

Drinking Water Quality Management Plan (DWQMP) Annual Report

2018 – 2019

Dumaresq-Barwon Border Rivers Commission (BRC)

SPID: 370

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LGA covered by this plan: Southern Downs Regional Council

Water Supply Schemes covered by this plan: Glenlyon Dam drinking water scheme

Glossary of terms

Term	Description
ADWG 2004	Australian Drinking Water Guidelines (2004). Published by the National Health and Medical Research Council of Australia
ADWG 2011	Australian Drinking Water Guidelines (2011). Published by the National Health and Medical Research Council of Australia
<i>E. coli</i>	<i>Escherichia coli</i> , a bacterium which is considered to indicate the presence of faecal contamination and therefore potential health risk
HACCP	Hazard Analysis and Critical Control Points certification for protecting drinking water quality
mg/L	Milligrams per litre
NTU	Nephelometric Turbidity Units
MPN/100 mL	Most probable number per 100 millilitres
CFU/100 mL	Colony forming units per 100 millilitres
<	Less than
>	Greater than
WTP	Water treatment plant

Document history and status

Revision	Date	Description	By	Review	Approved
A	13/12 /19	Draft for Sunwater Review	Ben Baillie (Jacobs)	Nicholas Stanton (Jacobs)	Nicholas Stanton (Jacobs)
0	18/12 /2019	Final for Submission	Ben Baillie / Nicholas Stanton (Jacobs)	Neil McCabe (Sunwater)	Chris Delamont (Sunwater)

1. Introduction

This report documents the performance of the Border River Commission's Glenlyon Dam drinking water service with respect to water quality and performance in implementing the actions detailed in the approved Drinking Water Quality Management Plan (DWQMP) as required under the *Water Supply (Safety and Reliability) Act 2008* (the Act). The report is for the period 1 July 2018 – 30 June 2019.

The report assists the Regulator to determine whether the approved DWQMP and any approval conditions have been complied with and provides a mechanism for providers to report publicly on their performance in managing drinking water quality.

2. Overview of Operations

The Glenlyon Dam drinking water scheme sources water from Glenlyon Dam. The dam is owned by the Department of Natural Resources and Mines and is managed by the Border Rivers Commission.

Sunwater is contracted for the asset management, operation and maintenance of the dam, the associated water treatment facilities and mains reticulation system for the provision of drinking water services to four houses, a small caravan park and day visitor / recreational areas together with associated toileting services (ie, picnic area toilets).

The water treatment process comprises of a multi-barrier three step process of;

- (i) Primary media filtration and storage
- (ii) Secondary filtration with organics removal through activated carbon media; and
- (iii) Two stage disinfection with UV and dosing by sodium hypochlorite.

The water treatment process, plant and equipment are essentially manually controlled by operations staff during day-light hours, with the exception of the automation of the sodium hypochlorite pump. This automatic chlorine dosing system maintains free chlorine residual levels above 0.5 mg/L in the clear water tanks as part of the water treatment process.

The treated drinking water is stored in above ground tanks for later use on a two or three day production cycle, depending on demand for drinking water at the caravan park and picnic facilities at Glenlyon Dam. Water is disinfected before reticulation.

The daily drinking water demand is very seasonal, typically ranging from 10 to 40 kL/day, with maximum and minimum demand values of 300 and 18 kL/week.

3. Actions taken to implement the DWQMP

Sunwater has implemented the DWQMP including setting operational limits and investigation into non-compliances, as defined in the DWQMP operational and verification monitoring programmes, and site specific work instructions.

Progress in implementing the risk management improvement program

Appendix A of the approved Drinking Water Quality Management Plan outlines the Improvement Plan Actions. A brief status report of the progress of these actions is included in Appendix B of this annual report.

All improvement items have been resolved, either by being completed or by being determined to be unnecessary and removed from the list, with the exception of ongoing operator training (to be undertaken every two years) which was due for completion in the 2018 calendar year. It is noted that

the operator managing the WTP holds a certificate 3 in water industry treatment operations and was included in the site specific refresher training conducted in 2016.

Revisions made to the operational monitoring program to assist in maintaining the compliance with water quality criteria¹ in verification monitoring.

No revisions have been made to the operational monitoring program over the past year.

Drinking water quality is tested in accordance with ADWG limits on a number of key parameters and monitored on two levels to ensure safe drinking water for consumers, these are the water characteristics and micro-biological tests. The drinking water quality tests involve routine monthly testing of microbiology at a NATA accredited Laboratory and weekly/daily testing at the WTP Laboratory of water chemistry (aesthetics) and residual chlorine.

Three water quality sampling locations (test points) within the distribution system are utilised to provide high levels of overall confidence, guarantee and surety in the provision of safe drinking water quality to consumers.

The sampling points were selected based on providing the highest probability of finding non-compliant drinking water in order to prevent a worst case scenario for a public health incident. The three water quality sampling points are located at the water treatment plant and at the end of the reticulation mains at the clear water tank(s), Caravan Park (Office) and Haigh Cottage (kitchen tap).

As these mitigation measures reduce “high” risks to risks of “medium” or “low” public risk, Sunwater believes the current verification monitoring program is adequate.

Amendments made to the DWQMP

No amendments were made to the DWQMP between 1 July 2018 and 30 June 2019.

4. Compliance with water quality criteria for drinking water

Under the *Water Supply (Safety and Reliability) Act 2008* the Dumaresq-Barwon Border Rivers Commission (BRC) (the entity responsible for Glenlyon Dam) is defined as a large water service provider.

The drinking water quality control parameters were developed from recommendations outlined in ADWG (2011). Table 4 (a): Drinking Water Quality Control Measures below shows the key parameters for operator testing and water quality acceptance. These parameters are tested at the WTP Laboratory for the three different water quality sampling points.

¹ Refer to *Water Quality and Reporting Guideline for a Drinking Water Service* for the water quality criteria for drinking water.

Table 4 (a): Drinking Water Quality Control Parameters

Parameter	Monitoring Frequency	Acceptable Limits
Residual chlorine (free) ^(Note 1)	Every 3 – 4 days	> 0.5 mg/L after 30 mins
Total chlorine	Every 3 – 4 days	< 5 mg/L
Raw Water pH	Every 3 – 4 days	N/A
Raw Water Turbidity	Every 3 – 4 days	N/A
Treated Water pH	Every 3 – 4 days	6.5 – 8.5
Treated Water Turbidity	Every 3 – 4 days	< 1 NTU

Note 1: The minimum acceptable residual chlorine (free) limit of 0.5 mg/L is not a specific requirement of the ADWG and has been applied by Sunwater as an internal operational check for disinfection performance. Although residual chlorine (free) is outlined in the DWQMP as a drinking water quality control parameter to monitor operational performance, verification of the efficacy of the treatment process and particularly disinfection is by the monthly micro bacteriological sampling.

Micro-biological control testing is also required to ensure compliance with ADWG as well as the standards in the Public Health Regulation 2005. The parameters and frequency of the monitoring is shown below in Table 4 (b): Micro-biological control.

Table 4 (b): Micro-biological Control

Parameter	Monitoring Frequency	Acceptable Limits
E.Coli	Monthly	<1 CFU
Total Coliforms	Monthly	N/A – significant changes will be investigated
Total Plate Count	Monthly	N/A – significant changes will be investigated

A summary of compliance with water quality criteria is included in Appendix A. This includes the following information:

- parameter
- unit of measure
- total number of samples collected
- number of samples that did not meet the water quality criteria
- maximum concentration or count

The water quality results over the 2018/19 financial year met the recommended values in the ADWG, with the exception of;

- One (1) instance where the treated water total chlorine exceeded the DWQMP limit of 5 mg/L (7.0 mg/L on 20/7/2018, recorded at the water treatment plant and the Caravan Park (Office)).

5. Notifications to the Regulator under sections 102 and 102A of the Act

One (1) notification to the regulator under sections 102 and 102A of the Act was made between 1 July 2018 and 30 June 2019. This was as follows:

- 20/7/2018 – Total Chlorine > 5 mg/L (incident)

All micro-biological testing this financial year revealed that there were no instances where *Escherichia coli* (*E. Coli*) exceeded the acceptable limit of <1 CFU/100ml.

Non-compliances with the water quality criteria and corrective and preventive actions undertaken

Total Chlorine > 5 mg/L (20/7/2018)

Glenlyon Dam WTP experienced total chlorine levels exceeding 5 mg/L recorded at the water treatment plant and at the Glenlyon Dam Caravan Park. Low flow to the recently installed chlorine analyser (a new chlorine dosing unit was installed approximately 2 – 3 weeks prior to the non-compliance) resulted in air bubbles getting trapped in the analyser unit causing it to read low to no chlorine (i.e. due to air bubbles on the analyser probe). Grab samples taken from the treated water from the water treatment plant and at the Glenlyon Dam Caravan Park showed total chlorine levels of 7 mg/L.

Immediate corrective actions involved notification to customers at the Caravan Park not to drink the water (alternative bottled water is available), draining / re-filling of water in the storage tanks, flushing the reticulation network with in-specification water and undertaking follow-up total chlorine testing. The plant was closely monitored for the 2 days following the non-compliance with operators increasing the frequency of testing.

As a long-term preventative action Sunwater have increased flow to the chlorine analyser to prevent the recurrence of air bubbles in the unit. A visual inspection mark has been added on the flow indicator at the appropriate flow level to assist operators with ensuring flow remains at the required level.

Prescribed incidents or Events reported to the Regulator and corrective and preventive actions undertaken.

Between 1 July 2018 and 30 June 2019, there were no instances that required notification to the Regulator under sections 102 or 102A of the Act.

6. Customer complaints related to water quality

Sunwater is required to report on the number of complaints, general details of complaints, and the responses undertaken.

Throughout the 2018/19 reporting period no complaints about water quality were received.

During 2018/19 reporting period, there were no suspected or confirmed cases of illness arising from the water supply system.

7. Findings and recommendations of the DWQMP auditor

An audit of the DWQMP was not required between the reporting period of 1 July 2018 and 30 June 2019.

8. Outcome of the review of the DWQMP and how issues raised have been addressed

An audit of the DWQMP was not required between the reporting period of 1 July 2018 and 30 June 2019.

Appendix A – Summary of compliance with water quality criteria

The results from the verification monitoring program have been compared against the levels of the water quality criteria specified by the Regulator in the *Water Quality and Reporting Guideline for a Drinking Water Service*.

The reported statistics do not include results derived from repeat samples, or from emergency or investigative samples undertaken in response to an elevated result.

The verification monitoring program was carried out as stated in the DWQMP

Table 1 - Verification monitoring results Glenlyon Dam Water Scheme.

Parameter	Units	Frequency of sampling	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	DWQMP Limit	Laboratory name
Treated water pH		Every 2-3 days	315	315	0	6.9	8.0	7.6	6.5-8.5	Glenlyon Dam WTP Laboratory
Treated water turbidity	NTU	Every 2-3 days	309	309	0	0.24	1.12	0.51	<5 NTU	Glenlyon Dam WTP Laboratory
Residual chlorine (free)	mg/L	Every 2-3 days	315	315	0	0.51	6.34	1.11	>0.5mg/L after 30 mins	Glenlyon Dam WTP Laboratory
Treated water total chlorine	mg/L	Every 2-3 days	315	315	2	0.71	7.00	1.51	<5 mg/L	Glenlyon Dam WTP Laboratory
E.coli	Cfu/100 ml	Monthly	24	0	0	< 1	< 1	< 1	<1 cfu/100ml	Laboratory Services Toowoomba

Note: Samples from different locations of each site were combined for reporting.

Table 2 (a) - Reticulation *E. coli* verification monitoring 2018

Escherichia coli health compliance:
Calculation of 12 month 'rolling' annual value

Department of Environment and Resource Management
Conserving and managing Queensland's environment and natural resources

Drinking water scheme: Glenlyon Dam Drinking Water Scheme

Year	2018											
Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
No. of samples collected	2	2	2	2	2	2	2	2	2	2	2	2
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	24	24	24	24	24	24	24	24	24	24	24	24
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2005* (the regulation) requires that 98 per cent of samples taken in a 12 month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement comes into effect once you have 12 months data and should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Table 3 (b) - Reticulation *E. coli* verification monitoring 2019

Escherichia coli health compliance:
Calculation of 12 month 'rolling' annual value

Department of Environment and Resource Management
Conserving and managing Queensland's environment and natural resources

Drinking water scheme: Glenlyon Dam Drinking Water Scheme

Year	2019											
Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
No. of samples collected	2	2	2	2	2	2						
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0						
No. of samples collected in previous 12 month period	24	24	24	24	24	24	22	20	18	16	14	12
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2005* (the regulation) requires that 98 per cent of samples taken in a 12 month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement comes into effect once you have 12 months data and should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Appendix B – Implementation of the DWQMP Risk Management Improvement Program

Table 4 – Progress against the risk management improvement program in the approved DWQMP (2015-2018)

Item No.	HACCP Control Area	Hazard / Event	Recommendation / Preventative Measure	Target date/s	Status as at 30 June 2019	(If implementing these actions will take longer than anticipated, please provide detail, as it may affect the approved DWQMP)
2015 – 2018 DWQMP						
1	Operator / Management Training	<ol style="list-style-type: none"> Non-compliant or poor water quality & odours / bad tastes from micro-biological build up. Knowledge / technical expertise lost when operators / staff transition. 	<p>Ensure all technical support, supervisory staff & WTP operators have attained certificate 3 standards.</p> <p>Conduct refresher training every 2 years. Increase the frequency of NATA drinking water quality testing</p>	Ongoing	Training completed in 2016, conducted by specialist water consultant. Refresher training is overdue	Ongoing as required.
2	WTP – Storage Tanks Reticulation System	Bacteria (<i>E. coli</i>)	Investigate costs & benefits implementing routine Colitag (<i>E. coli</i>) testing of tanks, distribution mains and customer test points. This was re-addressed as it was understood that this kit can provide a presumptive <i>E. coli</i> detection faster than the microbiological testing.	FY 15/16	Closed	Colitag testing has been internally investigated and deemed to be unnecessary.
3	Operating Manual	<i>E. coli</i> , Coliforms & HPC	Undertake a review of the operating manual to ensure consistency with standard WTP practices (i.e. chlorination & backwashing). Conduct workshops and risk assessments every 2 to 4 years as part of the RCM approach to managing TWS assets and operations	FY 15/16	Closed (but reviews will remain ongoing)	O&M documentation, namely work instructions were again reviewed and substantially updated during the 2017/18 reporting period.