OTWAY WATER

BOOK 22

Morphication
and
Myth Creation

Myths perpetrated within the "halls" of the natural resource managers and the water industry have had a dramatic impact on the surface and subterranean environments in the Otway Ranges.

(CONCLUSION, page 16)

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INTRODUCTION.

The understanding and meaning of the words "*Morphication*" and "*Myth*" as intended in this book are as follows. Morphication is an engineered word made up specifically to facilitate the telling of this book's story.

Morphication occurs when a statement undergoes or is caused to undergo a gradual process of transformation.

A Myth is a story or statement with an element of truth, often believed to be true by the teller, but is usually distorted, exaggerated or fabricated for effect.

A myth can result from:

1. an element of truth that undergoes a transformation through telling,
2. a statement that is told so often it becomes accepted as the truth. A statement that could be:
    a. based on misinformation,
    b. guesswork,
    c. assumption,
    d. a partial truth or
    e. fabrication.

Whatever the process of the myth creation, sound scientific research, studies and investigations should never allow morphication and or myths to happen whereby the end result is written up as a scientific fact.

Otway Water Book 22 examines examples of the ideas and statements in the early seeding stages of morphication; those that have blossomed into fully fledged myths, and one or two myths that have become truths through constant chatter.

These examples all relate to water issues centred around the Barwon Downs Borefield, Victoria, Australia.

Unfortunately, unless the writing up of these myths are not debunked, corrected and subsequently recorded, then they become part of historical record that can inappropriately influence decisions for decades.

1. The Two Thirds Myth.

The Definitive Statement that Groundwater extraction is Responsible for the Reduction of Two Thirds of the Baseflow in Boundary Creek.

(Boundary Creek is a tributary of the Barwon River in the Barongarook and Yeodene areas, Victoria, Australia.)

At community consultation open sessions during 2019 in Colac, Birregurra and Winchelsea and on other numerous occasions the following statement has been stated.

"***Pumping over the last 30 years had been responsible for two thirds of the reduction of flows into Boundary Creek***."

In the Colac Herald this statement was made, "***… recent technical work has confirmed Barwon Water's operation of the Barwon Downs borefield during the past 30 years was responsible for two thirds of the reduction of base flow into Boundary Creek.***" (Colac Herald May 10, 2019).

This statement was made in the Ministerial S78 Notice of the Water Act 1989 issued to Barwon Water on 11-09-2019. "***A further report commissioned by Barwon Water titled "Barwon Downs Geological Studies 2016-2017: Numerical model calibration and historical impacts"(Jacobs June 2017) found that: operation of the borefield over the past 30 years is responsible for two thirds of the reduction of groundwater base flow into Boundary Creek; the dry climate experienced during the same period accounts for the remaining one third, and operation of the borefield has increased the frequency and duration of no flow periods in lower reaches of Boundary Creek.***"

In December 2019 as part of Barwon Water's nine reports (1,279 pages) supporting the Remediation and Environmental Protection Plan resulting from the S78 Notice, the following statement was included. "***As predicted, groundwater pumping reduced groundwater contributions to flows into Boundary Creek. Technical studies in 2017 confirmed that the historical management of groundwater extraction from the Barwon Downs Borefield over the past 30 years was responsible for two thirds of the reduction of groundwater base flow into Boundary Creek, increasing the frequency and duration of no flow periods in the lower reaches of Boundary Creek. The dry climate experience during the same period accounts for the remaining one third reduction.***"

The same definitive statement being made time and time again.

"***Hydrogeological investigations found that operation of the Borefield over the past 30 years is responsible for two thirds of the reduction of base flow into Boundary Creek' (Jacobs, 2018a).***"

"…was responsible for two thirds of the reduction of groundwater base flow into Boundary Creek, increasing the frequency and duration of no flow periods in the lower reaches of Boundary Creek."

"***operation of the Borefield over the last 30 years is responsible for two thirds of the reduction in base flow into Boundary Creek" (Jacobs, 2018a).***

Besides there being many facts that point to another more feasible reason for Boundary Creek drying up,[21] the above definitive statements cannot stand up to any form of scrutiny.

The 2016-2017 report credited as determining that groundwater extraction was responsible for a two thirds reduction in base flow in Boundary Creek stated this, "***The model indicates that the operation of the borefield over the past 30 years is most likely responsible for two thirds reduction of base flows into Boundary Creek.***" (Jacobs 16 June 2017:Barwon Downs Hydrogeological Studies 2016-2017, Numerical Model-Calibration and Historical Impacts. Barwon Water.)

Indicating something as *most likely* should never morph into a definite one year later in the Jacobs 2018a report or any other report. Adding to the shoddy manner in which this definitive statement has morphed is the fact that Jacobs modelling has many inherent problems.[19][20] The "*indicates"* and "*most likely"* come from modelling that is suspect.[20]

> *Otway Water Book 35 argues that groundwater extraction is responsible for 100% reduction of baseflows in Boundary Creek in the Big Swamp Wetland area.[21]*

2. A New Myth in the Making.

Did Boundary Creek have NO FLOW periods pre Groundwater extraction?

The following statement has also morphed out of the Jacobs modelling, "***…and operation of the borefield has increased the frequency and duration of no flow periods in lower reaches of Boundary Creek. (Jacobs 2018a).***"

If local knowledge and experiences had been placed into the modelling, the model results would have been totally different. The only time Boundary Creek had any semblance of no flow between 1912 and the first groundwater extraction, was during the construction of McDonalds Dam across the creek. Attempting to determine the origin of this quote this was found on the Barwon Water "Have Your Say" website. "***This suggest that the lower sections of Boundary Creek would likely have no flow periods during summer regardless of groundwater pumping.***"

3. Blind and Deaf to Reality – another Myth Created.

Sometimes when local identities tell of their experiences and impart their knowledge little notice is taken. Unacknowledged issues and or observations go unrecognised when those people charged with natural resource management fail to take notice, and or, fail to look into concerns. Then to discredit and or replace this local knowledge without any investigation leads to bigger problems and the creation of more myths.

In March 2003 Barwon Water had this to say, "***No long-term flora and fauna impacts have been detected in the Boundary Creek area resulting from the operation of the Barwon Downs wellfield.***"[4] and by…

2012 Barwon Water was still insistent that there was no long term environmental impact caused by the Borefield. "…***water table drawdown occurs during pumping, but no long-term environmental impacts have been linked to borefield operation.***"[5]

Even four years later in 2016 Jacobs had this to say,

"***No evidence was found that declining groundwater levels caused by groundwater extraction at Barwon downs had a negative impact on vegetation health in the catchment.***"[1] Not that this statement was anything new despite this myth having been strenuously debunked on numerous occasions.[3]

There is always the chance that if something is not true and is repeated often enough it will eventually be accepted as true. This is especially so if these untruths are never corrected when found to be wrong.

By 2019 the reality and acceptance by resource managers of impact on vegetation in the Boundary Creek area could no longer be denied. But was another myth being created?

"***There is currently insufficient monitoring data to identify if historical groundwater pumping at Barwon Downs has caused any measurable impact to sensitive environmental receptors other than Boundary Creek and Big Swamp.***"[6] (Jacobs December 2019).

Wade's 2019 report places considerable doubt on the versacity of this Jacobs' statement.

4. Only Boundary Creek Significantly Impacted.

A 2017 Jacobs report found this.

"***The report concluded that no other rivers or creeks have been impacted as significantly as Boundary Creek through change to baseflow by operation of the borefield.***"[7] However, Wade's report of a 50% reduction of baseflows in Loves Creek in 2017 is getting close to the Boundary Creek dilemma.[8] Wade

regards this state as getting very close to catastrophic when follow up work in 2019 determined a 60% reduction by November 2019.[9]
Loves Creek baseflow reduction of 60% from groundwater extraction, is significant.
Another myth is created.

5. The Loves Creek is a Losing Stream Myth.

"***Loves Creek loses streamflow to groundwater for the majority of the year and becomes a gaining creek for a short period during the wet months of the year.***[10]
Modelling results appear to be driving this statement. How such a result could be reached when there is only one Stream Flow Gauging Station on Loves Creek that is located in the mid-section of the creek, defies all logic.

Otway Water Book 49, pages 44-48, looks at this statement in some detail in an attempt to understand how streamflow loss could possibly be correct. The conclusion reached being that this statement falls into the realm of mythology.

6. The Few Impacts from Groundwater Extraction Myth.

Hopefully the following excuse justifying the extraction of groundwater over surface water is long past being used as unfettered exploitation of groundwater.
"***Because the use of groundwater usually has few adverse environmental effects, it is often favoured over surface sources which can have marked effects***"[11]
This sentiment was repeated that often in the Department of Water Resources documents prepared as part of the Natural Resources Environmental Committee 1980's hearings, and, rather than being accepted as a generality that someone had thought up, it became an accepted truth. This urban myth type of thinking lasted well into the 21st century. What this in effect did was to allow the sanctioning of an ignorance of the connectedness between subterranean ecosystems and surface water ecosystems in the Otway Ranges. Water resource managers and decision makers had a lot to learn. Recommendation 4 of the NREC report reflected this.[12]

7. Water Myths Go Back a Long Way.

As far back as June 2002 in the Geelong Business News there was an article "Geelong's water resources far exceed the city's current and future

requirements."The then Barwon Water CEO, Dennis Brockenshire, was quoted as saying, "***One of the myths I have to deal with is that Geelong is short of water.***"

8. During the Millennium Drought 70% of Geelong's Water Came from Groundwater at the Barwon Downs Borefield.

"***2006-2010 – Millennium Drought.***
During this period, the Barwon Downs Borefield was the only standby source available to supplement the Geelong region water supply and with no other alternative sources to bring online the borefield was heavily relied upon to maintain supply of water and at times it supplied above 70% of Geelong's daily water requirements. Without the use of the borefield Geelong would have almost certainly run out of drinking water." (13)

On ABC television in 2008 Michael Malouf, Managing Director of Barwon Water at the time, stated that the Barwon Downs Borefield was "*...crucial to Geelong's water supply in a diversified sense. For example in the major drought period of 2006, the Barwon Downs aquifer provided over 70% of Geelong's water.*"

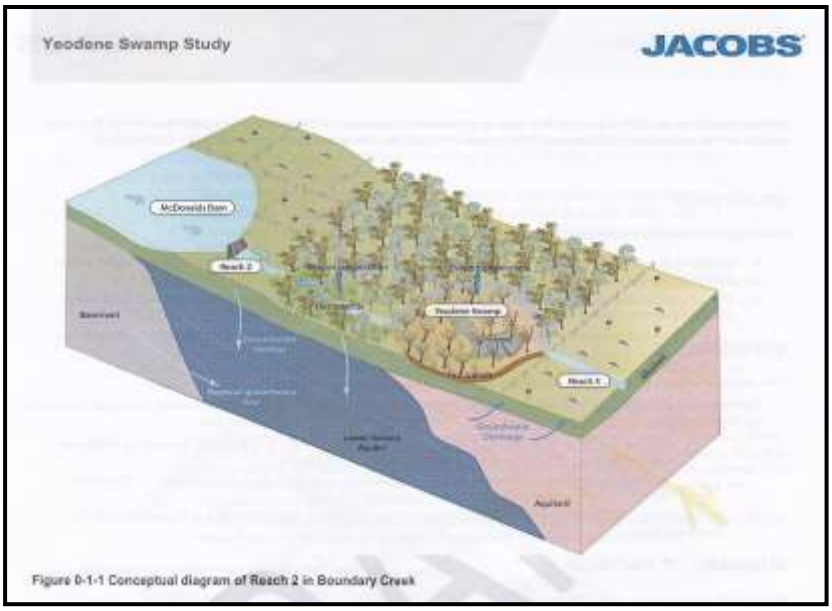
Numerous statements like these have been repeated so often as very definitive claims, that one could reasonably assume were based on readily available and verifiable data. However, efforts to gain exactly what percentage of Geelong's water came from the ground cannot be determined.
Statements containing such phrases as "***70% of Geelong's drinking water***," "***the 70% of the region's needs***," "***the 70% of Geelong's water needs***," "***the 70% of the Geelong water supply***," "***the city's drinking water***," "***the region's drinking water***," "***the city's daily use***," and "***Geelong's total water consumption***," could not be confirmed when matched against consumption data. It would appear that such claims are a classic example of the creation of an Urban Myth. Otway Water Book 52 discusses the 70% myth in detail.

9. Aquitard Under the Big Swamp at Yeodene.

The following statement is based on assumption, wishful expectation and the results of modelling relying on scant data.
"***Base on modelling and earlier bore logs Jacobs (2017a and 2017c) have suggested that the Big Swamp lies over an aquitard***..."(14)
The Big Swamp may well be sitting on an aquitard but to this day no observation bore has been drilled in the swamp specifically to investigate whether the swampy wetlands are directly connected to the Lower Tertiary

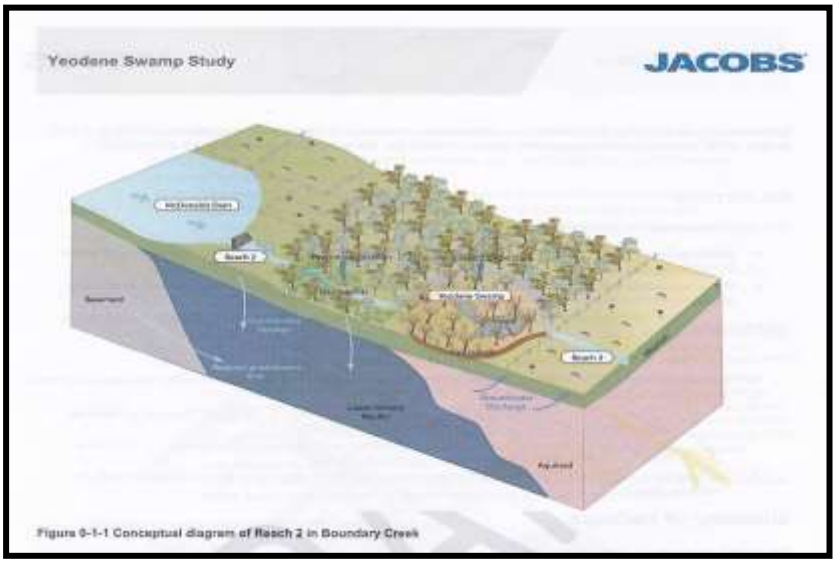
Aquifers or not. Assuming the modelling is correct is to accept and perpetrate a myth.

"***No detailed drilling has been undertaken within the swamp to determine the substrate under the Big Swamp.***"(14) Jacobs Figure 5 below presented 3 years later in 2020, shows that things are "…***not precisely known***." yet discussion at community meetings presented the notion that the Big swamp actually sits over an aquitard. The modelled suggestion becomes a definite. The following diagrams presented in documentation and at public meetings support this stance.



This diagram found in a Jacobs document is dated 9 November **2017**.(15)

This shows the Big Swamp appearing to sit above the aquitard. This matches the rhetoric of the time.

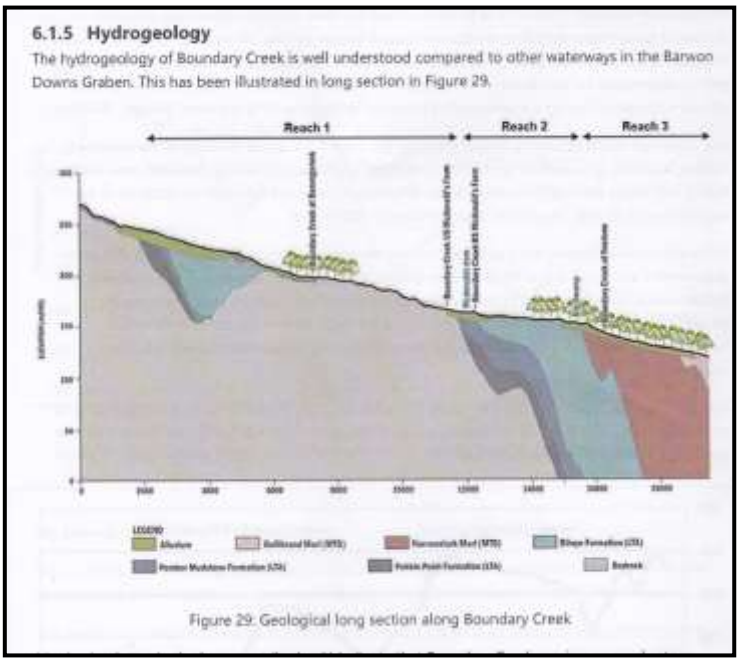


One year later. This same representation is still in use and can be found in the Jacobs document dated 10 August **2018**.)16)

This diagram appears numerous times throughout the year despite appeals to actually determine what earth layers are under the Big Swamp Wetlands. Cut out the guess work and rhetoric.

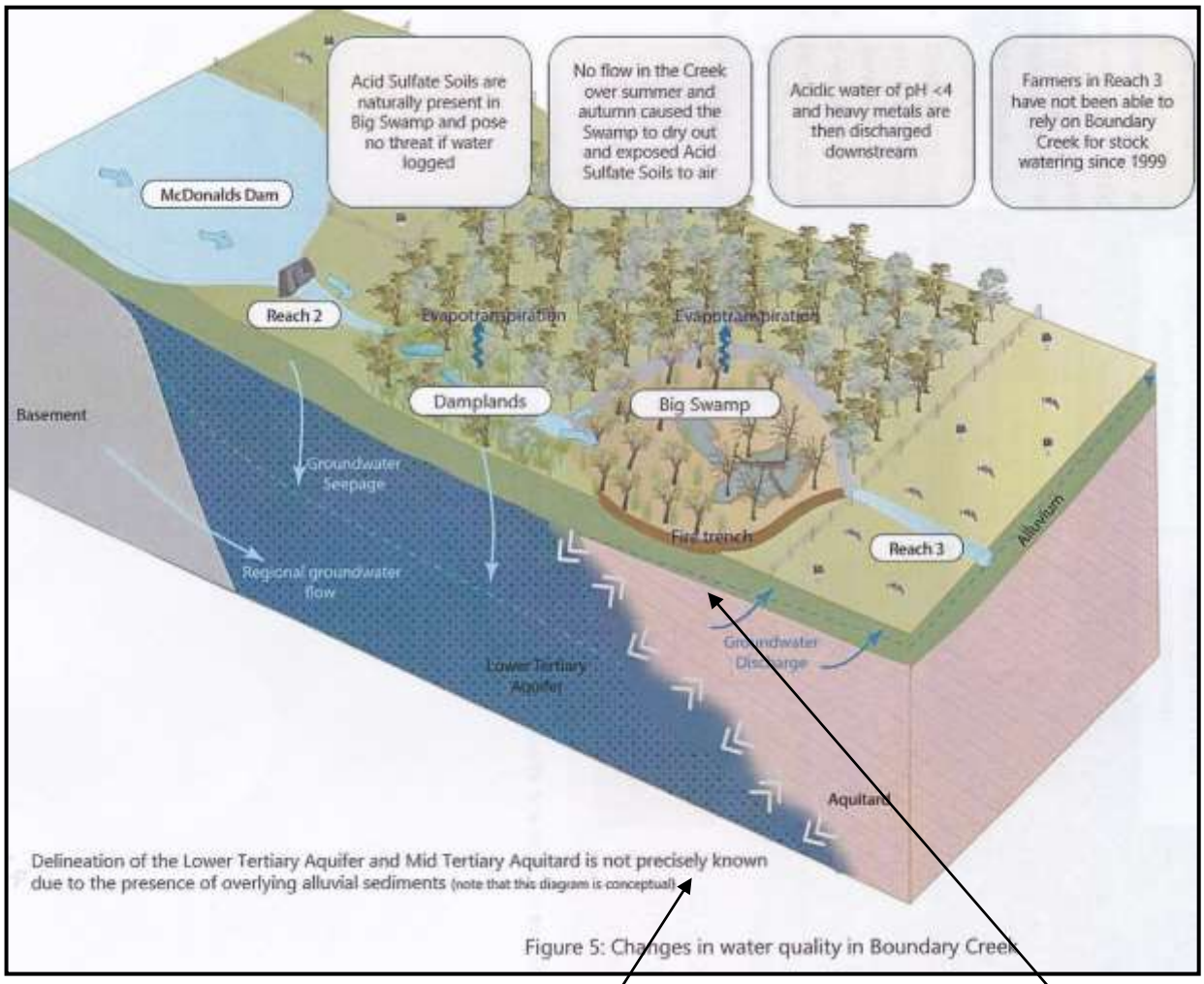
The modelling suggestion should be replaced with a definite.

Logic indicates that the Artificial Supplementary Flows that disappear half way into the swamp area are flowing into the depleted Lower Tertiary Aquifers.



This diagram (Jacobs 27 Feb. **2020**[17]) at least places the Big Swamp in no-man's-land which is closer to the reality of not knowing where it sits in relation to the Lower Tertiary Aquifers.

The diagram below also appears in the same document[17] but still gives the impression the Big Swamp sits over the aquitard.



The layperson has to read the fine print to gain some understanding as to what the double arrow heads mean. If anything, the approximate interface between the aquifer and the aquitard, should be shown half way under the Big Swamp.

The continual unsubstantiated discussion that places the Big Swamp Wetlands sitting on an aquitard is a myth created.

Post Script.

A day before finishing off this book an email arrived as part of the REPP (Remediation and Environmental Protection Plan) modifications asked for by Southern Rural Water.

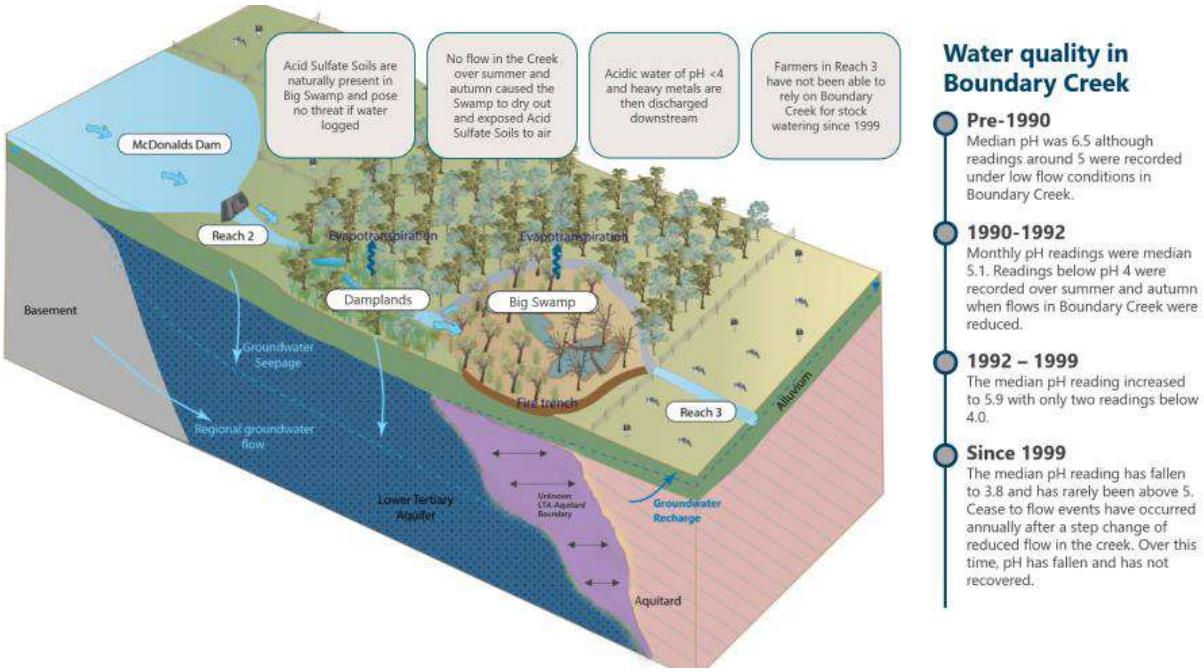
The following extract is from page 15 of a Barwon Water response to the Southern Rural Water requests for change, titled:

The ITRP mentioned in this extract refers to the Independent Technical Review Panel set up by Southern Rural Water to advise on the Remediation and Environmental Protection Plan (REPP).

"Boundary Creek, Big Swamp and surrounding environment
Remediation and Environmental Protection Plan
Summary of proposed amendments
30 September 2020."

The ITRP identified previously, and in the current review, that misconceptions regarding the conceptual model have been presented repeatedly and need to be corrected to "avoid further promulgation of false understanding and to avoid inappropriate remedial action."

The conceptual model used in Figure 5 has been updated to more clearly indicate that the location of the boundary between the LTA and the Aquitard is uncertain and cannot currently be clearly defined.



The following sentence to also be added at the end of page 35:
The below diagrams (Figures 5, 6 & 7) are conceptual and subject to further updates as additional information becomes available during later stages of the remediation program.

The aquitard under the Big Swamp Myth has been addressed – well done in anticipation of the investigative work being done.

10. Rapid Borefield recovery.

Once pumping stopped at the Barwon Downs Borefield following the Millennium Drought it was reported that the borefield was quickly recovering. Jacobs 18 December 2017."***Groundwater levels close to the borefield have recovered approximately 80% since 2010 when the borefield was last used.***"(18) This appears to be wrong on two counts.

- The borefield was used in 2016 when over 3,200 ML was extracted.
- This 80% recovery in the vertical one dimension vertical sense, equates to a considerable lower percentage in a three dimensional volumetric sense.

Otway Water Books 43 and 35 look at this type of recovery in some detail and present an argument that if the vertical recovery of 50% is considered from a 3D perspective rather than a 1D view point, the recovery would be more in the region of 12%. This 80% recovery is nothing more than wishful thinking.

The same report stated this, "***Groundwater levels are predicted to reach 90% recovery within 10 years if there was no future pumping.***"(18) Wrong impressions given, based on doubtful reasoning. As the Independent Technical Review Panel (ITRP) appointed by Southern Rural Water to assist with review of Barwon Water's remediation plan indicated, "***avoid further promulgation of false understanding and to avoid inappropriate remedial action***." (See page 12 above)

Is this another myth in creation??

11. No Confirmed Impacts Outside the Boundary Creek Area.

The Ministerial S78 Notice instructed Barwon Water to remediate the Boundary Creek, Big Swamp and surrounding environment. A copy of the S78 Notice can be found in Otway Water Book 42 D. The ensuing proposed Remediation and Environmental Protection Plan for 0.47 km^2 area around Boundary Creek and the Big Swamp is progressing extremely well. However, the remainder of the surrounding 480 km^2 environment that falls within the influence of the borefield is to follow at some later stage. Any remediation will be decided after investigation and *confirmation* of impact which is due to be finalised in 2023. Two things are wrong with this.

1. There are already confirmed impacts outside of the 0.47 km^2 that fall within the area of drawdown influence, and

2. taking three years to look at the remediation of "*significant confirmed*" impacts in the surrounding area draws upon the local communities' patience, endurance and tolerance. Also, an impact significant to the resource managers may well preclude lesser impacts that are actually very significant to those local people and communities affected.

12. Newlingrook Investigation at Kawarren.

In 2007 and despite a zero Permissible Consumptive Volume (PCV) for the Gellibrand Groundwater Management Area, Barwon Water was back at the Kawarren Borefield in 2007 looking at extracting 16 GL/year.

This 2007 groundwater extraction project in the Gellibrand Groundwater Management Area at Kawarren, was called "The Newlingrook Groundwater Investigation…" However, Kawarren is in the middle of the Gellibrand Groundwater Management Area and the Kawarren borefield site is at least 12 kilometres away from the closest boundary of the Newlingrook Groundwater Management Area. At the time the Newlingrook Groundwater Management Area PCV allowed groundwater extractions whereas the Gellibrand area had a legislated zero groundwater extraction level. The Gellibrand and Kawarren community believed the naming of the project as "Newlingrook" to be a calculated and deliberate misnaming to gain some justification that extraction investigations could be allowed at Kawarren.

The local community lodged many protests and made it quite clear to Barwon Water and their consultants that a mistake had been made including Newlingrook in the project name. But to no effect. Nothing changed over six years of protest.

In the FINAL report, "extracted" four years after the project was abandoned, the title still named it as the "Newlingrook Investigation."
It would appear only one conclusion can be drawn regarding the naming. That it was a deliberate and calculated act not to be reversed and to remain a historical "fact." Perhaps another urban myth created.
Otway Water Book 49 Deals with this myth creation in more detail.

13. Return to Natural Wetting and Drying.

How easy it is to lay the foundations of a myth. Take these two examples from Barwon Water's 10-12-2019 draft version of the Remediation and Environmental Protection Plan (REPP) that had to be submitted to Southern Rural Water by 20 December 2019.

1. "***…pumping had increased the frequency and duration of no flow periods in the lower reaches of Boundary Creek.***" This is true but only if there is a preamble to this statement making it quite clear that the frequency was *zero* days of no flow before pumping. However left as it is, an impression is gained there were periods of no natural flow along Boundary Creek in the lower reaches pre-pumping. This was never the case.
2. "***…Return the Natural wetting and drying cycles of the swamp and creek including minimum flow requirements in reach 3 of Boundary Creek.***" Let's get it right. There is no evidence that the swamp underwent natural wetting and drying cycles pre groundwater extraction up to 1984 after the first groundwater extraction took place during the 1982-83 drought. Local knowledge going back 60 years at least, indicates a natural wetting and drying of the swamp was never the case. It was always so saturated it would never catch on fire from surrounding wildfire.
   Also, numerous efforts by generations of the McDonald family to drain the wetlands upstream of the Big Swamp pre 1982, were never successful. The spring and overflow waters from the LTA could never be stopped. Just one of the local knowledge experiences.

It is not sound scientific practice to base decisions on faulty information or myth. Neither is it good scientific practice to maintain a challenged statement without investigation and correction if found to be correct.

14. The 2004-19 Licence Operated within Set Conditions.

The water table trigger level in observation bore 109131 (Yeo 40) has been below the environmental flow trigger for a least 10 years This statement in a Jacobs document supporting the 12,000 ML/year groundwater extraction renewal of the 2019 licence, is wrong. The "…***borefield has been operated historically within the required trigger levels (as per the licence)***…"[(22)].
In 2004 two groundwater trigger levels were set for the Yeo 40 observation bore. One for subsidence and one for the release of Supplementary Flows into Boundary Creek. The Supplementary Flow trigger level has been breached for decades.[(23)(24)]

CONCLUSION

Myths perpetrated within the “halls” of the natural resource managers and the water industry have had a dramatic impact on the surface and subterranean environments in the Otway Ranges. Myths associated with groundwater mining and surface water impoundments have created numerous problems. These myths have contributed to Actual Acid Sulfate Soil generation; wetland decimation; baseflows into springs, soaks and streams being dropped to catastrophic levels; farmers’ agricultural pursuits threatened; the subterranean ecosystems being dried out to unprecedented levels, and, the natural ability of the aquifers of the Otway Ranges to buffer the area from drought and climate change being compromised.

It would appear that myths supporting the exploitation of water resource are allowed to continue even when, and despite evidence that the underlying “*belief*” is incorrect. To make matters worse the myths are recorded in scientific and technical studies purporting to be based on rigorous techniques. Studies on which future management decisions are made. But worst of all, is when the myth is known to be wrong and is never corrected. Either at the time of exposure, or in the text that has perpetrated the myth.

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