrobe University’s report recommendations.

These recommendations appear to be based on the assumption that very little is known of impacts already created; that there is insufficient data available to make informed decisions regarding these impacts and that any impact presently apparent is acceptable because an adequate identification criteria has not been developed.

Once again it is recommended that this new Base Case monitoring program does not evaluate the historical effects of land use change but,

“The program identifies the impacts of land use change from the residual or unaccounted impacts that are attributed to extraction and drought.”

On the very last page before the referenced credits the report includes this recommendation...

“That Barwon Water communicate regularly and as early as possible with regulators and stakeholders including the community regarding the proposed monitoring plan, its objectives and overall design and scope.”

Appendix A in this 2012 SKM report is titled “Ministerial Guidelines for Licensing Groundwater for Urban Water Supply.”

Why this is included is most befuddling. On page 2 of this document it states. ***“The guidelines do not apply to the renewal of groundwater licences for urban water supply purposes.”*** If this is missed by the reader a similar message is repeated on page 6 of the same Ministerial Guidelines.

Also: The use of yellow for headings is most interesting. For people with failing eyesight, usually with some age attached, yellow is a very difficult colour to see and as a consequence makes reading of various parts of this document quite onerous.

No comment has been made on Appendix B due to the extreme difficulty reading this section of the report.