



Book 41

SUPPLEMENTARY FLOWS

SUPPLEMENTARY FLOWS into BOUNDARY CREEK

Disclaimer

This book may be of assistance to you, but there is no guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaim all liability from error, loss or other consequence that may arise from relying on any information in this book.

This book has been prepared, and supporting documents used, with diligence. Statements within this publication that originate from groups or individuals have not been evidentially tested. No liability is accepted from any action resulting from an interpretation of this book or any part of it. The data in this book is arrived at from information sourced and available in the public domain at the time. The passage of time, manifestation of latent conditions or impacts of future events may necessitate further examination and subsequent data analysis, and re-evaluation of the data, findings, observations and conclusions expressed in this book. This book has been prepared in accordance with care and thoroughness. No warranty or guarantee, whether expressed or implied, is made of the data, observations and findings expressed in this book. This book should be read in full. I accept no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this book by any third party. However, I do sincerely hope this book encourages you to enquire about and or further evaluate the material presented and diligently follow up on any aspect of Otway Ranges water resource management that may have been aroused in your mind but not answered.

August 2021.

Malcolm Gardiner.

Email: otwaywater@yahoo.com.au www.otwaywater.com.au



CONTENTS.

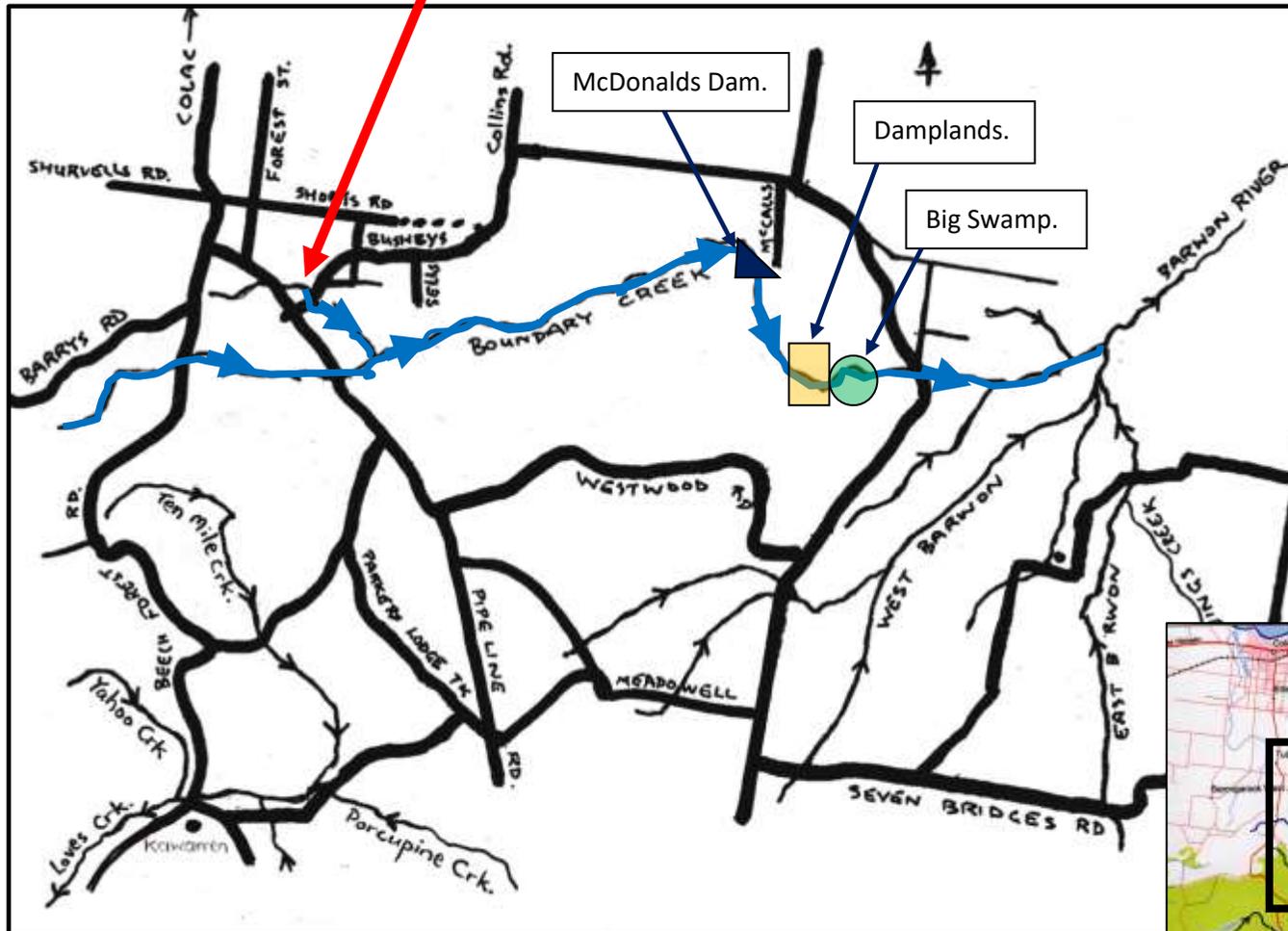
Page

5	Map showing Boundary Creek, Supplementary Flow release point, McDonalds Dam, Damplands, Big Swamp Wetlands
6-7	Introduction. Days dry along Boundary Creek, First Supplementary Flows, First report done in 2021.
7	Historically. Witebsky, 50% of Geelong's water in 1982-83, timeline of licences issued(chart), Unsustainable limits.
8	Licence Extensions and Confusion over start dates.
8	Two Different 2004-2019 Licences operating.
8	Confusion over when the 12,600 ML/year licence was issued – 1986 or???
9	If confusion over licences why would the Supplementary Flow information be any better.
9	Supplementary Flow Trials of 1999? Can't find any record of this event(s).
9	First available records of Supplementary Flows 2003.
10	The 2002, 2003 and Ecology Australia vegetation report wrongly linked to Section 6 of the 2004-19 licence conditions.
10	The 2003-2004 Gerangamete(Barwon Downs) Borefield report to Southern Rural Water. Why prepared? Is this report the reason reports up to 2007-08 had so many mistakes and problems?
11	Boundary Creek Licence Conditions from 2004. <ul style="list-style-type: none">• Section 6• 3.2 ML/day average summer flow – Witebsky.• 2018-2019 Boundary Creek stopped flow for 86 days.• New 2021 suggestion is that 4.4 ML/day of Supplementary Flows be released at critical times.
12-13	Licence Conditions Section 6. Licence conditions supposedly could not be made until the licence fell due in 2019.
14	Is it Spin, Dodgy or Just Poor Management.
14-18	Supplementary Flows in the early days. <ul style="list-style-type: none">• Closely reliant on the Otway to Colac system.• Data lost, not collected and varied markedly depending on source of information.• Licence NOT complied with.• Access to reports relied on the Freedom of Information process.
15	Summary of Supplementary Flow data taken from the annual reports sent to Southern Rural Water 2003-2008.
18	Tanker truck loads of water in 2006-07 carted in to farmers. Was there “really” a problem?

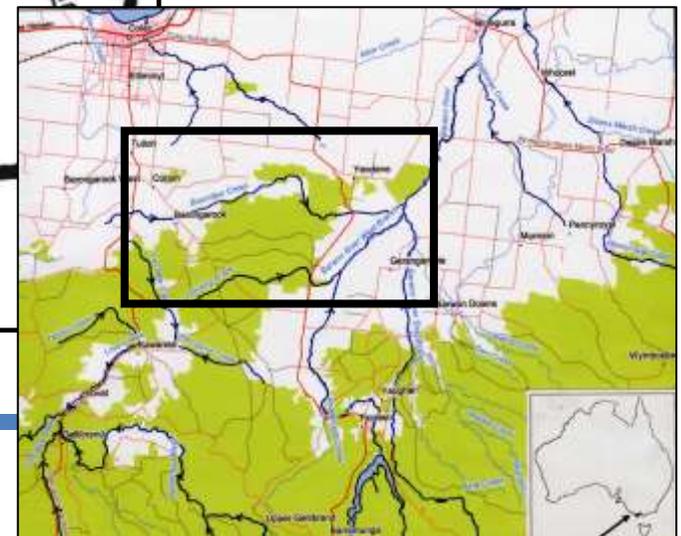
- 18 It took until the 2007-2008 report to get anything like close to fulfilling the Licence Conditions.
- 19 Example of a Section 6 Licence Condition of data present in chart format (also a chart on page 48).
- 20 Summary of Supplementary Flow data taken from the annual reports sent to Southern Rural Water 2008-2009.
- 20 Data of Supplementary Flows credited to the 31st day in months with only 30 days.
- 21 Days when Supplementary Flow Releases did not have to be made.
- 21 Chart of releases of Supplementary Flow2c 2003-2019. Picture of water being released.
- 22 Three graphs showing days of no flow at stream flow Gauging Station 233228; days of flows less than 1ML/day and extra days of releases when not required under the licence.
- 23-26 Breaches of Section 10 of the 2004-2019 Licence Condition up to the 2014-2015 report.
- Restricted access. Freedom of Information only access in early years.
 - Timing of reporting and availability.
- 27 After the 2010 fires it was easy to find where the last Supplementary Flows of Boundary Creek disappeared to.
- 28 Photographs where the Supplementary Flows stopped half way along the northern boundary of the Big Swamp Wetlands.
- 29-41 The Seven Stream Flow Gauging Stations along Boundary Creek.
- 41 Information found in McDonalds Dam licence WLE 043336. But copy of the licence cannot be located and access is refused.
- 41-42 McDonalds Dam – does it leak? – who is responsible that flows pass? (page 47 gives one answer) -human error is massive -extended periods of NO regulation of flows -automated flow release system so far rejected
- 42&47 A 2021 five page report on Supplementary Flows. Concentrates on post 2019 releases. 500 ML/year commitment to continued Supplementary Flow release during critical periods of need.
- 49-53 EPA lack of involvement. The EPA Section 6.1 B of the licence conditions has never been complied with over the 15 years of the licence.
- 54-58 In a 2017 report Jacobs raise a number of issues and recommended studies regarding the Supplementary Flows. Nothing done.
- 58-59 Conclusion.
- 60 Bibliography.

The Appendices can be found in Otway Water Book 41 B as a separate book making access to the references easier.

SUPPLEMENTARY FLOWS release point.

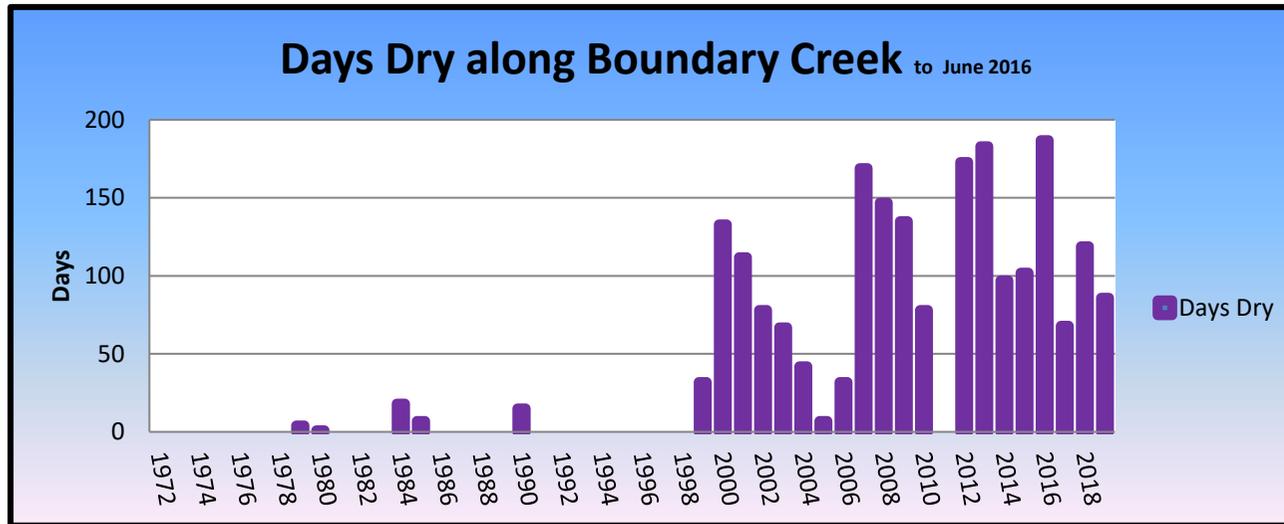


The Supplementary Flows are released from the Otway to Colac pipeline water supply system.



INTRODUCTION. *This work may assist if a comprehensive study of the Supplementary Flows is ever done.*

In 1984 for the first time since 1912, the natural flow of Boundary Creek stopped at the Shalley’s property east of the Colac Forrest Road Bridge in Yeodene. Since 1984 the period of no flow events has increased and can be directly associated with extensive groundwater extractions taken from the Barwon Downs Borefield for use in Geelong.



McDonalds Dam was constructed across Boundary Creek in 1978-79 and the creek flow was diverted around the works. Flows were interrupted during the construction period.

The values in this chart vary slightly depending on the source of the data. From 2008 this data is taken from Barwon Water’s Yearly Groundwater Licence reports sent to Southern Rural Water.

In 2004 and for the **first time**, the Barwon Downs groundwater extraction licence included a condition for Supplementary Flows. Farmer concern regarding no flow periods since groundwater extraction commenced prompted the inclusion of section 6 in this 2004 licence. The aim of the Supplementary Flow was to ensure there was a continuous flow down Boundary Creek of at least one ML/day at the Colac Forrest Road Bridge Stream Flow Gauging Station Number 233228 (see pages 12 and 13).

Considering the importance of this Section 6 it is amazing Southern Rural Water or Barwon Water had never questioned or commissioned a report on the effectiveness and applicability of the Supplementary Flows during the life of the 2004-2019 licence.

In 2021 a 5 page report was prepared that focussed on the Supplementary Flows applicable to the 2019 remediation of Boundary Creek and the Big swamp process (see Appendix Seven, page 79) .

Historically.

There were small extractions from the Barwon Downs Borefield pre the 1982-1983 drought. Barwon Water has repeatedly made the statement that 50% of Geelong's water came from the Barwon Downs Borefield during this drought. Following this drought a stress test pump was conducted between 1986 and 1990 in an effort to gain enough data to determine the groundwater extraction sustainability of the borefield (see Appendix Nine, pages 88-89). An extensive and comprehensive report was completed in 1995 by Witebsky et al.⁽¹⁰⁾ In September in the very same year a Southern Rural Water official stated a licence of 12,600 ML/year groundwater extraction was granted to Barwon Water (see Appendix Ten). This was at least 3 times the level recommended level.⁽¹⁰⁾ In 1997 after extensive investigation the Permissible

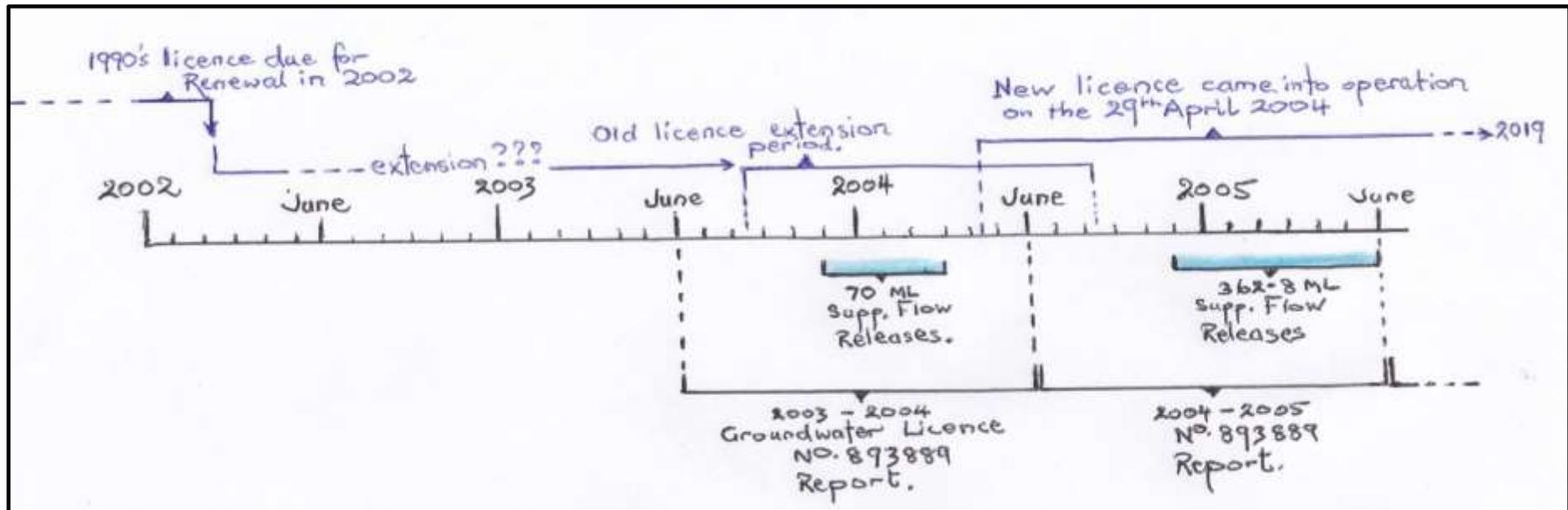


Diagram One.

Annual Volume extraction rate was set at 4,000 ML/year. However, Southern Rural Water would not enforce this until the licence came due in 2000 (see Appendix Ten).

Licence Extensions.

The licence was then apparently extended to 2002. And, because Barwon Water required more time to prepare its case for renewal the 2002 licence had to also be extended. The last extension was granted on the 18th of August 2003 for one year. It was to expire in August 2004 but before this licence expired on the 29th of April, the 2004-2019 licence was granted.

Confusion over when the 2004-2019 Licence Began.

In correspondence in 2007 Southern Rural Water stated that the licence came into operation on the 6th of May 2005.⁽¹¹⁾ This seems improbable but considering the way the licence process was being conducted anything is possible. To add to the mystery of when the licence started the 2018-2019 licence report states in the introduction that “*The Barwon Downs licence came into operation on November 7, 2006,...*”

Two Different Licences.

Up to 2006 there were Two Different 2004-2019 Licences in Operation.

After six months of negotiations with Southern Rural Water and Barwon Water an FOI letter was sent to Barwon Water requesting a copy of the 2004-2019 licence, (Barwon Water Ref. 15/260/0003X(3), 9/11/2006). Problems found in the licence prompted a request for a copy of the licence from Southern Rural Water.⁽¹¹⁾ The resulting copy of the licence from Southern Rural Water elicited a different copy of the licence (SRW Ref. 409667, 8/12/2006). Barwon Water had one version and Southern Rural Water had another version. And, this was as at the end of 2006. Little wonder the earlier licence reports fell well short of compliance. No one seemed to have anything but a cursory grasp of what was actually happening. And, little wonder that there were two different 2004-2005 licence reports.

Confusion over the Granting of the 12,600 ML/year Licence.

Add to this, the impression given by Southern Rural Water that the 12,600 ML/year extraction licence was first granted in 1995 after the stress test pump of 1986-1990, appears to be 9 years off the mark. In January 1986, Rick Evans reported

that “*Currently four bores are licenced to extract up to 12 600 ML per annum or up to 80 000 ML over a 10 year period.*” (see Appendix Twelve, pages 92-94).

Why Would Information on the Supplementary Flows Be Any Better?

Gaining an accurate and correct understanding of the earliest groundwater extraction licences and reports for the Barwon Downs Borefield was difficult and complicated. Little wonder the earliest data on the Supplementary Flows is no easier to gain.

The 1999 Supplementary Flow Trials.

In correspondence in 1999 by Barwon Water’s Executive Manager - Strategy and Technology, stated Supplementary Flows were being trialled (See Appendix Eleven, page 91). Unfortunately, the records for this trial have not been found.



- Where and when were they first released?
 - It is possible the first releases were near the Colac Barongarook Road Bridge that was causing downstream landholder erosion problems.
 - How much was released?
 - Over what timeframe(s)?
 - What were the outcomes, report, recommendations?
- Considering the importance of the Supplementary Flow releases there should have been a final report outlining how the Supplementary Flows were to be managed.

First Available Records.

The earliest record of any actual flows appears in the 2003-2004 Gerangamete Groundwater Report to Southern Rural Water when 70 ML were released between November 2003 and March 2004. Jacobs’ reports make mention on several occasions that the first Supplementary Flows were started in 2002. Mentioned only. No data or reference to data

provided. Were the 1999 trials regarded as Supplementary Flow releases? No record source or data or reference has been provided for the 1999 trials either. Then in a July 2021 statement by Barwon Water, it is stated that the Supplementary Flows started in 2003 (see Appendix Seven, pages **79-83**). This is supported in the 2003-2004 Groundwater Report by Barwon Water sent to Southern Rural Water (see comment on the 2003-04 report below).

Justification is Impossible.

However, both references to the 2002 and 2003 Supplementary Flow release statements have been directly attributed to complying with the licenced conditions as outlined in Section 6 of the groundwater extraction licence. Which of course is impossible. To make matters worse, Jacobs discounted the extremely important work of Ecology Australia's 2002 vegetation work, as inconsequential because of the licence condition for Supplementary Flows. Supplementary Flows made it impossible to draw any conclusions from the Ecology Australia work. As part of the argument, Jacobs actually referred to Section 6 of the extraction licence conditions as the reason for discounting Ecology Australia's report.⁽⁴⁾ Which of course is also impossible. The Section 6 licence condition was part of the 2004-2019 licence. Up until 2004 there was absolutely **no mention** of Supplementary Flows as a condition of **any** Barwon Downs Borefield groundwater extraction licence (see Appendix Eight, pages **2222**). When the 2004-2019 licence was issued on the 29th of April 2004 (or 6th May 2005) this was the first time Supplementary Flows had been stipulated (see Section 6 of the 2004-2019 Groundwater Extraction Licence below, pages **12-13**).

The 2003-04 Gerangamete Groundwater Licence Report to Southern Rural Water.

This 2003-04 groundwater licence report was not asked for until 2021. Up to this stage I was under the impression that the 2004-05 report was the first one completed under the new licence. Why was this earlier report prepared? It wasn't a condition of **any** licence. Neither, were the Supplementary Flow releases required as a licence condition for the period shown in the 2003-04 report. After the fiasco involved in gaining the 2004-05 report in 2006; the fact that this report was months overdue and that there were at least two versions of the 2004-05 report both containing numerous licence breaches, any consideration of a 2003-04 version never came to mind. Even today it is hard to understand why the 2003-04 Barwon Downs Borefield Groundwater report was even done. Perhaps it was a trial run. This may be the reason why

the following tens years of reports were so poorly done and so many of the licence conditions not complied with. Perhaps, the 2003-04 prototype had been based on guesswork as to what the 2004-2019 licence conditions would be and as a result each successive report followed this prototype.

Boundary Creek Licence Conditions 2004 to 2019.

From 2004 the flows in Boundary Creek and the release of Supplementary Flows are intricately interwoven. The granting of the 2004-2019 Groundwater Extraction Licence for the Barwon Downs Borefield included a section stipulating that flows in Boundary Creek must be maintained at year round levels of at least 1 ML/day at the Colac Forrest Stream Flow Gauging Station Number 233228. Considering the Witebsky et al.⁽⁵⁾ report had determined that pre groundwater extraction the flows in Boundary Creek to be an average daily summer baseflow of 3.2 ML, this was a considerable reduction. In reality this 1 ML/day was regarded as the minimum flow required for ecological survival of the creek and to ensure downstream landholders would maintain their year round and reliable supply of Stock and Domestic water. As part of the 2018 Remediation and Environmental Protection Plan (REPP) for the rehabilitation of the Big Swamp along Boundary Creek, the basic flow target has been lowered to a flow of 0.5 ML/day to pass the Stream Flow Gauging Station Number 233228.

Even though it took at least two years to develop the licence conditions in 2004, the assurances that a 2 ML/day release of Supplementary Flows would maintain flows in Boundary Creek every year of the 2004-2019 licence, Boundary Creek stopped flowing for extended periods during all but one of these years. In the last year of the licence (2018 – 2019) Boundary Creek stopped flowing on 86 occasions. This was nine years after groundwater extractions had stopped. The impact on the creek has been monumental and is expected to continue for some considerable time.

Part of the rehabilitation program (REPP) along Boundary Creek includes a recommendation of a 4.4 ML/day Supplementary Flow release during critical periods and aims at maintaining a flow of 0.5 ML/day at Stream Flow Gauging Station No. 233228.

Section 6 of the 2004-2019 Licence.

The 2004-2019 licence conditions relating to Boundary Creek.

6. FLOW IN BOUNDARY CREEK

6.1 General

A. Barwon Water must by 31 December 2004 install a new monitoring bore at a site in the vicinity of bore YEO (Bore ID 109131). This new bore is to be used for any purposes ascribed in this licence to bore YEO 40 (Bore ID 109131).

B. Barwon Water must provide a flow of 2 ML/d to the headwaters of Boundary Creek from any time that groundwater extraction commences under this Licence until:

- a. the groundwater level in bore YEO 40 (Bore ID 109131) recovers above a level of 158.5m AHD following the cessation of pumping; or
- b. at any time between 1 June and 30 November the natural flow at the Yeodene stream gauge exceeds 1 ML/d.

B. Prior to extraction of groundwater under this Licence, Barwon Water must obtain relevant approvals regarding the discharge of water to Boundary Creek from the Environment Protection Authority.

6.2 Monitoring

Barwon Water must:

- a. install a meter at the point of discharge to Boundary Creek referred to in sub-clause 6.1;
- b. read the meter each week; and
- c. record the weekly flow on a database within 7 days of measurement.

6.3 Maintenance

Barwon Water must, with respect to the meter referred to in sub-clause 6.2:

- a. inspect its condition whenever it is read;
- b. maintain it in good condition;
- c. recalibrate it whenever there is reason to believe that a reading may be inaccurate;
- d. replace it if damaged; and
- e. keep a database of all work done under sub-clauses 6.3(b), 6.3(c) and 6.3(d).

6.4 Reporting

Barwon Water must provide to the Authority within 60 days of the end of each year a report containing:

- a. weekly meter readings pursuant to sub-clause 6.2 (b), in both graphical and tabular formats;
- b. daily stream gauging data from the Yeodene gauge (233228), also graphed at weekly intervals;
- c. a summary of water discharged to Boundary Creek under sub-clause 6.1;
- d. a summary of all work done under sub-clauses 6.3(b), 6.3(c) and 6.3(d); and
- e. details of any issues arising from the monitoring results, including significant variations to predicted trends, and associated recommendations, if any.

Even when it was established early in the life of the licence that these targets were not being met, Barwon Water in 2014 steadfastly maintained that the Supplementary Flow licence changes could not be made until the time of renewal of the licence in June 2019.⁽⁴⁾ This was particularly upsetting when it was announced in 2015 that the vegetation licence conditions had been changed and that discussions had first been negotiated with Southern Rural Water in 2012.

Is it Spin, Dodgy or Just Poor Management?

By the time the 2004 groundwater extraction licence was issued Barwon Water had been extracting water from the Barwon Downs Borefield at Gerangamete off and on for over 20 years. If the thoroughness for accurate data collection and statements in the early years of the 2004-2019 licence was any indication, little confidence could be placed on the correctness of what actually took place in the previous 20 years.

Supplementary Flow Releases Linked to the Colac System.

Maintaining Supplementary Flows was closely reliant on the Otway to Colac water supply system. Colac's water supply had priority and at times disrupted the flows into Boundary Creek. Also, Colac's water consumption figures varied depending on which source was used.⁽⁷⁾ Spin was a common occurrence.⁽⁷⁾ Crucial data lost or at best could not be located (see Appendix Three, page 67). 2004-2019 licence conditions were not complied with.⁽⁷⁾ How then could any confidence be placed on the reliability of what was happening with the implementation, management, delivery and reporting of the Supplementary Flow releases.

A Different Source of Supplementary Flows.

During one of the periods when the Supplementary Flows were turned off due to repairs in the Otway to Colac system, Barwon Water was able to purchase a supply of alternative water enabling the Supplementary Flow to continue. This alternative source of water may be critical in keeping the Supplementary Flow going during the remediation of the Big Swamp and needs to be reported upon.

Gerangamete Groundwater Reports Summary of Appendices "F" – Supplementary Flows Releases and Boundary Creek Flows at the Colac to Forrest Stream Flow Gauging Station Number. 233228.

The data found in the following Tables, One and Two, has been taken from the Barwon Water annual reports regarding the Barwon Downs Borefield, Gerangamete, annually sent to Southern Rural Water. These reports were a condition of the 2004-2019 groundwater extraction licence, Section 6 (see pages 12-13 above).

Financial Year.	Flows Released to the nearest ML.	Days of No Flow	Days of Flow less than 1 ML. Days of no flow not included.	Days of Additional Releases Over and Above the Licence Conditions.	Days Missed When there should have been releases.
<i>2003-2004</i>	<i>70</i>	<i>Failed to comply</i>	<i>Failed to comply</i>		
<i>2004-2005</i>	<i>363</i>	<i>Failed to comply</i>	<i>Failed to comply</i>		
<i>2005-2006</i>	<i>421</i>	<i>Failed to comply</i>	<i>Failed to comply</i>		
<i>2006-2007</i>	<i>132</i>	<i>Failed to comply</i>	<i>Failed to comply</i>		
<i>2007-2008</i>	<i>580</i>	<i>140</i>	<i>241</i>	<i>47</i>	<i>16</i>

Table One.

Non Compliance with the Licence Conditions.

Up until the 2007-2008 report, parts of Condition 6 of the licence conditions were not being met, see Table One above (Condition 6.4). This was one of the issues of non compliance with the licence when raised with the Victorian Ombudsman⁽⁸⁾ in 2008. As it turned out the Ombudsman was used on three occasions in efforts to improve the annual reporting of Barwon Water's groundwater extraction licence activities.

NOTE: In recent years under CEO Tracey Slatter, Barwon Water has been open, co-operative, transparent and freely makes reports available.

To Access Reports FOI's Had to be Used (See Table Three, page 24).

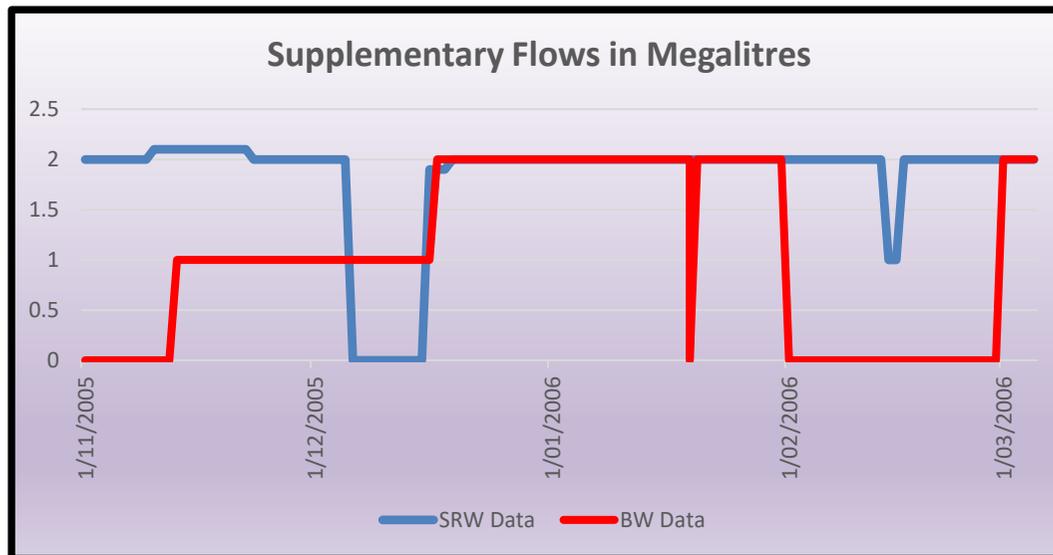
The early Barwon Downs (Gerangamete) Groundwater Extraction reports on the Barwon Downs Borefield had to be obtained under the Freedom Of Information Act. This was another issue with a condition of public transparency not being complied with. The Ombudsman assisted when attempting to gain the 2013-2014 Gerangamete Groundwater report.⁽⁹⁾

It wasn't until the 2014-2015 period that there was a major shift in the reporting, openness, accuracy and transparency of dealings with Barwon Water. Up to this period it appeared that Barwon Water was "allowed" to do as it wished. Reports repeatedly late. Hard to obtain. Full of inaccuracies and this attitude of obstruction and poorly presented reports appeared to be supported by Southern Rural Water.

Supplementary Flow Reporting.

Up until the 2007-2008 report, some licence condition data on the Supplementary Flows wasn't collected, or recorded or reported upon.

Examples of Supplementary Flow data that does not match.



Example.

This graph is based on the data taken from data supplied by Southern Rural Water (See Appendix Two, pages 61-66) and data provided by Barwon Water (see Appendix Three, pages 67). Both lots of data were provided under Freedom Of Information requests.

In November 2005 and in February 2006 the discrepancies between the two sets of data is quite marked.

In December 2005 SRW's data showed nil release for 10 days but the Barwon Water data states 1 ML/day flow was released.

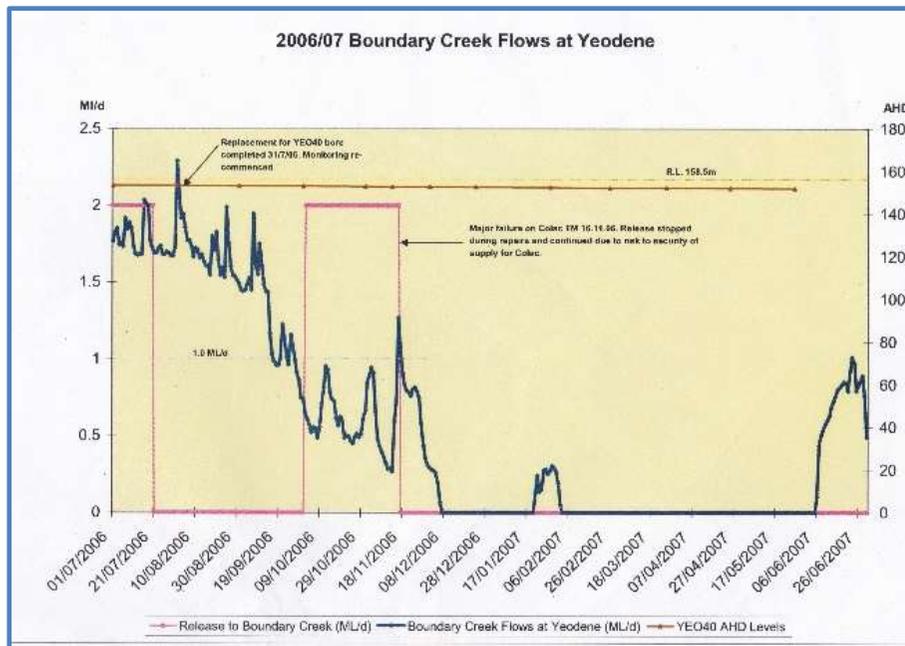
Data Not Collected or Missing.

Two interesting things were also included in the reply from Barwon Water regarding the FOI request for data.

1. There were no records for extractions from the Barwon Downs Borefield pre 1988. Amazing. Especially when Barwon Water reports that 50% of Geelong's water came from groundwater extractions during the 1982-83 drought.

2. No records of Supplementary Flows kept prior to 22/12/2004. Amazing. Years later in 2021 when the 2003-04 report was requested a record of Supplementary Flows appeared dated pre 22/12/2004.
3. The licence came into operation on the 29th of April 2004 and “**A total of 70 ML was discharged into Boundary Creek between November and March during 2003/04.**”⁽⁵⁾

Example. The Graph below can also be seen in Appendix One, page 60 and is taken from the 2006-07 licence report.⁽⁶⁾ More copies of this chart from other years can be viewed in Appendix Twenty One.



The 2006-07 document reported that in mid November 2006, Barwon Water ceased Supplementary Flows into Boundary Creek due to the likelihood of critical low levels in the Colac storages over the summer period.⁽⁶⁾

Also, a major failure was reported as preventing transfer of water from the catchment to the city’s service basins for several weeks due to repairs and replacement works.⁽⁶⁾

However, there are two things wrong with this report.

1. The release of Supplementary Flows was not completely stopped. The 1” poly pipe next to the large metal extraction pipe was still flowing at an estimated 20,000 to 30,000 litres a day (see Appendix Four, pages 68-69).

2. During the period Boxing Day 2006 to at least February

2007 Colac Service Basin Number 4 was overflowing. This overflow was able to fill all of the landholders dams down the overflow drainage line. The drainage line was able to flow under the bridge at Aireys Street, Colac and then flow

on and into the Barongarook Creek that flows into Lake Colac (M. Gardiner pers. observation and G. Kemp pers com. and observation). Also, recently commissioned Service Basin Number 5 was being filled.



This photograph was taken in January 2007. It shows the overflow from Service Basin Number 4 east of the Forest Road in the drainage line.

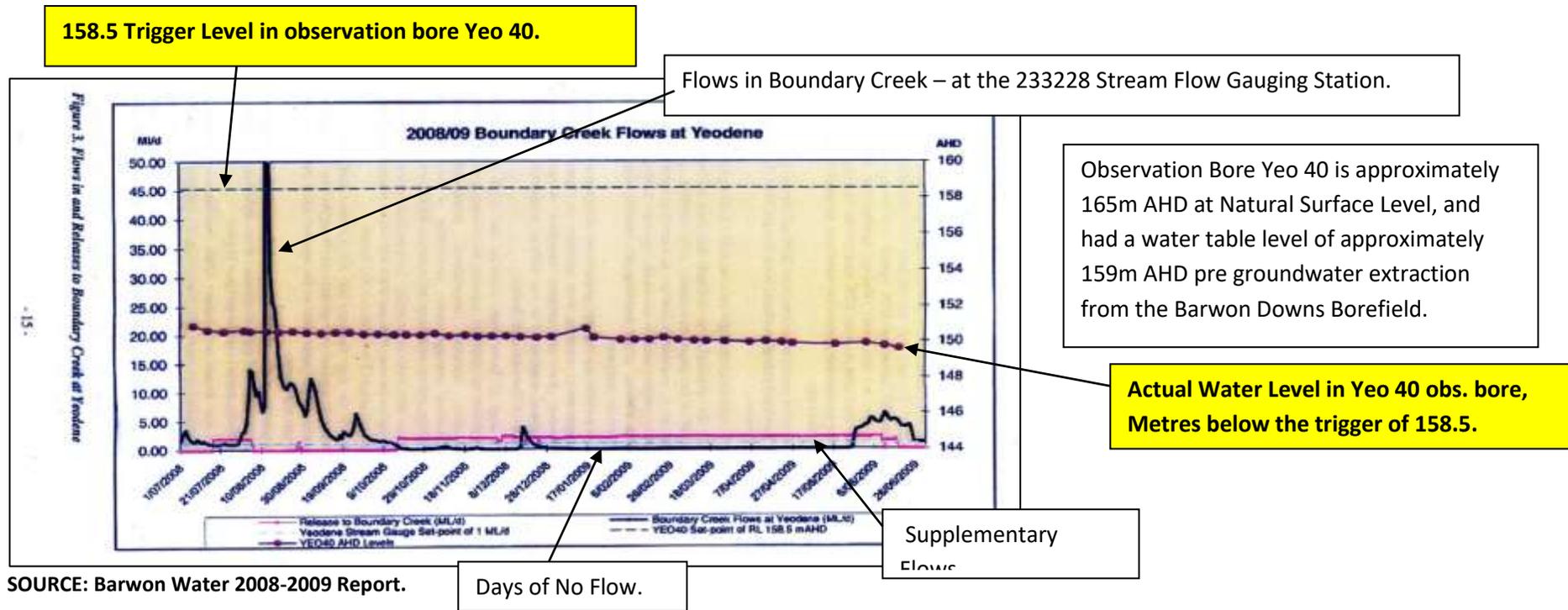
The Supplementary Flow Licence Conditions were first Completely Complied with in 2007-08.

It took many requests for Supplementary Flow data to be included in the annual reports. It was not until the 2007-2008 report that the reporting of Supplementary Flows complied with the licence conditions. For example the chart format as seen below in the 2008-2009 report was not being included.

Tanker Loads of Water Help Out.

In the early years of the 2004-2019 licence the Supplementary Flow releases, were partially reaching farmers downstream of the Big Swamp Wetlands. However, once the Supplementary Flows were all but turned off Boundary Creek stopped flowing for extended periods.

During the period 8 December 2006 and 10 April 2007, one hundred tanker loads at 25,000 litres per load, were delivered to properties below the Big Swamp Wetlands.



This chart is an example of data sourced in the yearly Barwon Downs Borefield reports, 2007-2019. These charts provide an excellent summary of yearly data collected regarding the Supplementary and Boundary Creek flows. More examples can be seen in Appendix Twenty One, pages **121-128**.

Summary of Supplementary Flow Data continued from page 15.

Financial Year.	Flows Released to the nearest ML.	Days of No Flow.	Days of Flow Less than 1 ML. Days of no flow not included.	Days of Additional Release Over and Above the Licence Conditions.	Days Missed When there should have been releases.,
<i>2008-2009</i>	<i>551</i>	<i>148</i>	<i>218</i>	<i>43</i>	
<i>2009-2010</i>	<i>615</i>	<i>78</i>	<i>174</i>	<i>135</i>	
<i>2010-2011</i>	<i>448</i>	<i>0</i>	<i>150</i>	<i>84</i>	
2010 Millennium The drought broke and groundwater extractions stopped.					
<i>2011-2012</i>	<i>723</i>	<i>123</i>	<i>171</i>	<i>184</i>	
<i>2012-2013</i>	<i>522</i>	<i>183</i>	<i>226</i>	<i>18</i>	
<i>2013-2014</i>	<i>554</i>	<i>97</i>	<i>167</i>	<i>79</i>	
<i>2014-2015</i>	<i>554</i>	<i>102</i>	<i>199</i>	<i>86</i>	
<i>2015-2016</i>	<i>533</i>	<i>187</i>	<i>248</i>	<i>42</i>	
<i>2016-2017</i>	<i>423</i>	<i>68</i>	<i>126</i>	<i>77</i>	
2016 An extraction of 3,400 ML.					
<i>2017-2018</i>	<i>469</i>	<i>119</i>	<i>145</i>	<i>82</i>	
<i>2018-2019</i>	<i>460</i>	<i>86</i>	<i>121</i>	<i>92</i>	

Table Two.

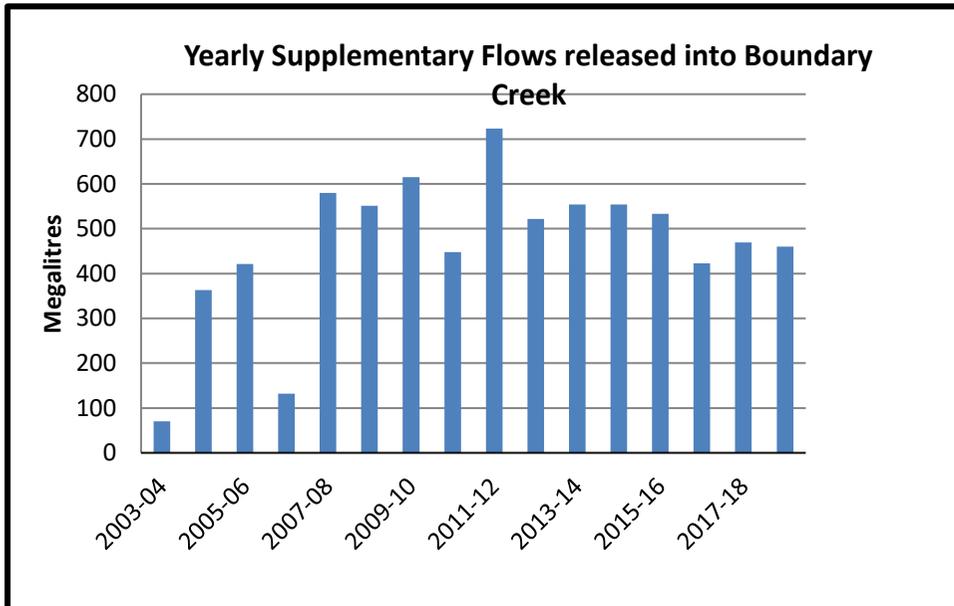
Extra Calander Days.

In some reports September, November, April and June were credited with Supplementary Flow recordings on the 31st day of the month. Impossible as each of these months have only 30 days.

Days of Release that were Not Required Under the Licence Conditions.

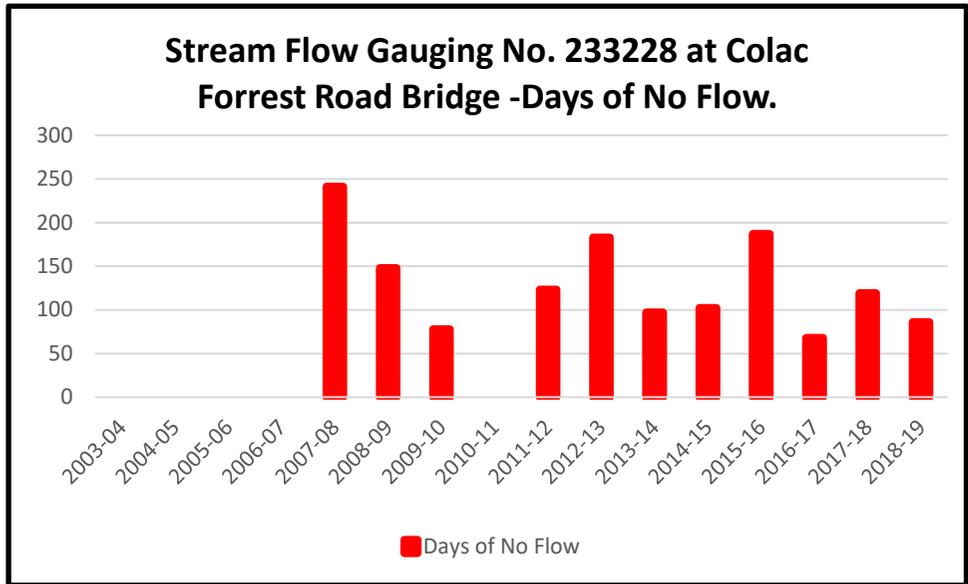
The figures in purple indicate the numbers of days each year when flows were released into the Boundary Creek system over and above the licence conditions. When the trigger level of 1 ML/day at the Colac Forrest Stream Flow Gauging Station was reached Supplementary Flows could be stopped. These additional flows did not have to be released. Which raises the question why were these flows continued? One of the most logical answers being that these flows were assisting with the recharging of the depleted Lower Tertiary Aquifer. And in any case these releases would be masking groundwater extraction impacts.

Under the 2004-2019 licence the following releases have been made.



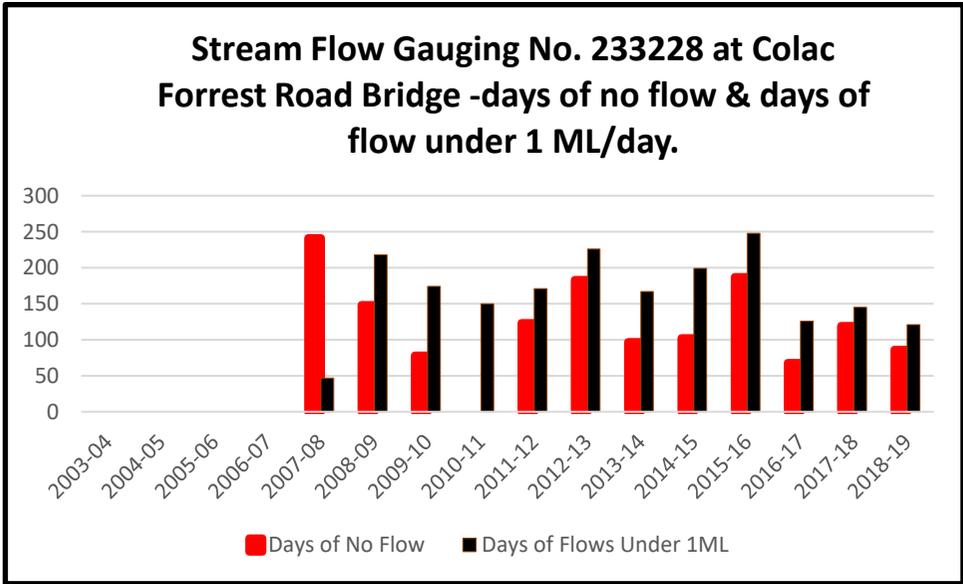
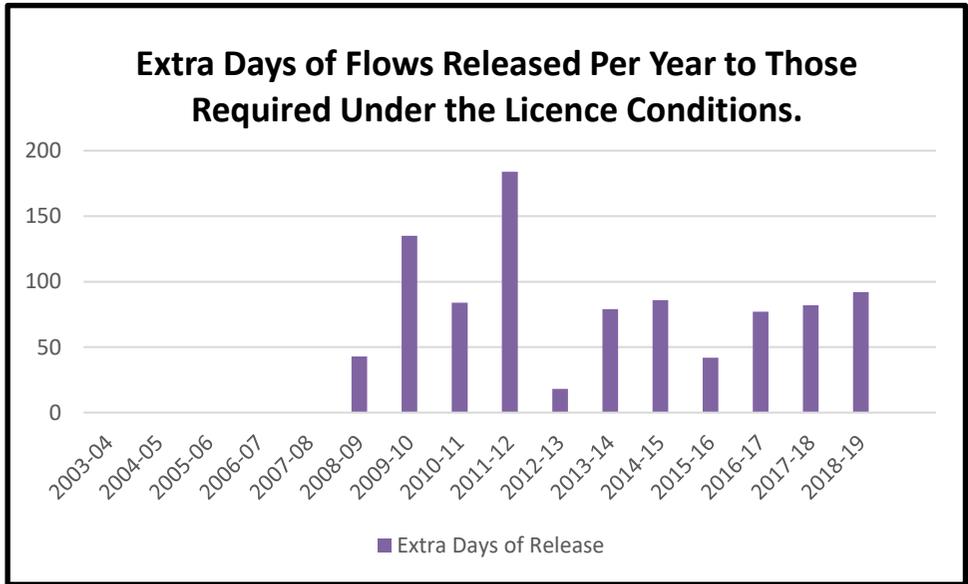
Release point of Supplementary Flows.

However, during the dry periods of the year these releases did not get past the Big Swamp. They disappeared into the depleted aquifers below.



Even with the return of good rains since 2010 and the end of the Millennium Drought, the no flow days to Boundary Creek have continued.

When adding the days of flows less than 1 ML/day this adds up to many days when the flows at the Stream Flow Gauging Station Number 233228 fell below the trigger level flow set out in the 2004-2019 licence conditions.



There are a significant number of days each year when the Supplementary Flows were continued even when they were not required under the licence conditions.

Troubles Gaining **Access** to the Annual Groundwater Extraction Reports Sent to Southern Rural Water, 2004-2019.

Data collected in relation to Section 6 of the Barwon Downs Borefield groundwater extraction licence had to be submitted to Southern Rural Water within 60 days of the end of the financial year. Then, within 7 days the report must be made available to the public – as per Section 10, COMMUNITY ENGAGEMENT of the licence conditions. Both Barwon Water and Southern Rural Water had difficulty with this condition and breeches were a regular occurrence.

10. COMMUNITY ENGAGEMENT

10.1 Information

Barwon Water must:

- a. within 7 days of submitting to the Authority a report required under sub-clauses 1.3, 3.5(a), 4.5, 5.5(a) or 6.4 make it available to the public;
- b. make available to members of the public on request any information held in a database referred to in this Licence; and
- c. provide to the Authority, within 14 days of the Authority's request, any information held in a database referred to in this Licence.

10.2 Engagement

Barwon Water will continue to engage with the local community and stakeholders regarding their operation of the Licence.

Table Three below, highlights some of the many examples of breaches of Section 10 of the groundwater extraction licence.

Reporting Period	It took an FOI Request to acquire the report	Maximum Time Used to Reply to the FOI	Date Report Finally Gained	Comments	Breached Licence
2003-04			2021	Report not requested until 2012.	
2004-05	SRW Ref 409667. SRW Ref 559928.	Yes Yes	23/1/07 30/1/08	There were two different reports in circulation and both contained data that could only be collected in the 2005-06 period. Otway Water Book 50 deals with this in detail.	Six months over due (see SRW's FOI Ref 1048526 in Appendix Five, pages 70-72).
2005-06	SRW Ref 409667	Yes	23/1/07		Four months overdue
2006-07	SRW Ref 525672	Yes	2/11/07		
2007-08	SRW Ref 646841	Yes	24/10/08 14/11/08	Copy sent basically useless as it was in black and white. Coloured copy arrived.	Late. Sent to SRW in October. BW Ref 15/090/00011A.
2008-09	SRW Ref 772004	Yes	11/11/09		
2009-10			30/9/10	This report was sent to SRW on 26/8/10 - 4 days before the 60 day deadline.	14 days when Supplementary Flows should have been provided.
2010-11					
2011-12			10/11/12	Numerous requests to obtain this copy in 2012.	Late being made available.

2011-12			Requested another copy in June 2021	Second copy requested. Different to the 10/11/12 copy obtained.	
2012-13			29/11/13	Numerous requests made for a hard copy. Finally solicited an email reply that stated a copy could be gained online. Not helpful.	
2013-14		Asked the Ombudsman to help obtain a copy. Ombudsman Ref C/15/9499.	29/6/15	Requests made verbally at Community meetings; emails. By 8/6/16 the best BW could do was " not a priority, " " will take the request on notice. " Ombudsman asked to assist.	10 months overdue.
2014-15			29/10/15	Noticeable change of attitude to disclosure and cooperation.	Late
2015-16			Gained a copy before due date.		
2016-17			Before due date.		
2017-18			Before due date.		
2018-19			Before due date.		

Table Three

Supplementary Flow Releases Every Year of the Licence.

Each year since 2004, Supplementary Flows have been released as per the licence conditions because the flows at the Yeodene Stream Gauge 233228 have either stopped or have been less than 1 ML/day flow. Also, the water level in the Yeo 40 observation bore has consistently been below the 158.5m AHD licence trigger level.

Appendix F taken from the 2009-2010 Groundwater Licence Report to Southern Rural Water.

The two charts below are examples of the formats required under sections 6.4a and 6.4b of the groundwater extraction licence.

In March 2010 when the Big Swamp Wetlands fire there were no flows downstream at the Colac Forrest Road Bridge stream flow Gauging Station 233228, despite Supplementary Flow releases into Boundary Creek.

Release to Boundary Creek (ML/day)

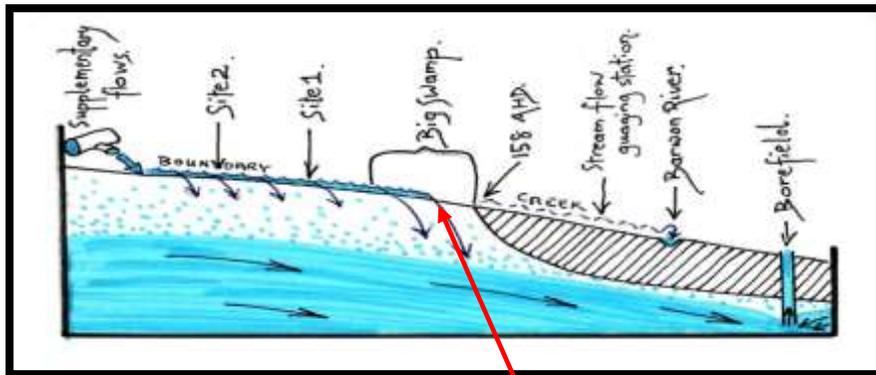
Date	July-09	August	September	October	November	December	January	February	March	April	May	June-10
1	0.00	2.13	2.21	2.02	3.35	2.04	2.06	2.07	2.09	2.07	2.06	2.13
2	1.23	2.15	1.09	2.03	3.36	1.26	2.09	2.07	2.22	2.07	2.06	2.13
3	2.07	2.15	0.00	2.00	3.35	0.00	2.09	2.07	2.23	2.06	2.06	2.13
4	2.12	2.14	0.00	1.98	3.30	1.31	2.09	2.07	2.23	2.06	2.07	2.13
5	2.12	2.13	0.00	1.99	2.84	2.09	2.08	2.06	2.22	2.06	2.10	1.97
6	2.12	1.77	0.00	1.99	2.07	2.09	2.07	2.06	2.22	2.06	2.10	2.14
7	2.11	0.05	0.00	0.74	2.07	2.06	2.07	2.06	2.22	2.06	2.10	2.14
8	2.08	0.00	0.00	0.00	2.07	2.06	2.04	2.05	2.22	2.06	2.10	2.14
9	2.05	0.00	0.00	0.00	2.07	2.06	2.01	2.05	2.22	1.87	2.10	2.14
10	2.08	0.00	0.00	0.00	2.07	2.02	2.02	2.06	2.23	0.00	2.11	2.14
11	2.08	0.00	0.00	0.00	2.09	2.04	2.03	2.04	2.15	0.00	2.11	2.05
12	2.08	0.35	0.00	0.00	2.08	2.09	2.02	2.06	2.08	0.00	2.11	2.01
13	1.88	2.11	0.00	0.00	2.04	2.08	2.03	2.05	2.09	0.00	2.11	0.01
14	2.08	2.02	0.00	0.00	2.02	2.06	2.03	2.05	2.08	0.00	2.11	0.00
15	2.06	2.10	0.00	0.00	2.05	2.05	2.03	2.05	2.08	0.00	2.11	0.00
16	2.07	2.18	0.00	0.00	2.04	2.17	2.03	2.06	2.09	0.00	2.11	0.00
17	2.06	2.18	0.00	0.00	2.06	2.32	2.03	2.06	2.08	0.00	2.11	0.00
18	2.06	2.18	0.00	0.00	1.99	2.21	2.08	2.06	2.08	0.00	2.11	0.00
19	2.05	2.19	0.00	0.00	1.37	2.08	2.09	2.05	2.08	0.00	2.11	0.00
20	2.04	2.15	0.00	0.00	0.56	2.07	2.07	2.06	2.07	0.00	2.11	0.00
21	2.05	2.19	0.00	1.27	2.09	2.07	2.07	2.05	2.08	0.00	2.12	0.00
22	2.05	2.18	0.91	3.33	2.03	2.07	2.05	2.06	2.08	0.00	2.13	0.00
23	2.06	2.19	2.08	3.33	2.05	2.07	2.02	2.06	2.08	0.00	2.13	0.00
24	2.06	2.20	2.04	3.33	2.10	2.07	2.01	1.92	1.98	0.73	2.13	0.00
25	2.07	2.20	2.03	3.33	2.14	2.07	2.01	1.78	0.68	1.87	2.12	0.00
26	2.07	2.20	2.03	3.33	2.19	2.07	2.04	1.77	1.42	1.84	2.12	0.00
27	2.06	2.20	2.03	3.33	2.21	2.07	2.07	1.95	2.07	2.08	2.13	0.00
28	2.05	2.20	2.04	3.33	2.15	2.07	2.07	2.08	2.06	2.08	2.13	0.00
29	2.05	2.20	2.04	3.34	2.04	2.07	1.81		2.07	2.08	2.13	0.00
30	2.05	2.20	2.03	3.34	2.04	2.07	2.06		2.06	2.08	2.13	0.00
31	2.08	2.20		3.35		2.07	2.07		2.06		2.13	
Total	61.07	54.13	20.51	47.35	65.91	60.94	63.33	56.81	63.63	31.15	65.31	25.26

Flows in Boundary Creek at Yeodene Stream Gauge 233228 (ML/day)

Date	July-09	August	September	October	November	December	January	February	March	April	May	June-10
1	1.13	5.98	72.50	18.67	1.27	4.40	0.02	0.00	0.00	1.98	0.24	2.60
2	2.28	8.35	43.98	12.71	1.30	2.91	0.03	0.00	0.00	1.87	0.22	2.73
3	3.19	9.40	27.82	9.54	1.26	1.83	0.03	0.00	0.00	1.89	0.21	2.57
4	4.27	9.68	19.15	8.17	0.95	1.31	0.00	0.00	0.00	1.91	0.18	2.20
5	2.79	10.63	14.32	6.79	1.07	0.78	0.00	0.00	0.00	1.85	0.19	1.96
6	2.19	8.87	11.57	5.75	1.16	0.52	0.00	0.00	0.00	1.82	0.17	1.78
7	1.95	7.05	10.45	5.25	1.08	0.39	0.00	0.00	0.00	1.96	0.14	1.73
8	1.81	6.37	10.91	5.28	0.83	0.32	0.00	0.00	0.00	3.68	0.11	1.69
9	1.68	6.16	15.82	5.64	0.60	0.26	0.00	0.00	0.00	2.57	0.13	1.65
10	1.58	6.40	19.29	5.47	0.48	0.21	0.00	0.00	0.00	1.29	0.15	2.02
11	1.53	6.24	15.90	4.34	0.41	0.18	0.00	0.00	0.00	0.84	0.19	2.93
12	2.18	6.13	11.43	3.58	0.34	0.15	0.00	0.00	0.00	0.68	0.46	3.93
13	2.71	6.36	8.87	3.16	0.27	0.13	0.00	0.00	0.00	0.56	0.63	4.24
14	4.30	6.93	7.27	3.35	0.27	0.11	0.00	0.00	0.00	0.45	0.73	3.94
15	5.71	7.35	5.98	4.65	0.19	0.10	0.00	0.00	0.00	0.36	0.64	3.07
16	5.66	7.24	4.94	9.41	0.12	0.08	0.00	0.00	0.00	0.28	0.64	2.14
17	4.93	7.18	4.09	30.95	0.08	0.07	0.00	0.00	0.00	0.22	0.58	1.30
18	4.78	7.75	8.58	30.31	0.07	0.14	0.00	0.00	0.00	0.26	0.86	1.41
19	4.07	9.35	32.03	16.14	0.05	0.15	0.00	0.00	0.00	0.25	1.13	1.90
20	3.46	8.14	30.49	9.68	0.04	0.18	0.00	0.00	0.00	0.20	1.13	2.96
21	3.11	7.55	17.85	6.85	0.04	0.17	0.00	0.00	0.00	0.17	1.17	3.15
22	2.90	18.28	12.00	4.87	0.05	0.20	0.00	0.00	0.00	0.17	1.20	2.88
23	2.92	55.90	18.73	3.52	0.07	0.23	0.00	0.00	0.10	0.23	1.24	2.74
24	3.68	30.38	32.72	3.16	0.06	0.18	0.00	0.00	0.62	0.44	1.24	2.01
25	5.48	18.77	20.43	2.90	0.07	0.15	0.00	0.00	0.60	0.48	1.24	1.39
26	5.94	21.35	19.55	2.61	0.07	0.11	0.00	0.00	0.76	0.65	1.24	1.14
27	5.27	66.29	58.73	2.25	0.08	0.08	0.00	0.00	0.91	0.45	1.31	1.17
28	4.87	57.13	56.82	1.90	0.09	0.07	0.00	0.00	1.31	0.38	1.35	1.12
29	4.63	36.20	47.67	1.65	0.10	0.06	0.00	0.00	2.15	0.39	1.37	1.48
30	4.43	43.78	30.51	1.44	2.41	0.06	0.00		2.88	0.56	1.66	1.49
31	4.53	101.60		1.29		0.05	0.00		2.29		2.19	
Total	109.90	608.76	890.20	231.28	14.87	15.55	0.08	0.00	11.62	28.81	23.95	67.33

After the 2010 Big Swamp Fire.

After the March 2010 fire in the Big Swamp Wetlands it was extremely easy to follow and walk down the streambed of Boundary Creek and see where the flows ceased. The creek runs alongside the northern edge of the Big Swamp. Up until the 2010 fire it was extremely hard to determine where the Supplementary Flows stopped flowing due to dense vegetation along the riparian zone of the creek. The flows would enter the westerly end of Boundary Creek but for extended periods none would emerge at the easterly end. By the time the 2010 fire took place the lower section of Boundary Creek had no flow for nearly 60 days (see the table, page 26 above).

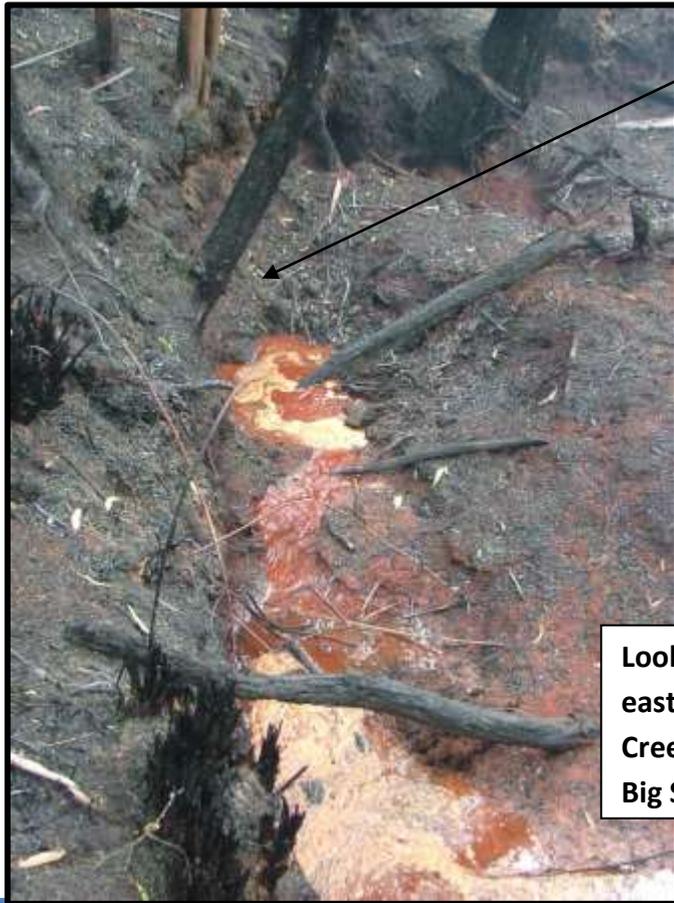


Spot where the Supplementary Flows finally disappeared.

Easterly Boundary of the Big Swamp Wetlands.



After the 2010 fires it was extremely easy to see where the supplementary flows finally disappeared. These pictures taken along Boundary Creek tell the story.



Looking downstream towards the east in the streambed of Boundary Creek on the north boundary of the Big Swamp Wetlands.



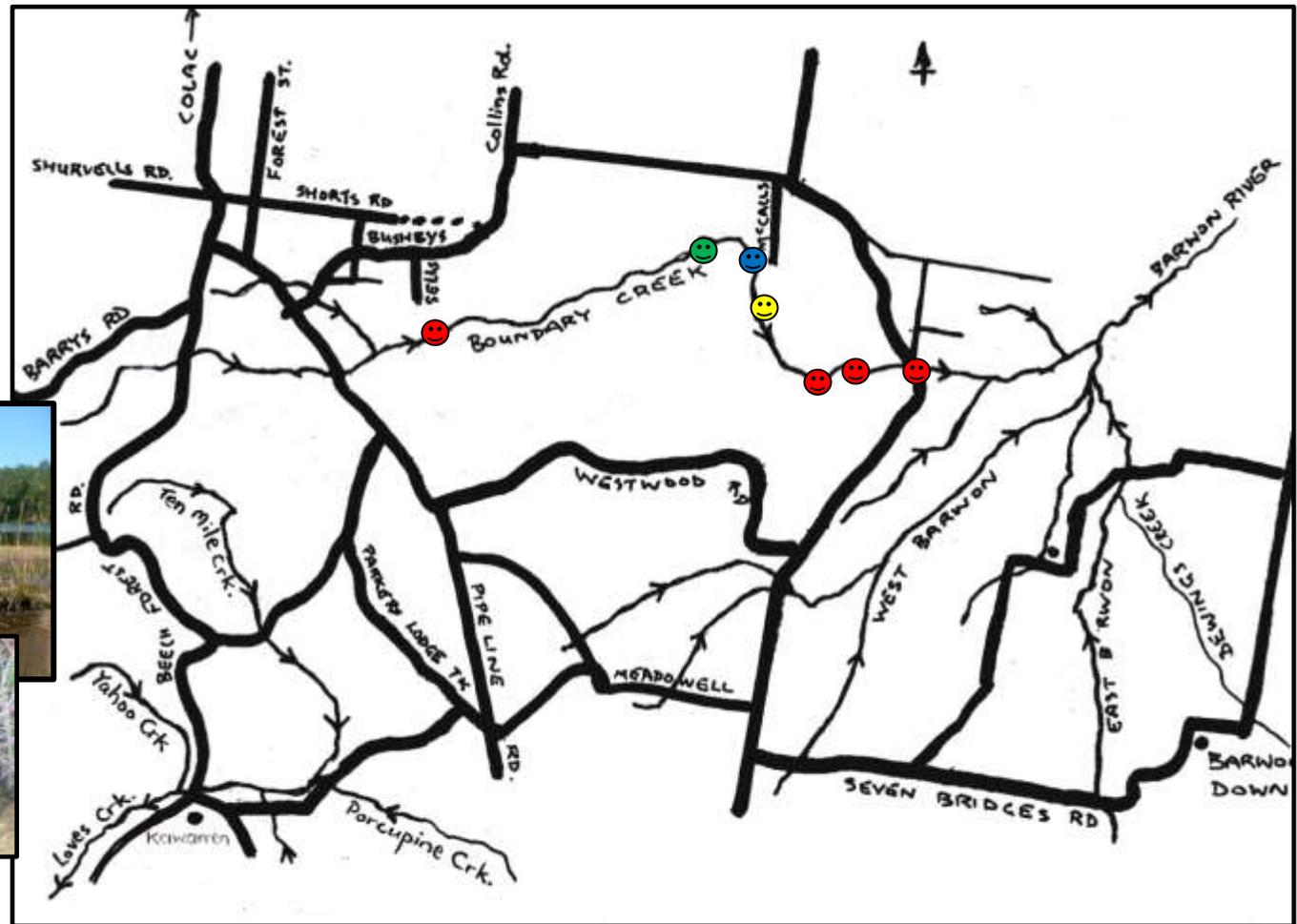
Looking back in a westerly direction upstream just below the position of the picture on the left. Note the stream bed is dry below the last trickle of water.



Looking upstream from the easterly boundary of the Big Swamp. Dry.

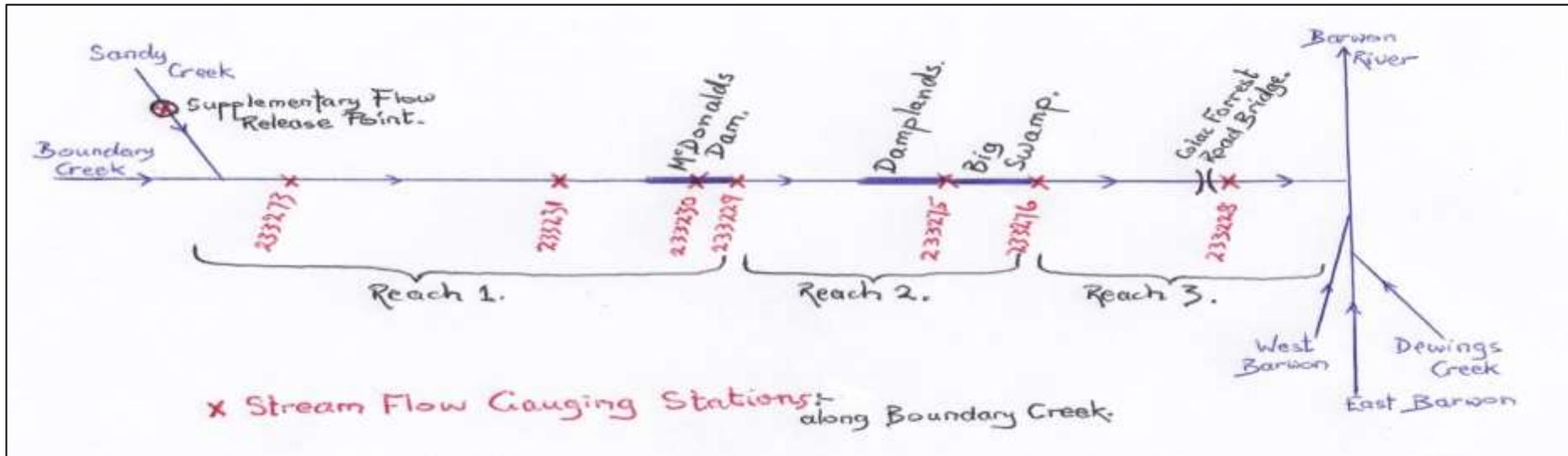
Stream Flow Gauging Stations along Boundary Creek.

In the late 1980s three Stream Flow Gauging Stations were commissioned along Boundary Creek **One above** McDonalds Dam. **One in** the dam and **One below** the dam.



Stream Flow Gauging Stations along Boundary Creek.

The data for the seven Stream Flow Gauging Stations along Boundary Creek should be organised into a data base and analysed. Rather than select and analyse piecemeal sections, an overall analysis needs to be completed. What will result is anyone’s guess but it can be assured that a better understanding of the effectiveness of the Supplementary Flows would result. Couple with and compared against observation bore data within the area may result in a better understanding of the impact the Supplementary Flows are having on aquifer recharge and possible masking of groundwater extraction influences. In 2018 Jacobs states, *“In Reach 1 hydrogeology is locally variable and groundwater levels in this part of the catchment have not experienced any drawdown in response to the operation of the borefield. Monitoring bores in this part of the catchment indicated the creek is gaining along this reach.”*⁽¹³⁾ As it would with 2 ML/day being released from the Otway Colac Pipeline in this reach. This masking of drawdown impact possibility has never been investigated.



Downstream of the Big Swamp, Stream Flow Gauging Station 233276.

There is a Gauge upstream at Sells, 233273.

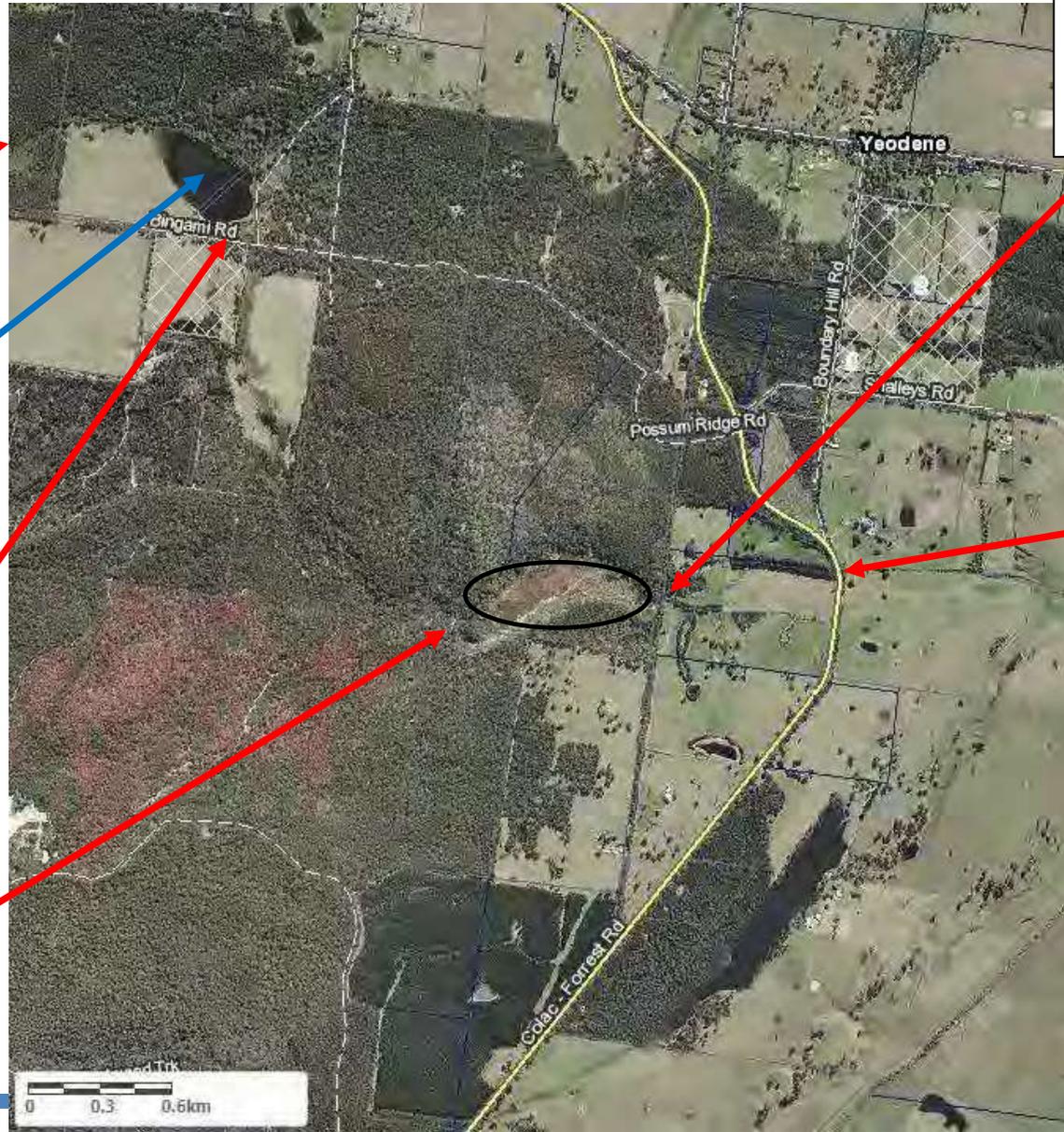
Upstream of McDonalds Dam, Stream Flow Gauging Station 233231.

In-dam Station now decommissioned, Stream Flow Gauging Station 233230.

Downstream of McDonalds Dam, Stream Flow Gauging Station 233229.

Upstream of the Big Swamp, Stream Flow Gauging Station 233275.

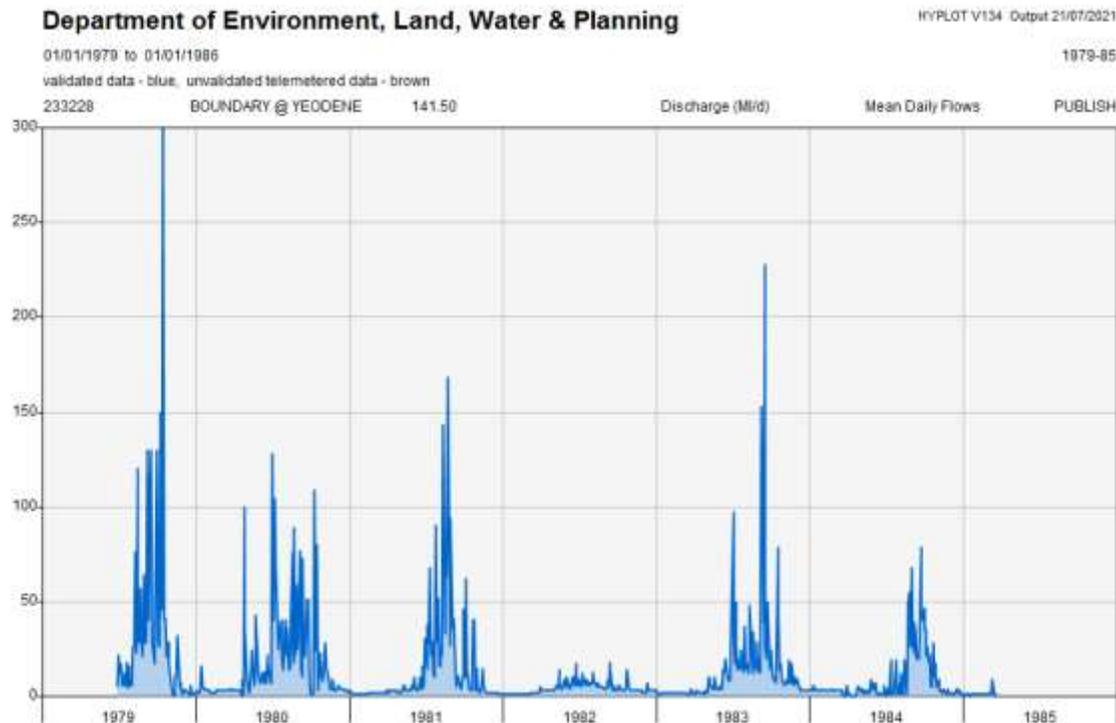
Stream Flow Gauging Station 233228.



Periods of Commission of the Seven Stream Flow Gauging Stations.

Oldest - Gauge No. 233228.

This is the oldest of the seven gauges and is located at the Colac Forrest Road Bridge. It has been functioning since 1979 and is the last gauge before Boundary Creek runs into the West Branch of the Barwon River.



The graph on Page 40 shows the flow at Gauge No. 233228 since 1985.

Three Stream Flow Gauging Stations commissioned in 1989.

Gauges 233229, 233230 and 233231 were installed in an effort to ensure all of the low summer flows into McDonalds Dam were being passed on down Boundary Creek.

Gauge No. 233229 (see page **36**).

This gauge was first commissioned in 1989 and recorded until 1995 when it was decommissioned until starting up again in 2014. It records the water flowing out of McDonalds Dam.

Gauge No. 233230(see page **35**).

This gauge ran from 1989 to 1994 before being decommissioned. It was located in the middle of McDonalds Dam. It has not functioned since.

Gauge No. 233231(see page **34**).

This gauge was commissioned in 1989 and ran for approximately 5 years before being decommissioned in 1995. It measures flows going into McDonalds Dam and was recommissioned in 2014.

Gauge No. 233273(see page **39**).

Gauge 233273 is a new gauge that was set up in June 2014 on Sells property just below where the Supplementary Flows flow out of Sandy Creek into Boundary Creek.

Gauge No. 233275(see page **37**).

This new gauge was commissioned in 2019 just upstream of the Big Swamp.

Gauge No. 233276(see page **38**).

Gauge 233276 is also a new gauge and was commissioned in 2019 to measure flows in Boundary Creek coming out of the Big Swamp area.

Department of Environment, Land, Water & Planning

HYPLOT V134 Output 20/07/2021

01/01/1989 to 01/01/2022

233231. Upstream of McDonalds Dam

1989-2021

validated data - blue, unvalidated telemetered data - brown

233231

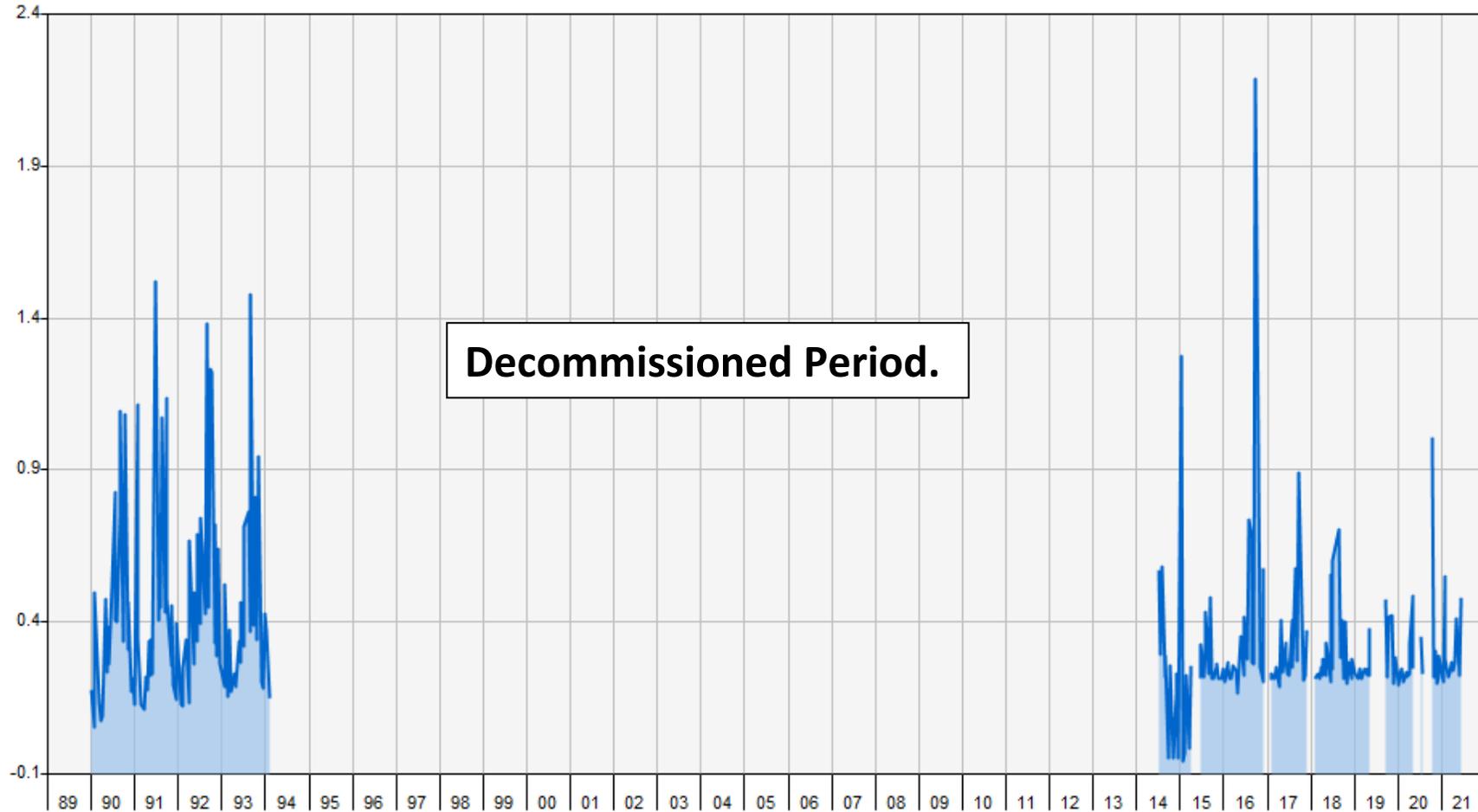
BOUNDARY @ MCDONALDS

100.00

Water Level (m)

Available for release

PUBLISH



Department of Environment, Land, Water & Planning

HYPLOT V134 Output 21/07/2021

01/01/1989 to 01/01/1995

validated data - blue, unvalidated telemetered data - brown

233230, In the Dam.

1989-94

233230

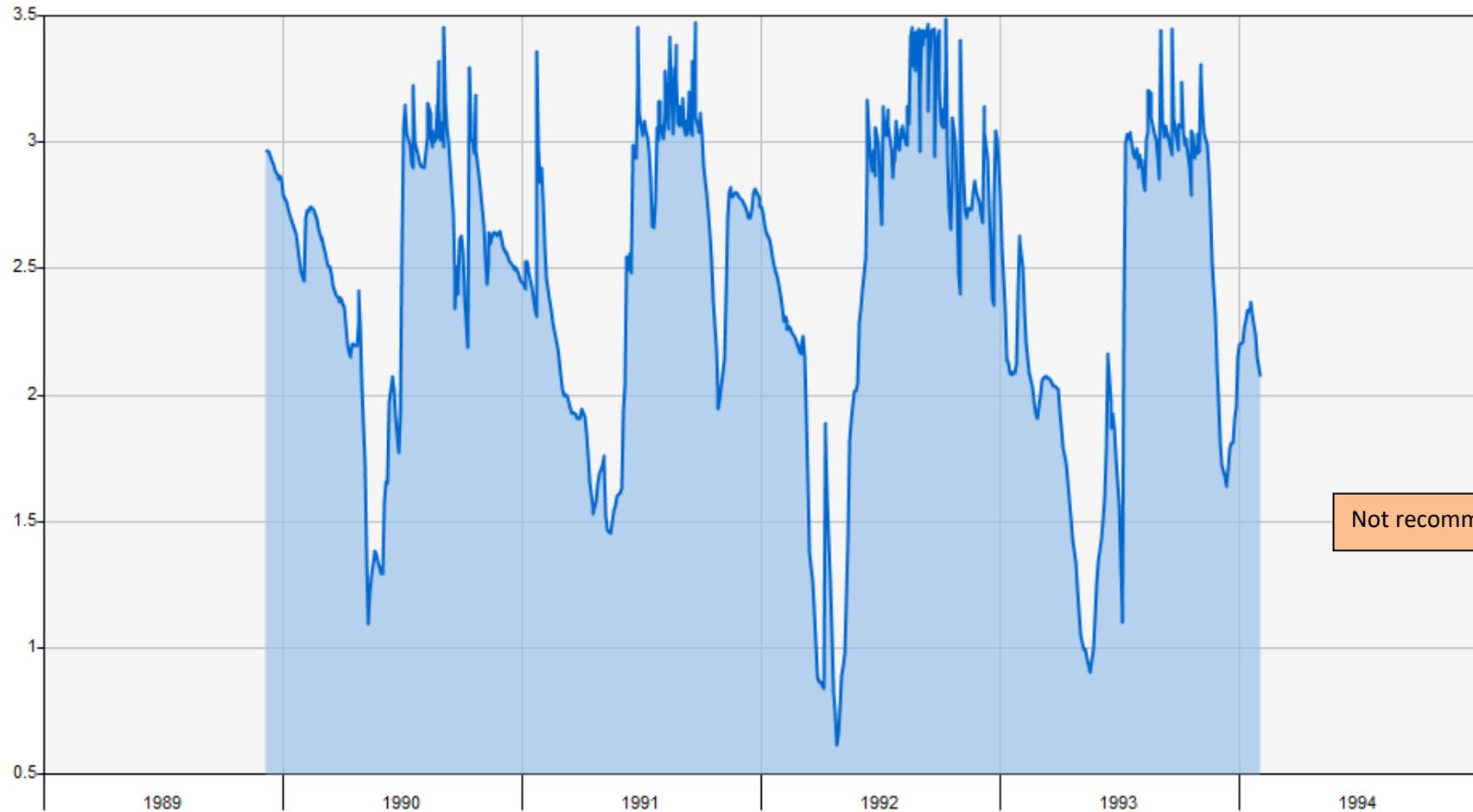
BOUNDARY @ MCDONALDS

100.00

Water Level (m)

Available for release

PUBLISH



Department of Environment, Land, Water & Planning

HYPLOT V134 Output 21/07/2021

01/01/1989 to 01/01/2022

233229, Downstream.

1989-2021

validated data - blue, unvalidated telemetered data - brown

233229

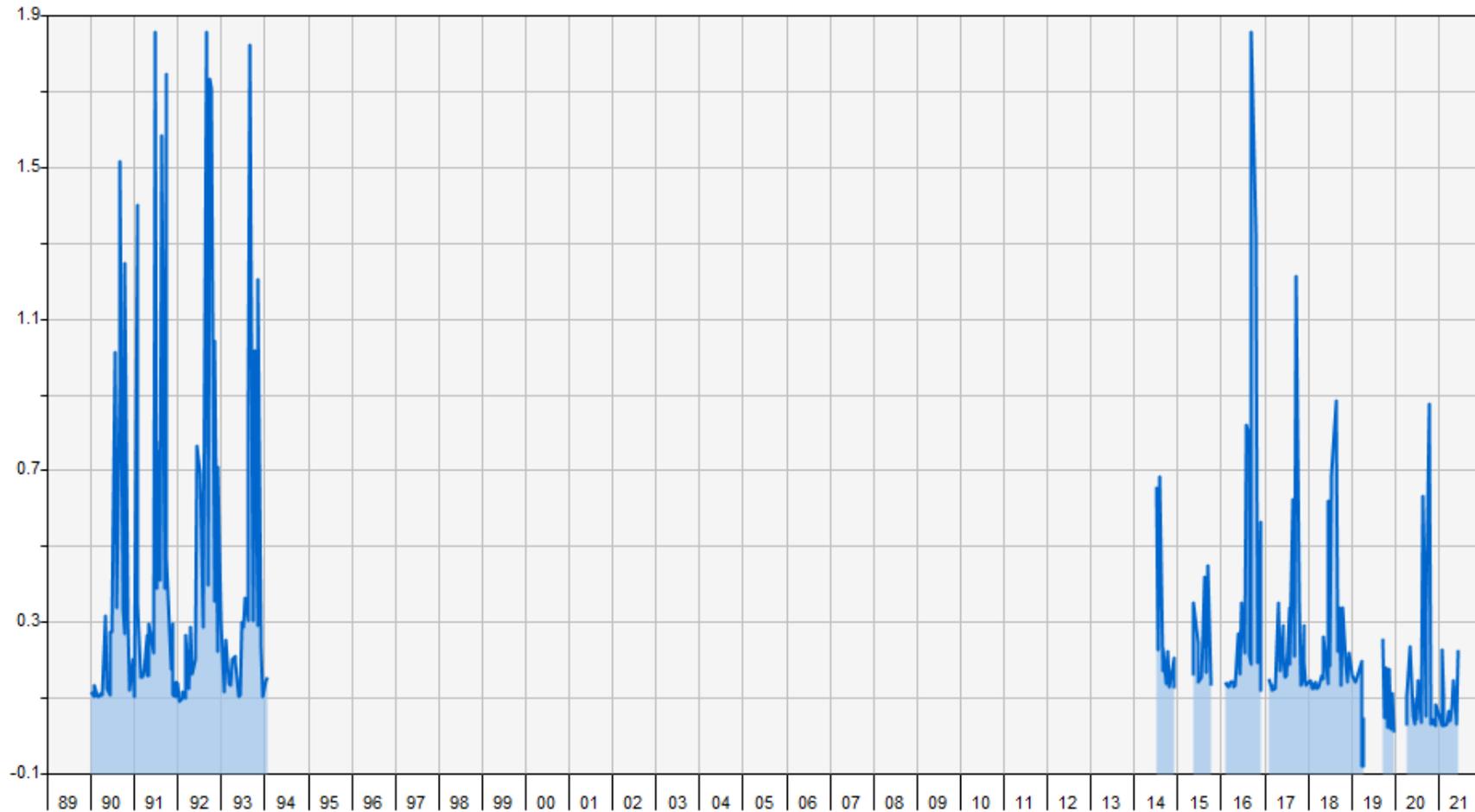
BOUNDARY @ MACDONALD

100.00

Water Level (m)

Available for release

PUBLISH



Department of Environment, Land, Water & Planning

HYPLOT V134 Output 21/07/2021

01/01/2019 to 01/01/2022

2019-21

validated data - blue, unvalidated telemetered data - brown

233275

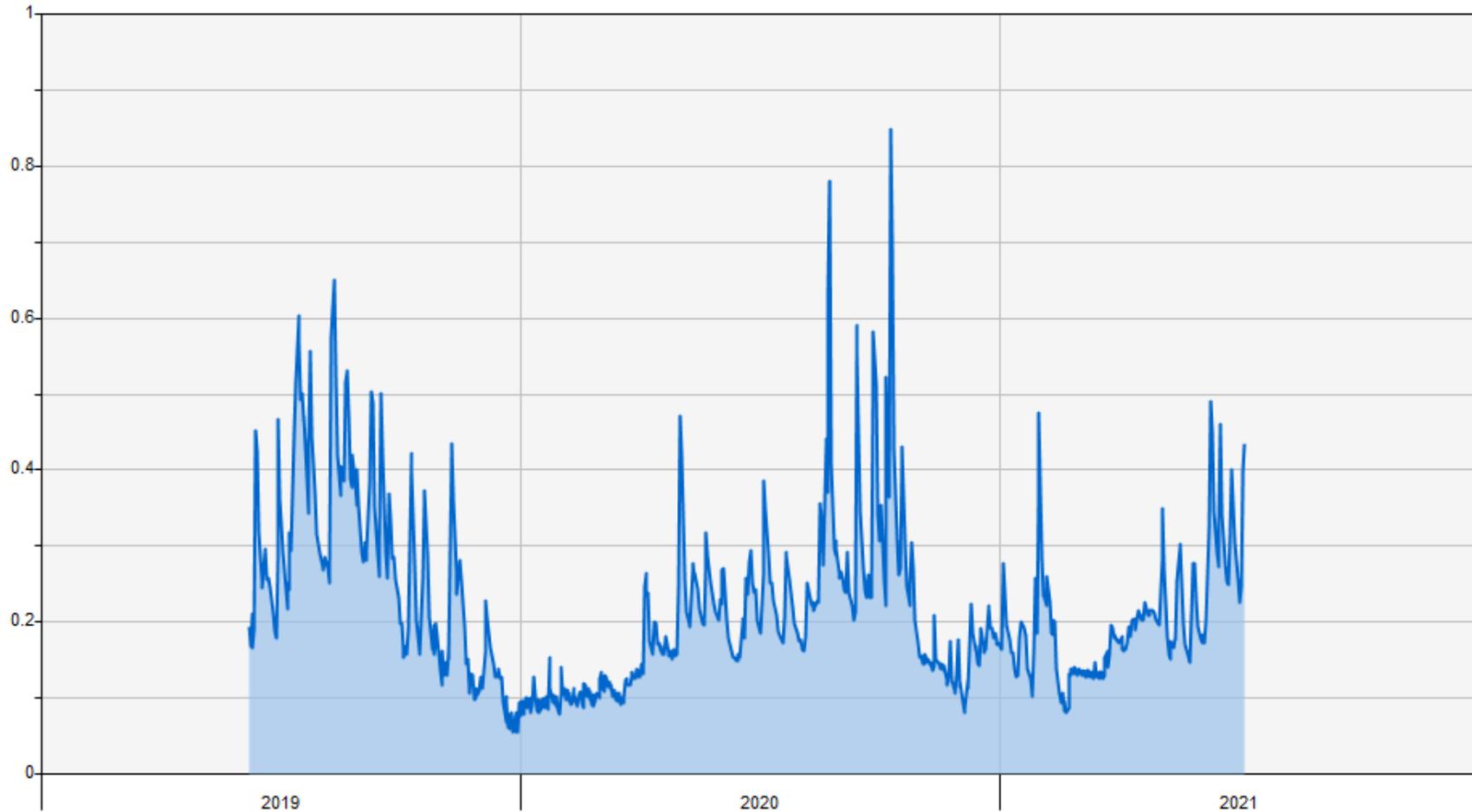
Boundary Ck U/S

100.00

Water Level (m)

Available for release

PUBLISH



Department of Environment, Land, Water & Planning

HYPLOT V134 Output 21/07/2021

01/01/2019 to 01/01/2022

2019-21

validated data - blue, unvalidated telemetered data - brown

233276

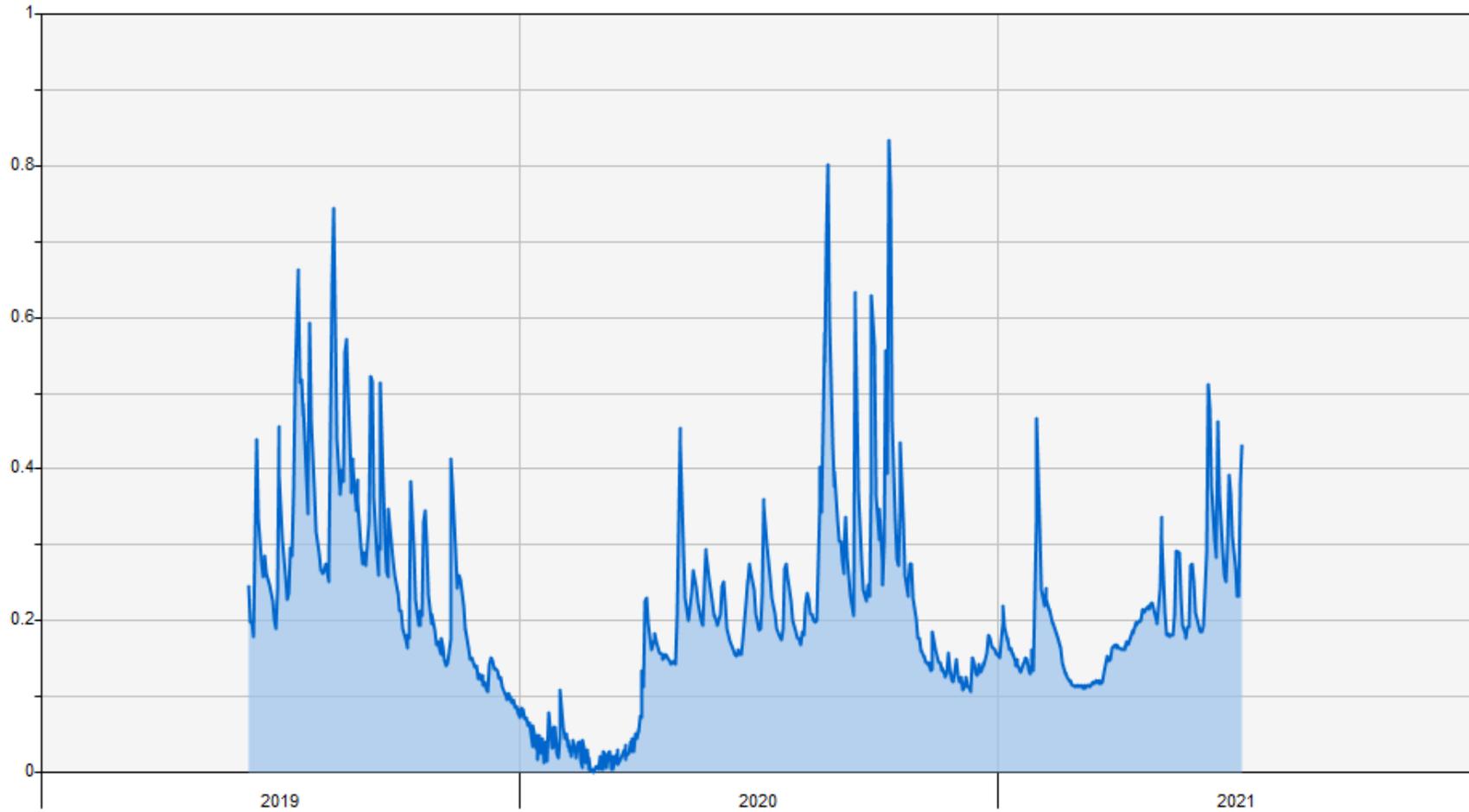
Boundary Ck D/S

100.00

Water Level (m)

Available for release

PUBLISH



Department of Environment, Land, Water & Planning

HYPLOT V134 Output 22/07/2021

01/01/2014 to 01/01/2022

2014-21

validated data - blue, unvalidated telemetered data - brown

233273

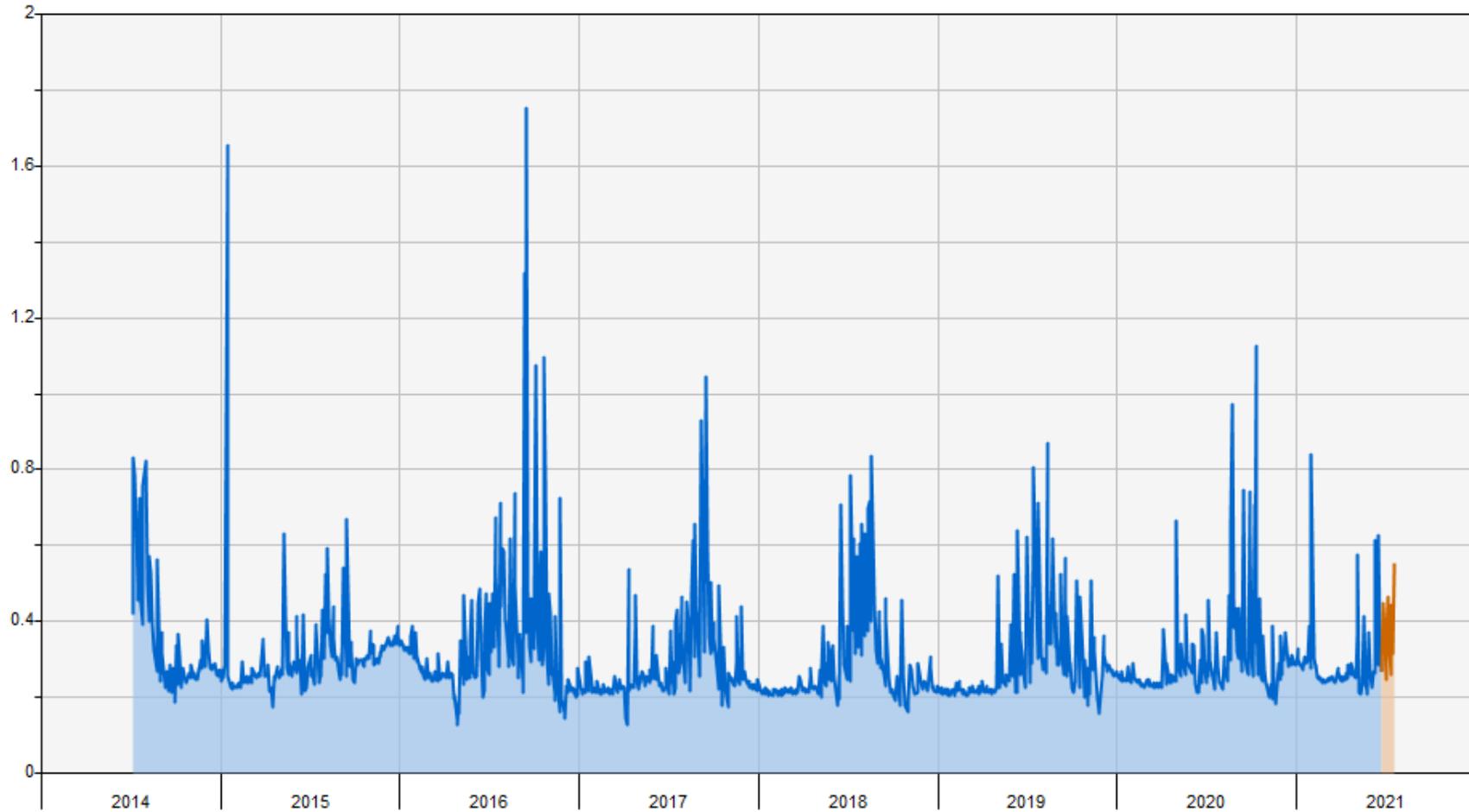
BOUNDARY CK BARONGAR

100.00

Water Level (m)

Available for release

PUBLISH



Department of Environment, Land, Water & Planning

HYPLOT V134 Output 21/07/2021

01/01/1985 to 01/01/2022

1985-2021

validated data - blue, unvalidated telemetered data - brown

233228

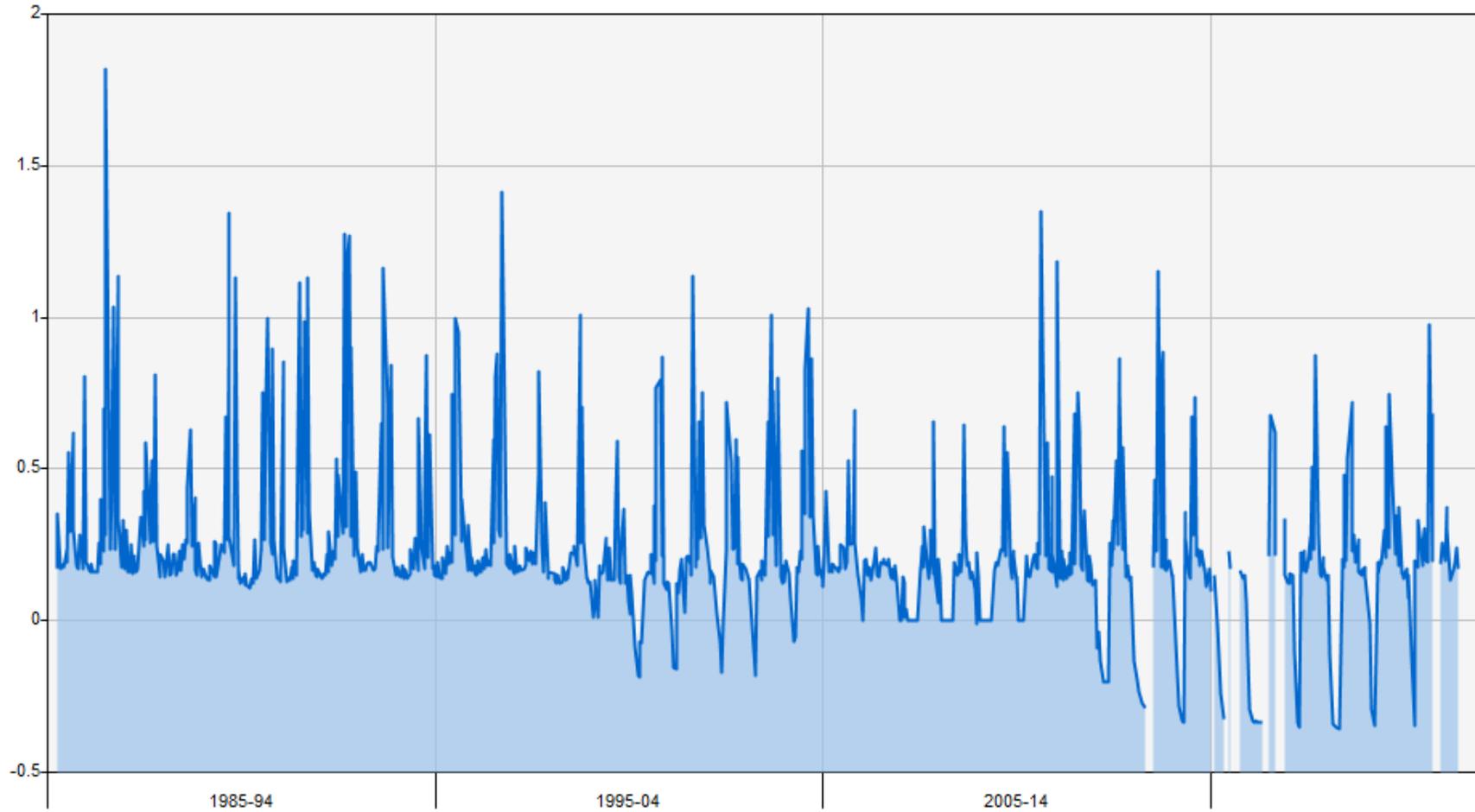
BOUNDARY @ YEODENE

100.00

Water Level (m)

Available for release

PUBLISH



McDonalds Dam and Licence WLE043336.

The information below has been taken from Barwon Water and GHD documentation that is reported to be based on the WLE 043336 document. However, Licence WLE043336 cannot be “found” despite requests made to both Barwon Water and Southern Rural Water. Also, apparently there is no longer a WLE 043336 document (see Appendix Twenty Two, page **129-131**). And, nobody seems to know how a copy of what the conditions are regarding the operation of McDonalds Dam can be obtained.

Licence WLE 043336 conditions as outlined in Barwon Water & GHD Documentation.

This dam was constructed across Boundary Creek in 1979. It holds approximately 160 ML. The spillway height is 167.47 metres AHD. A gate valve can be opened to allow flows down Boundary Creek in times when the water level is below the spillway. A maximum of 5 ML/day can be released through this gate valve.

The dam can be filled between 1 July and 31 October. However, all incoming flows up to 5ML/day throughout the year, must be released down Boundary Creek. Any water over 5 ML/day can be captured to fill the dam. How this was regulated when there were no Stream Flow Gauging Stations operating is a mystery. The yearly extraction licence from the dam totals 66 ML, with a maximum of 3 M L/day.

Whose responsibility it was to enforce these regulations was not stated nor was any idea given whose present day responsibility it is.

Does the Dam Leak?

Considering the dam has been constructed in an area where the LTA aquifer comes to the surface and because of the surface area of the dam, there is every chance that there is a certain amount of leakage into the LTA. This may explain why Boundary Creek below the dam and before the Damplands is regarded by Jacobs as a gaining stream.

Supplementary Flows and McDonalds Dam.

The agreement that the inflows into the dam during low flow periods should be the amount that is released or allowed to flow past the dam, has always been a contentious issue. The Shalley family landholders downstream of the Big Swamp, have never been satisfied with the amount of water reaching their sections of Boundary Creek since groundwater extraction at the Barwon Downs Borefield began.

Regulator Problems.

Nellie Shalley relates that she was a regular visitor to the dam requesting that the outflow be increased. Once the Stream Flow Gauging Stations upstream, in, and below McDonalds Dam were decommissioned any regulation accuracy of the inflow outflow was lost. Relying on personal judgement of the eye and guesswork was not that successful. Add to this, a change of landholder of the dam and irregular visits by different Southern Rural Water inspectors, the correct releases out of the dam could at best be described as spasmodic.

Extract from an email from Barwon Water dated 2-8-2012.

At Barwon Water's Remedial Environmental Protection Plan (REPP) meeting 23 June 2021, Barwon Water agreed to prepare a report on the Supplementary Flows (see Appendix Seven, pages **79-83**). As a follow up to this report it was asked have the flows out of McDonalds Dam ever stopped. This resulted in an excel email attachment covering the period 1 July 2014 to 2021. This excel included data on Supplementary Flows releases and inflows and outflows to the dam. Some of the data taken from the excel document can be seen in Appendix Fifteen, pages **97-110**.

Part of the email introduction to the excel attachment contained this:

“Supplementary flows through McDonalds Dam:

Since the stream gauges upstream and downstream of McDonald's Dam were reinstated in 2014, there have been a number of occasions where supplementary flows have been provided to Boundary Creek but the flows recorded downstream of McDonald's Dam have been significantly lower than the required 2

ML/day. Since Barwon Water replaced the control valve on the outlet of the Dam this has occurred much less frequently and Barwon Water continues to work with the landholder and SRW to ensure releases are maintained as required.

Attached is a copy of the data that shows the supplementary flow releases along with the inflows to McDonald's Dam and the outflows. Highlighted are the instances when the flow recorded downstream of McDonald's Dam is more than 20% below 2 ML/day. This is to account for any monitoring or data issues or reduction in outflows that could be attributed to loss of head in the dam."

At one stage as part of the REPP discussions it was stated that an automatic release valve would be installed below the dam, a valve that would be coordinated with the Stream Flow Gauging Station upstream of the dam. This would ensure that the same amount of water that was going into the dam would be released. However, even though an excellent idea, this has not come to pass for various reasons. One of the reasons being who would be liable if the valve failed and the dam emptied.

Who is Responsible for the correct release of water?

As read in the extract above, this remains a difficult problem. Barwon Water, the dam landholder and Southern Rural Water are trying to come up with a solution. Even with Stream Flow Gauging Stations above and below the dam mistakes or shortcomings that occur as a result of human error will not be avoided. The following examples of human error support the argument that there has to be a better method than leaving it up to any of the bodies mentioned above.

Human Error.

Appendix Thirteen shows how human error creates major discrepancies in Supplementary Flow release amounts between two different data sources. It is understandable that figures will be rounded off but when the two sets of data differ by megalitres, there should be some degree of concern.

A Bigger Concern.

The bigger concern is the number of consecutive days when the outward flows from the dam that are significantly lower than the inflows, are allowed to go unchecked. The Barwon Water excel email dated 2/08/2012, highlighted the following blocks of outward flows 20% or more lower than the inflows.

- During the continuous period 18/01/2015 to 15/02/2015 (see Appendix Fourteen, page 96),
there was a 29 day block when flows were not being correctly passed on. And, no one corrected the problem.
- 1/12/2015 to 18/04/2016 (see Appendix Sixteen),
there were 137 continuous days when nothing was done to correct the problem.
- 27/01/2017 to 2/04/2017 (see Appendix Seventeen),
66 days.
- 7/12/2017 to 2/05/2018 (see Appendix Eighteen),
147 days.
- 25/12/2018 to 26/03/2019 (see Appendix Nineteen).
89 days.

One or two days of poorly regulated flows would be a reasonable time to pass before a red alert should warn the person in charge of ensuring the licence condition are being followed. This should prompt a field trip to corrects the problem – not 147 days etc.

20% Reduction in Outflows is Bad Enough, but, 50% or more...

Between 1/01/2014 and 27/07/2021 there were 581 days when the outflow was lower than 50% of the inflows (see Appendix Twenty for an example of this). Supplementary Flow releases have been poorly managed to say the least.

The majority of these “problems/breeches” were counter to the intention of the 2004-2019 licence conditions. Someone was not doing their job as the flows were not, at best regulated, and, at worst not policed. What this shows is despite Stream Flow Gauging Stations above and below the dam; despite landholders input; irrespective of Barwon Water and Southern Rural Water involvement, discrepancies of 20% can go uncorrected for huge amount of consecutive days

without any correction. What was happening pre July 2014 is anyone's guess. An automated system seems to be the best option.

Other thoughts on the Passing Flows Through McDonalds Dam.

The 2/08/2021 excel email throws up very interesting data.

- Periods of Supplementary Flow release when there was no apparent reason for these release, at least not being required as a licence condition.
- There are numerous flows out of the dam larger than the flows into the dam. e.g. 11/1/2021 Supp Flow released 3.04 ML; Inflow to the dam 1.55 ML; outflow from the dam 3.55 ML.
- What was happening at the Stream Flow Gauging Stations upstream and downstream from the those around McDonalds Dam?
- How were the observation bores responding during this period?
- What was the correlation between the observation bore behaviour and the Supplementary Flows?

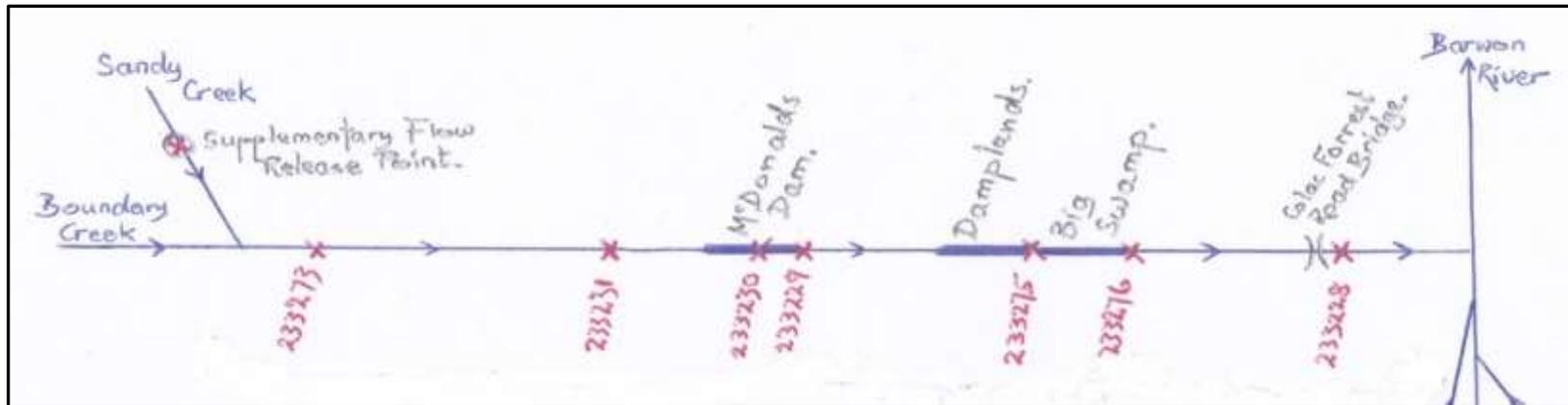
An Automated Outflow From McDonalds Dam.

An automated system is more than achievable with telemetry and up to date technology for a fail safe method of automatically releasing the same amount of water from McDonalds Dam as the amount that flows into the dam.

In a 2017 Technical Works Program on the Big Swamp, Jacobs made the recommendation that "*Automated flow control from McDonalds Dam to ensure minimum 3 ML/day is released between November and June before the end of 2017.*"⁽¹⁴⁾ was a possibility. Nothing has come of this and as can be seen on page 44 above. Even up to 2018-2019 there were large periods of continuous outflowings from the dam that did not match the inflowing volumes.

An Automated System should:

- Continue daily recording of flows in the six Stream Flow Gauging Stations on Boundary Creek.
- Include an alarm notification telemetry system between the gauges and a central control base.



- If an alarm system is incorporated into the workings of the Stream Flow Gauging Stations then no more than a day should pass before remediation action is triggered. This would avoid the human error allowing incorrect flows to take place as in the past. e.g. 137 continuous days when the outflows were 20% or more less than the inflows to the dam in 21015-2016; 66 continuous days in 2017; 147 continuous days in 2017-2018, and, 89 continuous days as late as 2018-2019.
- Supplementary Flows and two Stream Flow Gauging Stations measuring inflows into the dam should never “fail” at the same time, and
- with two Stream Flow Gauging Stations below McDonalds Dam but above the Big Swamp would ensure flows below the dam are accurately recorded.
- If the automated valve releases a maximum of 5 ML/day (4.4 ML/day as proposed in the REPP) then there would be ample time to make repairs in the event of a failure of the system. Especially as the dam holds approximately 160 ML. Days could pass with little loss to the system before correction is made.

Barwon Water Points the Finger Squarely at SRW as the Responsible Body for the Regulation of the Dam.

“Successful remediation of Boundary Creek and Big Swamp is dependent on passing flow conditions being enforced at “McDonald’s Dam”{ in accordance with its licence conditions (dam licence no WLE 043336).”

“Southern Rural Water is responsible and accountable for effectively regulating compliance with the passing flow conditions with the holder of the dam licence.”

(See Appendix Twenty Two, page **61**).

The Supplementary Flow Report Resulting from the 23 June 2021 Meeting.

As stated earlier at the 23 June 2021 Barwon Water’s Remedial Environmental Protection Plan (REPP) meeting, Barwon Water agreed to prepare a report on the Supplementary Flows. This turned out to be a five page document (Appendix Seven, pages **79-83**). The bulk of the report concentrates on the Supplementary Flows and the remediation of Boundary Creek and the Big Swamp as from 2020. Three graphs take up a considerable space on these five pages. It would appear that the third graph of the Stream Flow Gauging Station 233228 should show a much wider section where the water levels are superficially elevated. Overall a disappointing report when it was assumed the report would cover a much wider period of the Supplementary Flow release.

500 ML/year Commitment.

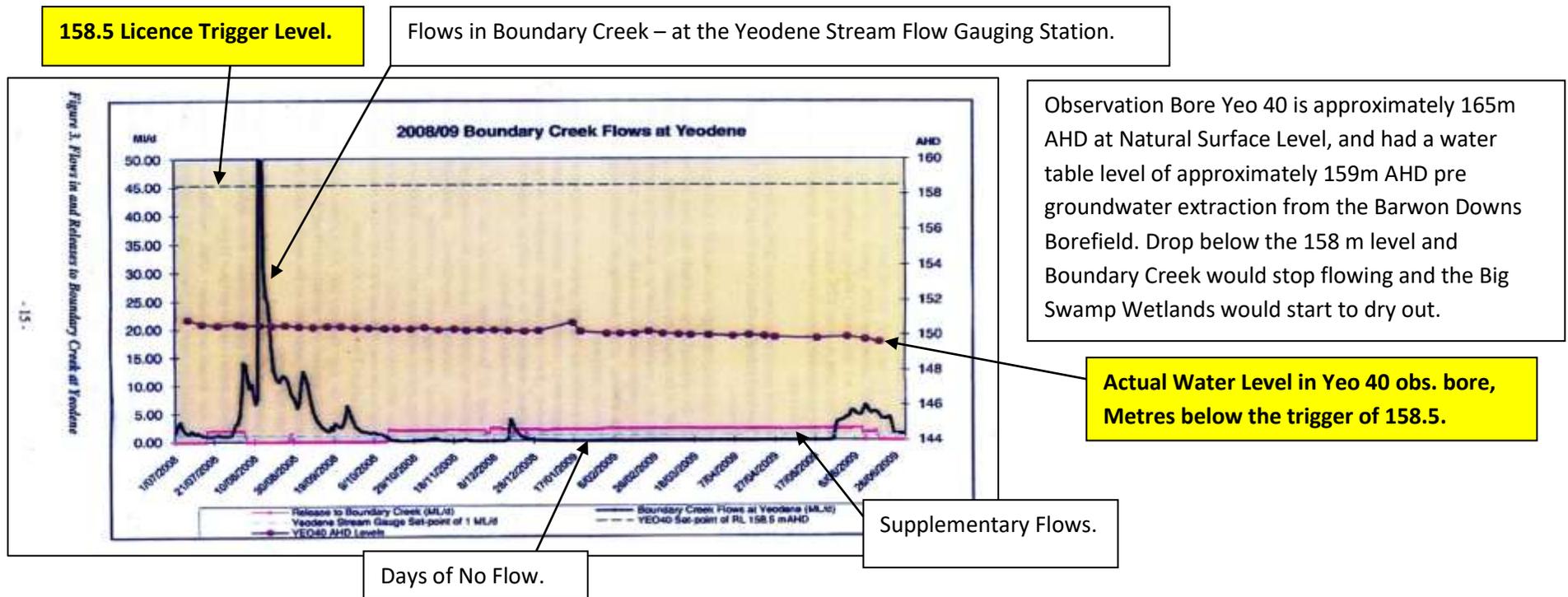
As part of the 2019 rehabilitation of Boundary Creek and the Big Swamp, Barwon Water is committing the release of 500 ML/year of water out of the Otway Colac system to assist with keeping the Big Swamp at a certain moisture level. The idea being to release 4.4 ML/day at strategic times to assist the workings of the barriers being placed across various sections of the Big Swamp. It will be interesting to follow how this is managed.

This table shows the Supplementary Flows that have been released over the years. Page **19** above and page **48** below shows these figures in graphic format.

Year	Volume (ML)
2003/04	70
2004/05	362.8
2005/06	421
2006/07	132
2007/08	580
2008/09	551
2009/10	615
2010/11	448
2011/12	723
2012/13	522
2013/14	554
2014/15	554
2015/16	533
2016/17	423
2017/18	469
2018/19	460
2019/20	461
2020/21	559

This Chart Taken from the 2008-2009 Barwon Water Groundwater Report to Southern Rural Water.

The chart below, is representative of a summary of the Supplementary Flow data sourced in the yearly Barwon Downs Borefield reports, 2004-2019. Similar examples from other reports can be seen in Appendix Twenty One, pages **121-128**.



This chart shows graphically how the Supplementary Flows have not reached the Yeodene Stream Flow Gauging Station Number 233228 during the drier months of the year.

EPA Not Prepared to Become Involved.

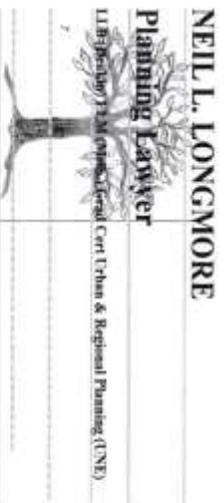
Up to 2020 the Environment Protection Authority (EPA) has refused to be involved in the problems experienced as a result of the extraction of groundwater from the Barwon Downs Borefield (Otway Water Book 20, pages 46-55 discusses this in some detail). Considering the massive amounts of acid and heavy metal pollution this seems quite unbelievable. Even when there was the 30 kilometre fish kill down the Barwon River the EPA refused to become involved in the investigation of the pollution source.⁽¹³⁾ The implications of the Supplementary Flow with this issue have not been investigated.

One would think the EPA should be concerned with the pollution happening in the region and be particularly worried that Supplementary Flows disappearing into the subsurface during dry periods could be causing contamination of the aquifers and subterranean ecosystems.

Condition of the 2004-19 Licence Not Complied With for 12 Years at least.

Prior to extraction of groundwater under the extraction Licence, Barwon Water should have obtained relevant approvals regarding the discharge of Supplementary Flow releases of water into the Boundary Creek system. See Section 6.1 B of the 2004-2019 groundwater extraction licence, on page **12** above.

The following three pages place considerable doubt on whether this has ever been done. Also, the lack of follow up on this issue highlights the lack of concern shown by the EPA and Barwon Water to follow the conditions of the licence.



7 July 2016
Paul Rawson
Barwon Water FOI Officer
PO Box 659
GEELONG VIC 3228

Dear Sir,

Freedom of Information Request

Please find enclosed a money order with the relevant fee for you to provide access to the public information regarding the licence granted by Southern Rural Water under which Barwon Water must operate the Gerbangannet borefield:

Take and use licence BEE032496 has an addendum LHR93889, Clause 6 in the second schedule is termed "Flow in Boundary Creek". There are two sub-clauses numbered 6.1B. The second 6.1B states:

"Prior to extraction of groundwater under this licence, Barwon Water must obtain relevant approvals regarding the discharge of water to Boundary Creek from the Environment Protection Authority"

Please provide copies of all such approvals obtained by Barwon Water from the Environment Protection Authority prior to the commencement of extraction of groundwater under the licence.

Yours faithfully,

Neill Longmore

Enc.
25 Rafferty's Road, GELLIBRAND RIVER VIC 3239 ph: 52 358
254 mob: 0477 931188 nlongmore@netspace.net.au



Our Ref: F081901
Enquiries To: Paul Rawson

26/08/2016

Neil Longmore
 25 Rafferty's Rd
 Gellibrand River 32239

Dear Mr Longmore

Freedom of information request

I refer to your letter dated 07/07/2016 in which you sought access under the *Freedom of Information Act 1982* ("Act") to:

Take and use licence BEF032496 has an addendum LHS93889. Clause 6 in the second schedule is termed "flow in Boundary Creek". There are two sub-clauses 6.1B. The second 6.1B states "Prior to extraction of groundwater under this licence, Barwon Water must obtain relevant approvals regarding the discharge of water to Boundary Creek from the Environment Protection Authority". Please provide copies of all such approvals.

After a thorough and diligent search of the documents held by Barwon Region Water Corporation, I have determined that the document you seek does not exist or, if it existed, cannot be found. Accordingly, I have determined to refuse access on that basis.

In brief, the steps taken to identify and locate the documents were as follows:

- i. A thorough and diligent search within Barwon Water's corporate databases and electronic systems
- ii. A thorough and diligent search in all associated hard copy files

These searches were conducted by officers from the records management, Strategy and Planning and Infrastructure Services teams.

If you are not satisfied with my decision, you may complain to the FOI Commissioner by writing to PO Box 24274, Melbourne, Victoria, 3001. Telephone: 1300 842 364. Email: enquiries@foicommissioner.vic.gov.au. Web: www.foicommissioner.vic.gov.au

Barwon Region Water Corporation

ABN 86 348 376 514

✉ PO Box 659 Geelong VIC 3228



barwonwater.vic.gov.au



1300 656 007

You have 60 days from the date you receive this letter to submit your complaint.

Yours sincerely



Paul Rawson
FOI Officer
Manager Corporate Support Services



Stream Flow Gauging Station No. 233228 at Colac Forrest Road Bridge, early 2000's.

Struggles Made in 2017 to Study the Supplementary Flows.

The following 13 quotes (*in blue*) have been taken from Jacobs 2017 “Boundary Creek aquatic ecology investigation”⁽²⁾ and set the scene for what was to follow after 2017, including use of the Supplementary Flows. At this stage, in 2017, Barwon Water was still preparing to renew the groundwater extraction licence.

- 1. A supplementary flow released by Barwon Water which was designed to compensate for any potential impacts of groundwater extraction.*** Whatever the reason, the flows have failed to achieve this from the very first release of water. However, the general feeling being portrayed was that continuing the flows was a good thing. This feeling was based purely on assumption, guesswork and generalisation and was at odds with local observation.
- 2. These additional studies, informed by this study, will be the primary tools used to understand potential impacts from the Barwon Downs borefield and to assess what impact the 2ML/day supplementary flow is having on the ecological values of Boundary Creek.*** These additional studies were asked to be done by the Barwon Water Groundwater Community Reference Group in 2013. And, considering it was locally known after the first releases in 2004, that these flows were not achieving this aim, these additional studies should have been implemented way back in 2005. A comprehensive assessment and report on the Supplementary Flows still has not been done.
- 3. Under the conditions of the current groundwater extraction licence, Barwon Water are required to provide supplementary flow (currently 2 ML/day) to Boundary Creek to mitigate potential impacts on stock and domestic users from extraction from the Barwon Downs bore field.*** It was obvious that these flows were not mitigating the impacts and farmers were not getting their rightful stock and domestic water since groundwater extraction began. The groundwater extraction regime introduced by Barwon Water denied the

landholders their right to water. In the early days Barwon Water actually attempted to mitigate Nellie Shalley's stock and domestic water losses by carting in tanker loads of supplementary water (see page 18).

4. *The numerical model, together with a hydraulic model, will be used to estimate the impact of extraction on flow in Boundary Creek and to assess the ecological benefits or risks of the 2 ML/day supplementary flow.*

Gaining accurate historical data to feed into the model is in the lap of the gods. A complete set of data from the stream flow gauging stations is far from satisfactory. Only "sketchy" Supplementary Flow data could be fed into the models. Also, there is little evidence that any Supplementary Flow data has been utilised.

5. *It is difficult to determine the natural flow regime in Reach 1 of Boundary Creek due to the influence of the supplementary flow.* This statement reinforces the comment made for point 4. The same could apply to the observation bores in the area.

6. *The supplementary flow to Boundary Creek is released upstream of the dam and the operator is required to pass the 2 ML/day supplementary flow.* Who the operator is still hasn't been definitely determined. The landholder of the dam; Barwon Water or the regulator of licences, Southern Rural Water?

7. *During the winter months, presumably when the dam is full, the flow records at the gauges are almost identical. However during the summer months, there is some variability in the flow. At some points the inflow is less than the apparent outflow but at other times more water is being released than is entering the dam.* This statement gives the impression that there are years of continuous data collection, but this is far from the truth. Two of the critical stream flow gauging stations were only just put back into operation in 2014, after a 20 year period of shutdown. Also, in 2014 additional new gauges were added. The only gauge with a continuous record of any length is the one at the Colac Forrest Road bridge in Reach 3 - Stream Flow Gauging Station Number 233228. Also, data collected in the last few years is impossible to draw any

conclusions from, other than to say the accuracy of water being released from McDonalds Dam cannot be guaranteed, is presently poorly regulated and decisions are being made on very limited data.

8. ***Boundary Creek stream flow is gauged upstream and downstream of Big Swamp at the gauge downstream of McDonalds Dam and at Yeodene. The flow record indicates that in the summer months Boundary Creek is flowing upstream of Big Swamp but not downstream (Figure 3-3). Flow magnitude is reduced downstream of the swamp in winter but to a minor extent. This is only a very short period of record, however, it shows that the supplementary flow is making it downstream of McDonalds Dam, but rarely downstream of Big Swamp in the summer months.*** This has been known since the Supplementary Flows were first introduced 13 years previously, and forms part of the local knowledge base. This local knowledge is by no means a “*very short period of record.*”
9. ***Reach 1 may have experienced cease to flow events prior to the 2 ML/day supplementary flow release which commenced in the early 2000s.*** One just has to ask the farmers who have lived on Boundary Creek for decades to be able to accurately remove the word “*may*” from this statement.
10. ***The supplementary flow is evident in the streamflow until Big Swamp, but is not apparent downstream under many conditions. Boundary Creek in Reach 3 rarely stopped flowing at any time of year prior to 1999, but since then has stopped flowing for long periods in most summer and autumn months downstream of Big Swamp.*** After the 1982-83 drought extraction Boundary Creek began to have periods of no flow.
11. ***The next step is to improve the understanding of the current groundwater surface water interactions and the influence of Big Swamp, assess the effectiveness of the current location of the supplementary flow release, (given it does not appear to reach Reach 3) and quantify the flow requirements of the current ecological values.*** There is absolutely no doubt the Supplementary Flows do not reach Reach 3 during dry

periods. The data from the continuous Stream Flow Gauging Station on Reach 3 (Number 233228) emphatically shows that these flows do not pass the Big Swamp.

12. To quantify the flow requirements of the aquatic values of the creek and improve the understanding of groundwater surface water interactions and the role of the supplementary flow, additional studies and investigations are required. Until these studies are done the data being fed into the models (see point 4 above) is of doubtful value as will be the results.

13. These additional studies, informed by this study, will be the primary tools used to understand potential impacts from the Barwon Downs borefield and to assess what impact the 2ML/day supplementary flow is having on the ecological values of Boundary Creek. As has been suggested from the earliest time when the Supplementary Flows were mentioned at the Barwon Downs Groundwater Community Reference Group (CRG) meetings, the best way to determine the value of these flows would be to turn them off. The consistent answer given at the CRG meetings being the licence conditions could not be changed until the licence came up for renewal. **However, as already discussed, at the very same time this was being said Barwon Water was already in negotiations with Southern Rural Water to have the 8 vegetation sites cited in the licence, changed to 14 sites.**

A most basic fact that still needs to be determined is where does the Lower Tertiary Aquifer interact with the Big Swamp. What are the geological structures under the swamp? A comprehensive understanding of what is happening through the swamp can not be gained until these structures are known.

Other Questions that Require Some Investigation.

- What was Sandy Creek's flow regime pre Supplementary Flow releases?
- What are the physical and chemical properties of the released water?
- To what level do the Supplementary Flows mask groundwater extraction impacts in the area?

- Where does the Supplementary Flows disappear to during the drier months?
- What role do the Supplementary Flows contribute to pollution of the LTA?

From 2019 the Supplementary Flows Fill a Different Role.

Since Barwon Water let its groundwater extraction licence at Barwon Downs lapse in 2019, Supplementary Flows have continued to be released down Boundary Creek. The objectives of these flows includes assisting water to flow along Boundary Creek as far as the confluence with the Barwon River and also to help maintain and sustain a water table within the Big Swamp.⁽³⁾ Supplementary Flows of 4.4 ML/day at certain critical periods will form a significant and substantial part of the Remedial and Environmental Protection Plan for the Big Swamp.⁽³⁾ Neil Longmore poses issues with these continuing releases of Supplementary Flows (see Appendix Twenty Three, page **132-136**) and need to be considered.

CONCLUSION.

The objective of releasing Supplementary Flows was well intentioned and the trigger levels set for these releases were designed to maintain flows in Boundary Creek. This regime would have succeeded except that the amount of water being extracted at the borefield was far in excess of the amount being released into the Boundary Creek system and far in excess of what was naturally being recharged. Boundary Creek was changed from a groundwater receiving creek to a losing stream. As a consequence the Supplementary Flows of 2 ML/day never reached their intended destination, disappearing into the depleted Lower Tertiary Aquifers (LTAs) by the time they reached half way along the Big Swamp Wetlands.

Jacobs states that in the upper region of the Big Swamp Wetlands the LTAs' water table was dropped to 10-15 m below the natural surface level.⁽¹⁾ Consequently, from the first release, the Supplementary Flows never had a chance of achieving their objective.

Since the withdrawal of the application to renew the groundwater extraction licence the Supplementary Flow Section 6 of the licence has morphed into the Supplementary Flows becoming an integral part of the Remediation and Environmental

Project Plan (REPP). How successful this will be, to some extent, relies on the filling of the huge data gaps that have shrouded the running of the Supplementary Flows over the last 15 years.

Suggested Recommendations.

1. Gain a comprehensive understanding of the function, administration mechanisms and understanding of what is actually taking place when Supplementary Flows are released.
2. Instal an automated outflow release system on McDonalds Dam.
3. Interview the Thiess personnel who collected the data from the earliest days at Stream Flow Gauging Station 233228. They have a wealth of historical personal knowledge in regard to Boundary Creek.
4. Determine why the three Stream Flow Gauging Stations at McDonald's Dam were decommissioned in the 1990's.
5. Interview locals and listen to their views in a meaningful way gaining valuable early and present day experiences and observations.
6. Check and collate the pH data collected at Boundary Creek by the Upper Barwon Landcare Network group.
7. Start and complete the "studies" suggested by Jacobs back in 2017 (see pages **54-55**).
8. Find the report(s) on the 1999 Supplementary Flow trials.
9. Answer the questions set out on pages **57-58** and pages **130-136** of Appendix Twenty Three.
10. Determine where the Supplementary Flow disappears to by the time it reaches the Big Swamp Wetlands.
11. Validate and verify all of the sections of reports that make mention of any Supplementary Flow data and statements.
12. Determine what the flow regime was in Reach 1 pre groundwater extraction times.
13. Investigate the relationship between the Supplementary Flows and the observation bore network in the Boundary Creek area, especially at the west end of McDonalds Dam.

SKM/Jacobs⁽¹⁵⁾ states “*It is not known whether leakage of the supplementary flow into the LTA is sufficient to maintain the water table at the surface and keep it connected to the regional water table, or that a perched water table (i.e. disconnected to the regional water table) immediately adjacent to the creek channel has formed.*”

14. Pre groundwater extraction and pre supplementary flows, the Lower Tertiary Aquifers were full and overflowing with artesian pressure heads and as a consequence perched or alluvial aquifers were not an issue.⁽⁷⁾ There is sufficient historical data available to avoid having to make such incorrect statements.

BIBLIOGRAPHY.

1. Jacobs 9 November 2017: 2016-2017 Technical Works Program, Yeodene Swamp Study. Barwon Water.
2. Jacobs 17 March 2017: Boundary Creek aquatic ecology Investigation. Barwon Water.
3. GDH April 2021: Big Swamp Integrated Groundwater-Surface Water Modelling for Detailed Design Technical Modelling Report. Prepared for Barwon Water.
4. Gardiner. M.J., February 2017: Hydrological Sensitive Vegetation Sites -Barwon Downs Borefield Area of Influence. Otway Water Book 31.
5. Barwon Water 2004: Groundwater Licence No 893889 Gerangamete Area. 2003/04 Report. Prepared as part of the Licence conditions for Southern Rural Water.
6. Barwon Water 2007: Groundwater Licence No 893889 Gerangamete Area. 2006/07 Report. Prepared as part of the Licence conditions for Southern Rural Water.
7. Gardiner. M.J., June 2007: Who Gives a Damn?. Otway Water Book 1.
8. Gardiner. M.J., October 2008: One Giant Environmental Footprint. Otway Water Book 8.

9. Gardiner. M.J., 2016: A Breakdown in Governance. Otway Water Book 33.
10. Witebsky S., Jayatilaka C. and Shugg A. J., November 1995: Groundwater Development Options and Environmental Impacts. Barwon Downs Graben, South-Western Victoria. Department of Natural Resources and Environment.
11. Gardiner. M.J., June 2007: Who Gives A Damn?. Otway Water Book 1.
12. Gardiner. M.J., November 2016: Fish Kill, Upper Reach of the Barwon River June 2016. Otway Water Book 32.
13. Jacobs 26 November 2018: Barwon Downs Technical Works Program, Groundwater Assessment Report. 1/FINAL. Prepared for Barwon Water.
14. Jacobs 9 November 2017: 2016-2017 Technical Works Program, Yeodene Swamp Study. Final Draft. Prepared for Barwon Water.
15. Sinclair Knight Merz, 14 April 2009: Barwon Downs Flora Study 2008. Final 1. Barwon Water, Victoria Australia.