Sydney Drinking Water Catchment Audit 2019-22

Appendix Report

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A TETRA TECH COMPANY

RESTORE

DOCUMENT TRACKING

Project Name	Drinking Water Catchment Audit 2022
Project Number	22WOL-1728
Project Manager	Katherine Lang
Prepared by	Contributors and reviewers are listed in Appendix A
Approved by	Dr Richard Cresswell
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Template 2.8.1

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Abbreviations

Abbreviation	Description
ANZECC	Australian and New Zealand Environment and Conservation Council
Chl-a	Chlorophyll-a
Cond	Conductivity
DO	Dissolved oxygen
DPE	NSW Department of Planning and Environment
EPA	NSW Environment Protection Authority
GIS	Geographic information system
LLS	Local Land Services
NH4	Ammoniacal nitrogen
NHMRC	National Health and Medical Research Council
NorBE	Neutral or beneficial effect
NOx	Oxidised nitrogen
PSR	Phosphorus soluble reactive
TN	Total nitrogen
TP	Total phosphorus
Turb	Turbidity

1. Appendix A Audit team

The audit team comprised personnel from Eco Logical Australia and Restore Environmental Consultants.

Table 1-1: Audit team

Name	Role in audit	Qualification
Beth Medway (Restore Environmental Consultants)	Lead Auditor	Registered Planner +EIA (Registered Environmental Assessment Practitioner) Graduate Certificate in Change Management Master Environmental Engineering Science Master Environmental Studies Bachelor of Applied Science (Hons 1)
Dr Richard Cresswell	Project Director	Doctorate (Geology and Meteoritics) Master of Science (Geology and Archæometry) Bachelor of Science (Geology)
Katherine Lang	Project Manager	Bachelor of Environmental Science (Advanced) with Honours
Sophie Powrie	Reviewer	Bachelor of Applied Science Environmental Biology
Dr Andrew Butler	Indicator specialist - erosion	PhD (Soil Science) Bachelor of Science (Honours) (Soil Science) Certified Environmental Practitioner – Certificate 40 Certified Professional Soil Scientist (S00422)
Andrew Herron	Indicator specialist - water	Bachelor of Environmental Engineering (Hons)
Anne Gibson	Indicator specialist - groundwater	Bachelor of Applied Science (Earth and Land Science), (Hons 1)
Ian Dixon	Indicator specialist - fish, macroinvertebrates	RIVERSTYLES geomorphology assessment (Provisional) AUSRIVAS Accreditation (Australian River Assessment System) Master of Tropical Environmental Management: The Relationship between Catchment, Aquatic and Riparian Condition Bachelor of Landscape Architecture
Nathan Kearnes	Indicator specialist - bushfire and native vegetation	Bushfire Protection and Design Certified Practitioner - Fire Protection Association Aust. BPAD23575-L3. Graduate Diploma in Bushfire Protection Bachelor of Science
Scott Chrystal	GIS lead	Bachelor of Science (Spatial Information Science)
Erin Hodgkin	GIS support	Bachelor of Science (Environmental Science)
Hallam Brichacek	Technical support - water	Bachelor of Environmental Engineering (Honours)
Katherine Pellowe	Technical support	Bachelor of Science (Technology) majoring in Biological and Environmental Sciences
Kerrie Burke	Administrative support	Administration

2. Appendix B Catchment indicators and measurements

Table 2-1: Catchment indicators, measures and sources

Catchment health indicator	Measurement proposed in 2009	Sources used in 2022 audit
Community attitudes, aspirations and engagement	The number of community natural resource management organisations within the catchment The number of landholders engaged in improvement works	Community submissions to the audit Submissions to major project development applications Community engagement programs Councils' Community Strategic Plans
Population settlements and patterns	Population and distributions across the catchment	Population distribution
Land use	Type and extent of land use	Land ownership and use
Sites of pollution and potential contamination	Sites and areas of potential pollution impact	Environment protection licences Contaminated land Collaborative pollution control programs
Soil erosion	Estimates of the total area of the catchment with observed gully erosion	Gully erosion Hillslope erosion Erosion in urban land
Ecosystem and raw water quality	Turbidity, pH, electrical conductivity (EC), total aluminium, total iron, total nitrogen (TN), total phosphorus (TP), oxidised nitrogen (NOx), ammoniacal nitrogen (NH4), filterable reactive phosphorus (FRP), chlorophyll-a and dissolved oxygen (DO), assessed against the ANZECC and ARMCANZ (2000) guidelines	WaterNSW water quality compliance data and annual reports (2019-22) WaterNSW statistical trend analysis 2011-21 WaterNSW routine water quality data (all records for selected analytes)
Nutrient load	Level of compliance of sites of point source nutrient input with Environment Protection Licences and/or Pollution Reduction Programs during the audit period	EPA environment protection licences
Cyanobacterial blooms	Compliance with the NHMRC (2008) recreational water quality guidelines for cyanobacteria in freshwater	WaterNSW cyanobacterial alerts for recreational waters
Surface water flow	Level and variability of streamflow Maximum permissible annual volume of surface water that can be extracted under water access licences in each subcatchment	WaterNSW flow data
Environmental flows	Total volume of water by type released from storages Number of dams, weirs and other barriers to flow in the catchment, including the number remediated	WaterNSW environmental flow compliance data
Groundwater availability	Extraction entitlement relative to the sustainable yield (long term average	Monitoring data from bores

Catchment health indicator	Measurement proposed in 2009	Sources used in 2022 audit
	extraction limit) at a Groundwater Management Area or water source scale	
Macroinvertebrates	Macroinvertebrates	AusRivAS monitoring results
Fish	Fish	Fish surveys Fish community status Threatened fish Fish passage
Riparian vegetation	The extent and condition of riparian vegetation within the catchment	The extent and condition of riparian vegetation
Native vegetation	The area and condition of native vegetation	The area and condition of native vegetation
Fire	Area and location burnt by bushfires and hazard reduction burns	Fire type, extent, frequency and severity
Wetlands	Size, type, location and condition of wetlands	Distribution of wetlands
Physical form	River Styles Stage 2 (Condition)	River Styles – Hawkesbury Nepean catchment updated in 2022; remainder 2013-16

3. Appendix C Consultation for the audit

Table 3-1: Audit consultation process

Task	Description	Timing
Notification of audit		
Print / online newspaper notices	Refer to example notice in Figure 3-2. Notices were placed in the following organisations: Blue Mountains Gazette Braidwood Tallaganda Times Crookwell Gazette Goulburn Post Illawarra Mercury Koori Mail Lithgow Mercury Oberon Review St George and Sutherland Shire Leader South Coast Register Southern Highland News Sydney Morning Herald The District Bulletin Wollondilly Advertiser	July 2022
Notification letters to agency heads	Sent by WaterNSW CEO	July 2022
Notification letters to government and non-government organisations	See example in Figure 3-1 Refer to list of organisations contacted in Table 3-2	July 2022
Consultation with indigenous organisations	Liaison with WaterNSW Aboriginal Engagement Manager Phone calls and emails to confirm contact details, discuss purpose of audit, advise letter will be sent and offer to meet Letters and emails sent Follow-up phone calls and emails Organisations consulted are listed in Table 3-2	July-September 2022
Data and information gathering		
Initial submissions received	Included letters, emails and phone calls from community groups, individuals and commercial organisations As outlined in section 8.3.1 of the main volume of the audit report, written submissions (mainly in email format) were provided by the following non-government entities: • Lock the Gate • Metropolitan Coal • South32 Illawarra (refer to Figure 3-3 for copy of letter submission) • Sutherland Shire Environment Centre	July-November 2022

Task	Description	Timing
	Written submissions were also provided by Mr Patrick Garry regarding on-site sewerage systems.	
Direct contact with stakeholders, including Teams meetings	Refer to list of organisations contacted by the lead auditor and/or specialists (Table 3-2) Presentations by WaterNSW to the audit team on selected topics	July-December 2022
Site inspections	Refer to schedule in Table 3-3	November 2022
Audit report reviews (including meetings with agencies)		
Preliminary draft audit report	WaterNSW	January-February 2023
Recommendations and draft audit report	Department of Planning and Environment (DPE) Biodiversity Conservation Science DPE Major Projects DPE Post-Approvals DPE Water Environment Protection Authority Rural Fire Service National Parks and Wildlife Service NSW Reconstruction Authority Mining, Exploration and Geoscience Office of Energy and Climate Change Office of Local Government Resources Regulator WaterNSW Wingecarribee Shire Council	March-April 2023

Table 3-2: Other organisations consulted for this audit

Type	Name
Indigenous	Bathurst Local Aboriginal Land Council Batemans Bay Local Aboriginal Land Council Cubbitch Barta Native Title Claimant Aboriginal Corporation Coomaditchie United Aboriginal Corporation Darug Custodian Aboriginal Corporation Deerubbin Local Aboriginal Land Council Gundungarra Aboriginal Heritage Association Inc. Gundungurra Tribal Council Aboriginal Corporation Illawarra Local Aboriginal Land Council Nowra Local Aboriginal Land Council Pejar Local Aboriginal Land Council Tharawal Local Aboriginal Land Council Mogo Local Aboriginal Land Council Ngambri Local Aboriginal Land Council

Type	Name
	South Coast People
	Ulladulla Local Aboriginal Land Council
Community	Australian River Restoration Centre
	Blue Mountains Conservation Society
	Blue Mountains World Heritage Institute
	Protect Our Water Alliance
	Coal Free Southern Highlands
	Landcare NSW
	Lithgow Environmental Group
	Lock the Gate Alliance
	National Parks Association of NSW
	Nature Conservation Council of NSW
	Robertson Environmental Protection Society
	Sutherland Shire Environment Centre
	Sydney Knitting Nannas
	The Mulloon Institute
	Total Environment Centre
	Wilderness Australia
	WWF
Other non-government	Australian Water Association
	Stormwater NSW
	Water Sensitive Cities Australia
	Water Services Association of Australia
	Dairy NSW
	Endeavour Energy
	Mt Piper Power Station (EnergyAustralia)
	Transgrid
	Greenspot
	NSW Mining
	Centennial
	Peabody Energy Metropolitan Coal
	South 32 Coal
	Wollongong Coal Limited
	Australian Rivers Institute, Griffith University
	Macquarie University
	Centre for Environmental Risk Management of Bushfires (University of Wollongong)
NSW Government	DPE Biodiversity Conservation Science
	DPE Major Projects
	DPE Post-Approvals
	DPE Water
	Department of Health
	Environment Protection Authority
	Local Land Services

Type	Name
	Rural Fires Service
	National Parks and Wildlife Service
	NSW Reconstruction Authority
	Mining, Exploration and Geoscience
	Office of Energy and Climate Change
	Office of Local Government
	Resources Regulator
	WaterNSW
Local council	Blue Mountains City Council
	Campbelltown City Council
	Eurobodalla Shire Council
	Goulburn Mulwaree Council
	Kiama Municipal Council
	Lithgow City Council
	Oberon Council
	Queanbeyan Palerang Regional Council
	Shoalhaven City Council
	Snowy Monaro Regional Council
	Sutherland Shire Council
	Upper Lachlan Shire Council
	Wingecarribee Shire Council
	Wollondilly Shire Council
	Wollongong City Council

20 July 2022

Our ref: 22WOL1728

[redacted]
Attention: [redacted]
Sent via email: [redacted]

Dear [redacted]

Request for Information - Sydney Drinking Water Catchment Audit 2019-2022

The NSW Minister for Lands and Water has commissioned Eco Logical Australia to conduct the Sydney Drinking Water Catchment Audit 2019-2022 in accordance with the *Water NSW Act 2014*. The Catchment has an area over 16,000 km^2 and extends from north of Lithgow in the upper Blue Mountains, to the source of the Shoalhaven River near Cooma in the south (see Attachment A). Water from land within the Catchment is collected and stored to supply Sydney, the Blue Mountains, the Illawarra, the Southern Highlands, Goulburn and parts of the Shoalhaven.

The auditor is seeking data, information and submissions to assess the health and management of the Catchment over the period from 1 July 2019 to 30 June 2022 in the context of longer-term trends. The 18 catchment health indicators and the 2019 Audit report are available at http://www.waternsw.com.au/about/legislation/catchment-audits.

If you hold relevant and suitable data or information that can be shared or if you would like to make a submission, we would appreciate it if you could send it by **31 August 2022** via:

Email: catchmentaudit2022@ecoaus.com.au OR

Post: Sydney Drinking Water Catchment Audit 2022
Eco Logical Australia
PO Box 12 Sutherland NSW 1499

If you require more information about this request or the audit, please contact me via the email above or on 0403 648 243.

Regards,

Beth Medway
Principal Environmental Consultant and Lead Auditor

Figure 3-1: Example notification letter

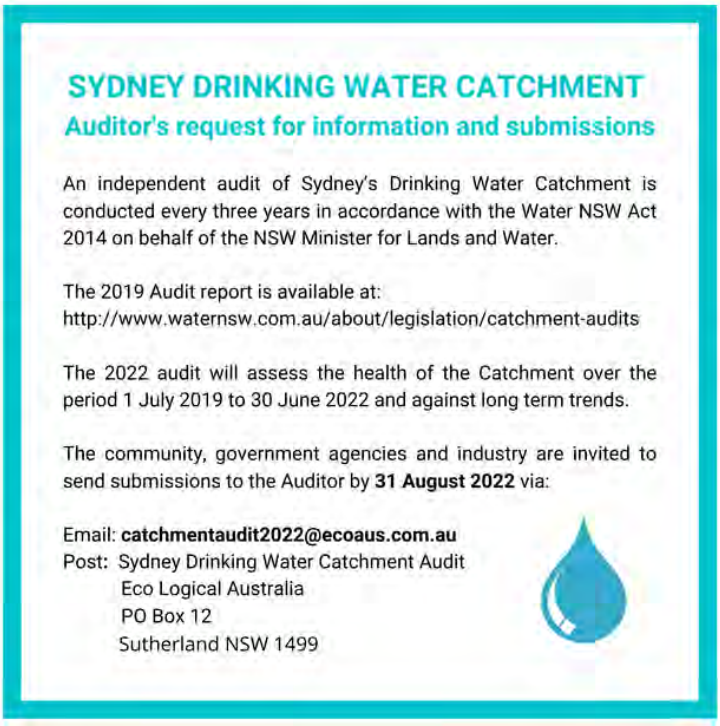


Figure 3-2: Example newspaper notice

Table 3-3: Field visit schedule

Date	Location	Organisations represented
8 November 2022	Urban stormwater management at The Oaks and Oakdale Nattai Lookout and W10I fire trail – fire impacts and vegetation regrowth	Audit team WaterNSW Wollondilly Council (invited to The Oaks/Oakdale but unavailable)
16 November 2022	Stormwater management in the Blue Mountains Gardens of Stone State Conservation Area Lake Lyell	Audit team WaterNSW Blue Mountains City Council Centennial Energy Australia NPWS (invited to Gardens of Stone but unavailable)
23 November 2022	South East LLS office (presentation) Agricultural properties near Goulburn and Braidwood	Audit team WaterNSW Local Land Services The Mulloon Institute

28 August 2022

Illawarra Metallurgical Coal
South32
Port Kembla Coal Terminal
Port Kembla Road
Inner Harbour
PORT KEMBLA 2502
New South Wales
Australia
T +61 2 4286 3000
south32.net

Beth Medway
Principal Environmental Consultant and Lead Auditor
Eco Logical Australia
PO Box 12 Sutherland NSW 1499

Dear Beth,

RE: Sydney Drinking Water Catchment Audit 2022

I refer to your letter dated 20 July 2022 regarding the Sydney Drinking Water Catchment Audit 2019-2022 in accordance with the *Water NSW Act 2014*.

Illawarra Coal Holdings Pty Ltd, a wholly owned subsidiary of South32 Limited (South32), is the owner and operator of two mines, including the Dendrobium Mine which is located within the Greater Sydney Water Catchment Special Areas.

Background

South32 produces high-quality metallurgical coal used for steelmaking. Our coal is considered some of the best in the world and our operations are important to the region and New South Wales through our economic and employment contributions.

The BlueScope Steelworks at Port Kembla is the largest steel production facility in Australia, and one of only two primary iron and steel making facilities in Australia. South32 supplies the Steelworks with approximately 60% of their total Hard Coking Coal requirements.

There is currently no economically viable alternative to the use of metallurgical coal in the blast furnace method of steelmaking used at the BlueScope Steelworks.

South32's Illawarra operations:

- Provide jobs for approximately 1,900 people, with more than 90% of wages paid to workers residing in the Illawarra region.
- Result in expenditure of $400 million a year in the Illawarra region, of which $240 million is spent with more than 200 locally based suppliers.
- Contributes more than A$1 million a year to support local community groups and organizations.
- Contributed approximately $95 million in royalties to the NSW government in FY21.

South32 is the most significant metallurgical coal producer in the region, providing local supplies of a product essential to the BlueScope Steel works, and also exporting around the world.

Mining Practices within the Catchment

Mining within the Catchment is one of the few productive developments allowable within the Catchment area, with appropriate Consent and approvals. South32 endeavours to minimise and avoid impacts to sensitive surface features in its operations. Examples of these include:

- Not mining beneath named watercourses.
- Not mining within 300 m of reservoirs.
- Avoiding major natural features e.g. Sandy Creek Waterfall.

Sydney Drinking Water Catchment Audit 2016-2019

The then NSW Minister for Water, Property and Housing commissioned Eco Logical Australia to conduct the Sydney Drinking Water Catchment Audit 2016-2019 in accordance with the *Water NSW Act 2014* (Eco Logical Australia 2020). A key finding of this audit was "*Ensure sufficient water entitlements are retained by all mines operating in the Special Areas to cover potential surface water losses resulting from mining induced effects…*"

The Independent Expert Panel for Mining in the Catchment Report (IEPMC) (2019) followed on from the findings of the 2016 audit and recommended that "*the NSW Government establish a regulatory regime to license surface water losses in the Special Areas. There is currently no legal mechanism available under the Water Management Act 2000 for a mining company operating in the Special Areas to acquire a licence for surface water 'take'. This is a problem for historical and existing mining operations in the Special Areas as they are unable to comply with the water legislation.*"

The NSW Government previously announced it will establish a regulatory regime to address this issue and South32 has met with DPE Water on numerous occasions to discuss this matter. However, no solution has been put forward at this time.

Greater Metropolitan Region Unregulated River Water Sources Water Sharing Plan

The Greater Metropolitan Region Unregulated River Water Sharing Plan commenced in 2011. Prior to the Water Sharing Plan commencing, existing mines were not required to hold surface water licences under the *Water Act 1912* (NSW) for their incidental/indirect water take that resulted from mine subsidence. There was no legislative requirement to hold licences for this type of water take and it was not required by the NSW Government. Therefore, no surface water entitlements were made available to mines when the Greater Metropolitan Water Sharing Plan commenced in 2011.

Section 60I of the *Water Management Act 2000* came into effect on 1 March 2013. Section 60I clarified that mines that take or divert water from a water source as a result of mining activities must be licensed for that water take or diversion. However, the rules of the Water Sharing Plan – which commenced two years earlier – do not allow or do not have sufficient entitlements to permit the obtaining of surface water entitlements to comply with section 60I.

The draft replacement of the Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Sources was recently on public exhibition. No changes to the Water Sharing Plan which would accommodate equal opportunity for stakeholders to acquire water entitlements were present in the draft Water Sharing Plan. South32 has made submissions to DPE Water regarding this matter.

The Independent Expert Panel for Mining in the Catchment Report (2019)

The IEPMC, formed partly in response to the 2016 Catchment Audit, completed its Report in late 2019. Key conclusions include:

- There has been a major effort over the last decade by Dendrobium Mine to employ up-to-date 3-dimensional groundwater models and best practice modelling methods undertaken by suitable experts, with expert peer review. The models have improved in accuracy and predictive capacity and peer reviews of the models and modelling have provided valuable direction without which the process may have been less focussed.
- Mining related water losses to the catchment over the past 100 years are low compared to other components of Sydney's supply and demand, for example recent losses from the Dendrobium, Russell Vale and Wongawilli mines of less than 8 ML/day on average compared to the Sydney Desalination Plant capacity of approximately 250 ML/day (Sydney Desalination Plant, 2019) and estimated leaks from the Sydney Water supply infrastructure of approximately 130 ML/day.

Since the publishing of the IEPMC Reports, South32 has continued to build on its groundwater modelling efforts which were acknowledged by the IEPMC. The progression of the research and continued development of the groundwater model is documented in a recent groundwater assessment (Watershed Hydrogeo, 2022) for the Dendrobium Mine. Several matters which were critical of the Dendrobium Mine published in the IEPMC Report are addressed in the recent assessment and would provide valuable background to the Auditor. The groundwater assessment is available on the Major Projects Website.
https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSI-33143123%2120220427T061045.250%20GMT)

End of Panel Reports

Since the 2019 Catchment Audit, another three longwalls (16, 17 and 18) have been extracted from Dendrobium Area 3. Details of subsidence impacts and induced water losses from the Catchment have been document in the end of panel assessments for the respective longwalls, note Longwall 18 End of Panel report is currently being prepared and is not available at the time of writing. These end of panel reports are available on the South32 Website.
(https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents

Thank you for the opportunity to provide a submission on the 2019 – 2022 Catchment Audit. If you have any questions or wish to discuss any of the matters further. Please contact the undersigned.

Yours sincerely

C.Brady

Cody Brady
Principal Approvals
South32 Illawarra Metallurgical Coal

Figure 3-3: Letter submission from South32 Illawarra (3 pages)

4. Appendix D Current recommended practices and standards (June 2022)

Current recommended practices tabulated below in italics were prepared by WaterNSW.

Category	Title	Status
Construction earthworks	Rural Earthmoving in the Sydney Drinking Water Catchment	Planned for review next audit period
	Best Practice Erosion and Sediment Control Vol 1 – 3 (White Book)	Added (Feb 20)
Onsite sewage	Designing and Installing On-Site Wastewater Systems	Updated (Nov 19) Under review (2022)
	AS/NZS 1547:2012 On-site Domestic Wastewater Management	
	Environmental Guidelines - Use of Effluent by Irrigation	
	On-site Sewage Management for Single Households (Silver Book)	
Environmental Management Plans	Guideline for the Preparation of Environmental Management Plans	
Roads	Managing Urban Stormwater Soils and Construction – Vol 2C Unsealed Roads	
	Managing Urban Stormwater Soils and Construction – Vol 2D Main Road Construction	
	Guidelines for Treatment of Stormwater Runoff from Road Infrastructure (AP-R232/03)	
	Unsealed Roads Best Practice Guide	Added (Feb 20)
	Sealed Roads Best Practice Guide	Added (Feb 20)
Rural Residential Subdivision	Water Sensitive Design Guide for Rural Residential Subdivisions	Updated (May 21) Planned for review next audit period
Service Stations	Environmental Action for Service Stations	
	Practice Note: Managing run-off from service station forecourts	Added (Nov 19)
Stormwater	Adoption Guidelines for Stormwater Biofiltration Systems, Version 2	
	Using MUSIC in the Sydney Drinking Water Catchment	
	Water by Design, Maintaining Vegetated Stormwater Assets (V1)	
	Water by Design Construction and Establishment Guidelines: Swales, Bioretention Systems and Wetlands	
	Managing Urban Stormwater: Soils and Construction Vol 2E Mines and Quarries	
	Managing Urban Stormwater: Soils and Construction Vol 2A Installation of services	
	Managing Urban Stormwater – Harvesting and Reuse	

Category	Title	Status
	Water by Design Bioretention Technical Design Guidelines	
	Water Sensitive Urban Design Engineering Procedures: Stormwater	
	Managing Urban Stormwater: Soils and Construction Vol. 1 4th edition (Blue Book Vol.1)	
Water quality information requirements	Developments in Sydney's Drinking Water Catchment – Water Quality Information Requirements	Updated (Sept 20) Under review (2022)
Composting	Establishing a Licensed Composting Facility: A guide to siting, designing, gaining approval and a licence to develop and operate a composting facility in NSW 3rd edition.	
	Environmental Guidelines for Composting and Related Organics Processing Facility.	
Solid Waste Landfill	Environmental Guidelines for Solid Waste Landfills (Second edition, 2016)	
Chickens	Best Practice Management for Meat Chicken Production in NSW Manuals 1 and 2	
Controlled Activities	Controlled Activities Guidelines 1. Laying pipes and cables in watercourses. 2. Outlet Structures 3. Watercourse Crossings.	
Intensive Agriculture	Planning Guidelines: Intensive Livestock Agricultural Development	Added (Feb 20)
Dairy	Effluent and Manure Management Database for the Australian Dairy Industry	
	Environmental Management Guidelines for the Dairy Industry	
Horses	Horse Property Developments in the Sydney Drinking Water Catchment	Under review (2022)
Horticulture	Nursery Industry Water Management Best Practice Guidelines	
	Managing wastewater from Intensive Agriculture: A wetland system	
Pesticides and Herbicides	Herbicides: guidelines for use in and around water	
	Spray sense leaflet series – Information for Users of Agricultural Chemicals	Removed (Jun 21)
Biosecurity	Managing Biosecurity Risks in Land Use Planning and Development Guide	Added (May 22)

5. Appendix E Long-term median stream flow

Graphs of long-term median stream flow and photos (where available) for selected gauges were sourced from the Real-time water data (waternsw.com.au) website on 15/12/22

5.1. Sites with lower median stream flows during the audit period compared to long term

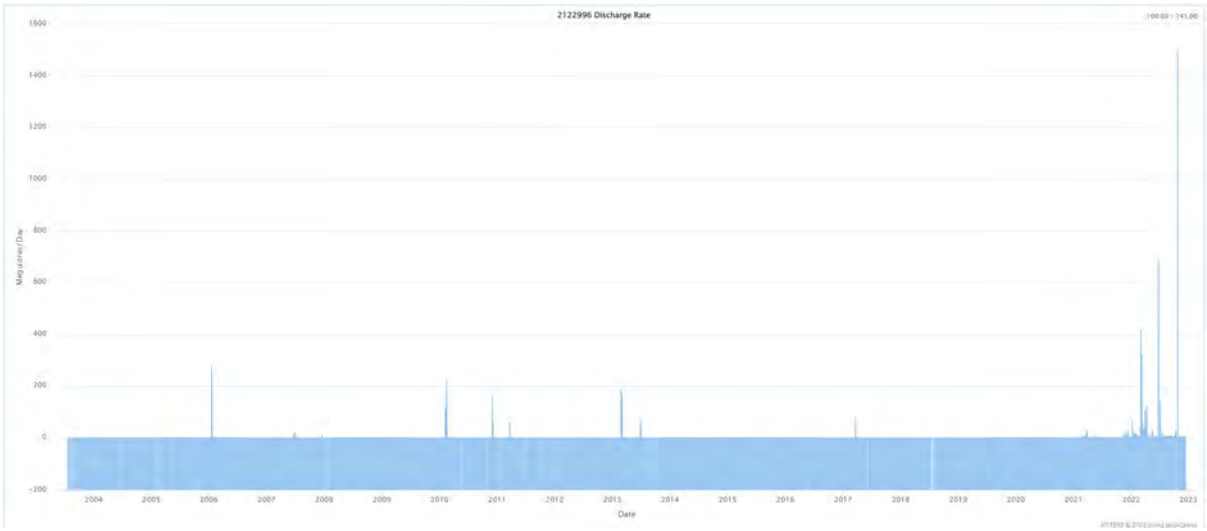


Figure 5-1: Graph of median stream flow at 2122996 Tonalli No 2

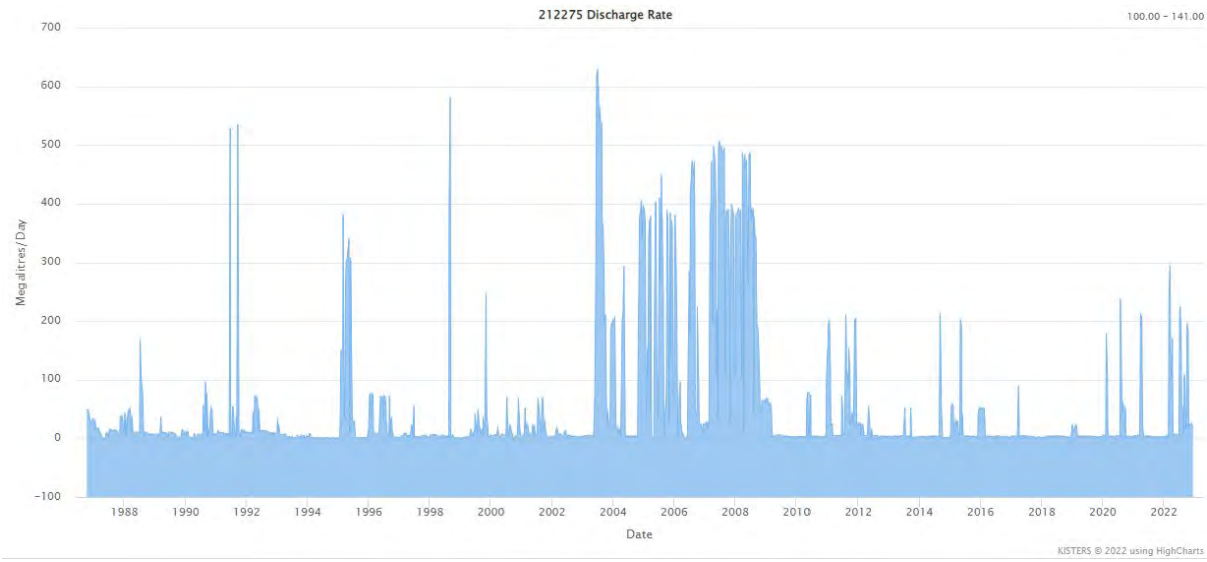


Figure 5-2: Graph of median stream flow at 212275 Wingecarribee River at Sheepwash Bridge

Figure 5-3: Photo of Kedumba River at Kedumba Crossing

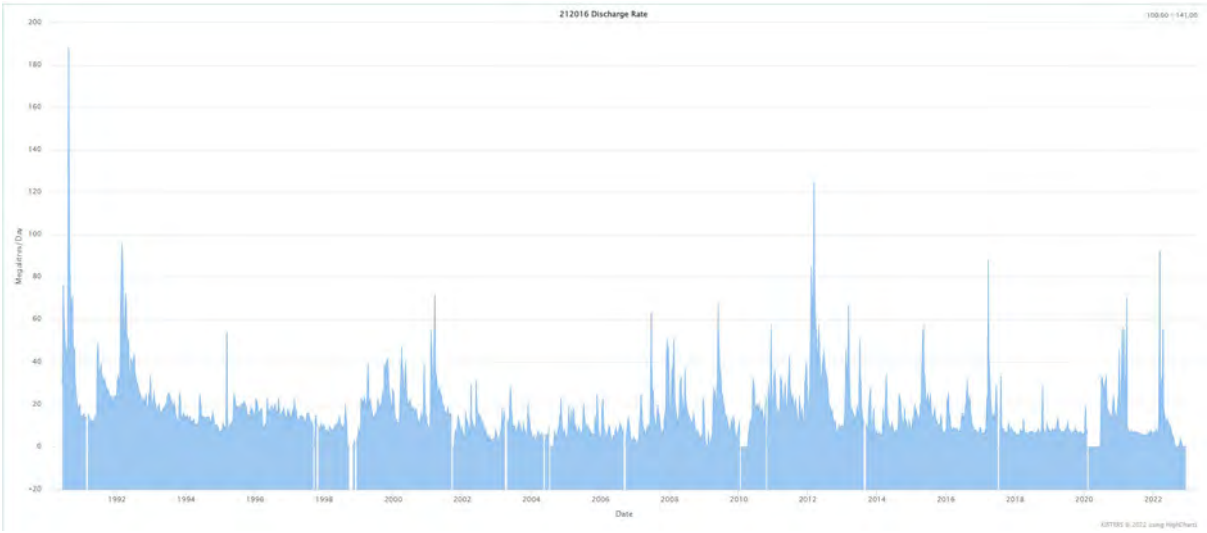


Figure 5-4: Graph of median stream flow at 212016 Kedumba River at Kedumba Crossing

Figure 5-5: Photo of Cataract River at Jordans Crossing

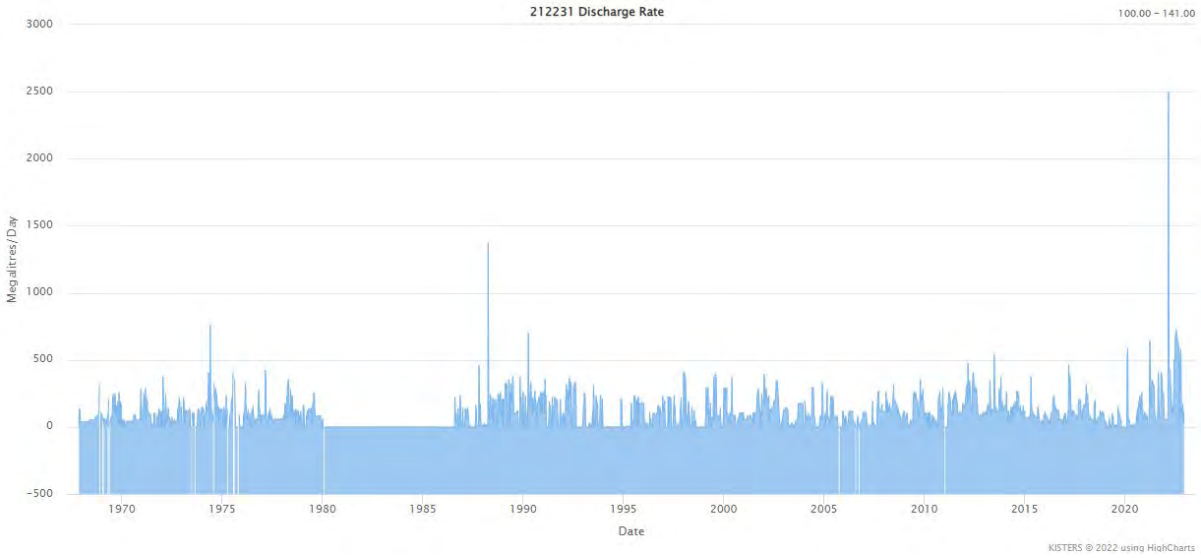


Figure 5-6: Graph of median stream flow at 212231 Cataract River at Jordans Crossing

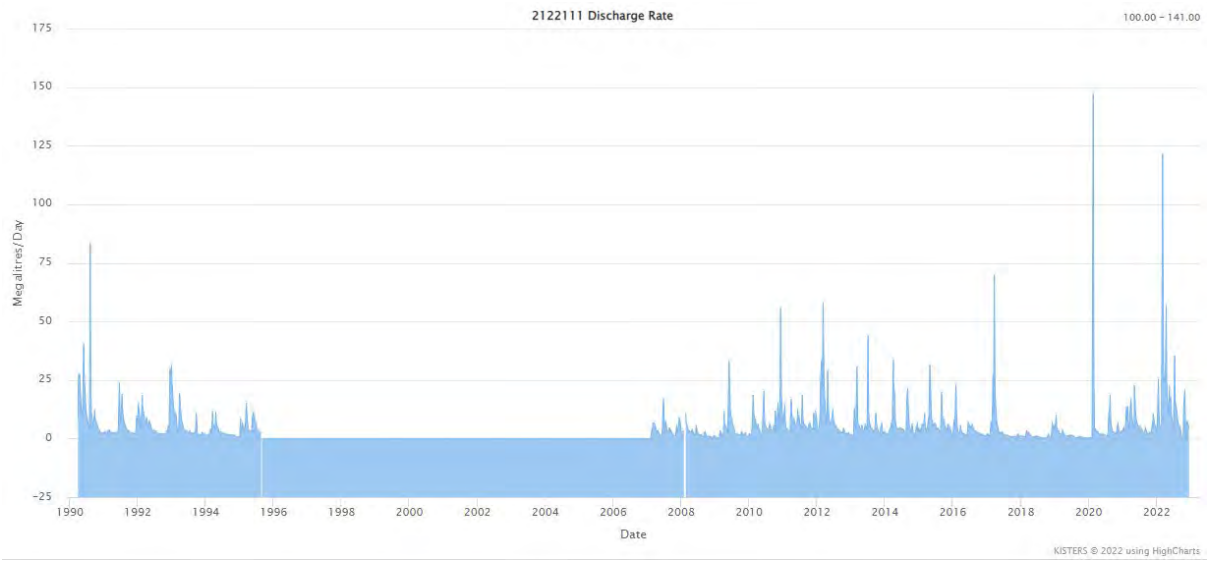


Figure 5-7: Graph of median stream flow at 2122111 Avon River at Summit Tank

5.2. Sites with notably greater stream flow during the audit period compared to long term

Figure 5-8: Photo of Coxs River at Glenroy Bridge

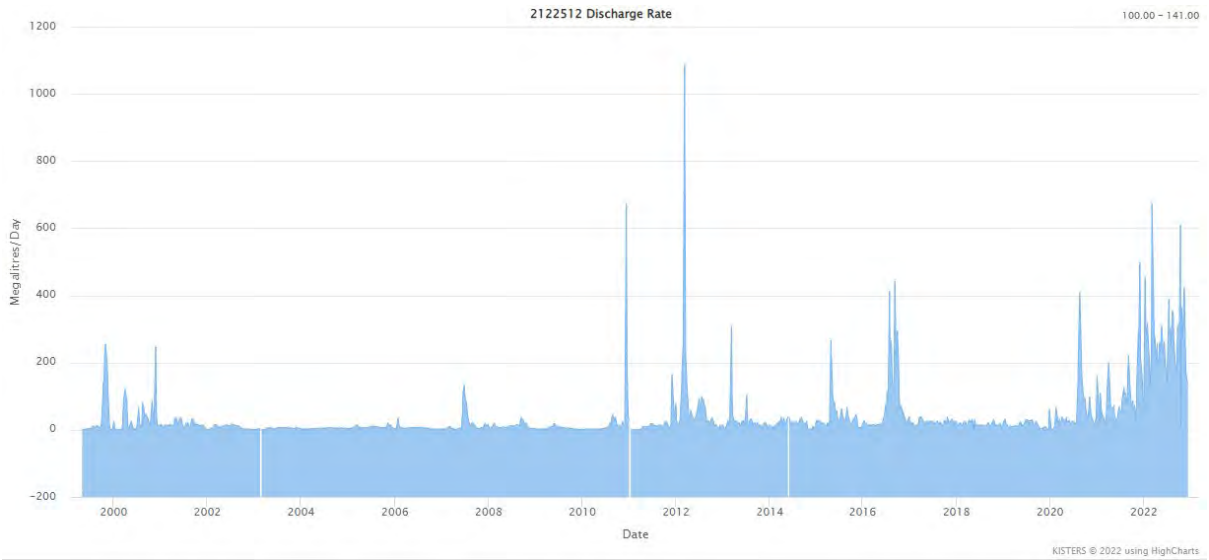


Figure 5-9: Graph of median stream flow at 2122512 Coxs River at Glenroy Bridge

Figure 5-10: Photo of Wollondilly River at Murrays Flat

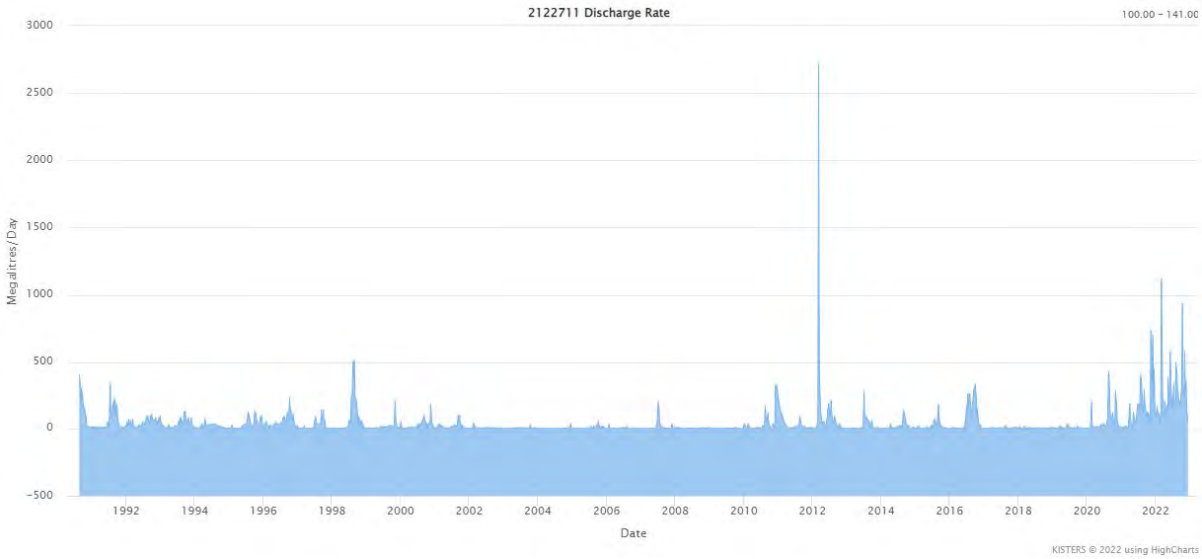


Figure 5-11: Graph of median stream flow at 2122711 Wollondilly River at Murrays Flat

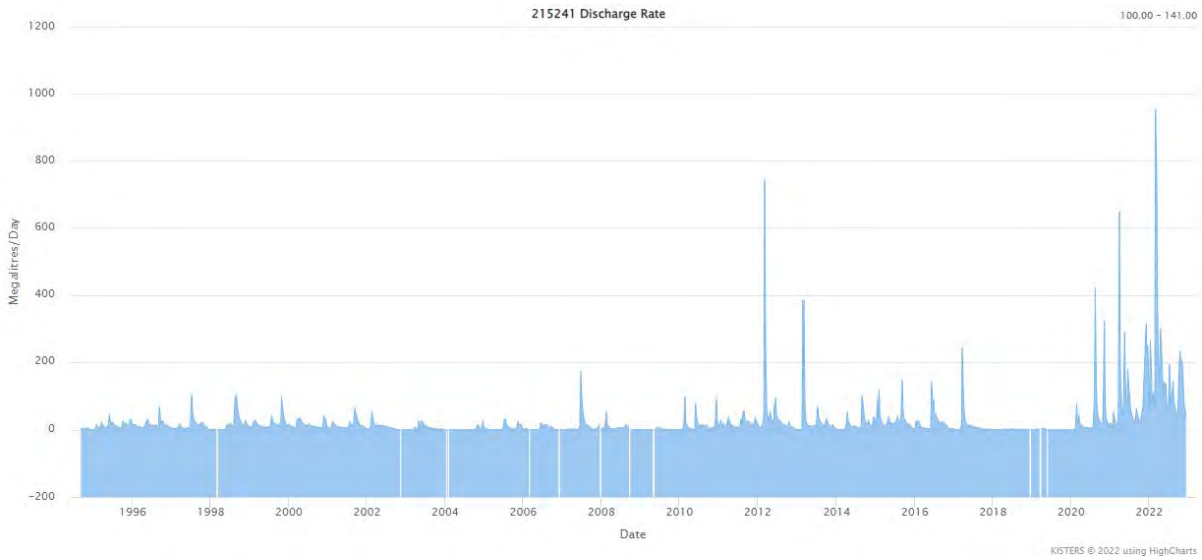


Figure 5-12: Graph of median stream flow at 215241 Jembaicumbene Creek at Bendoura

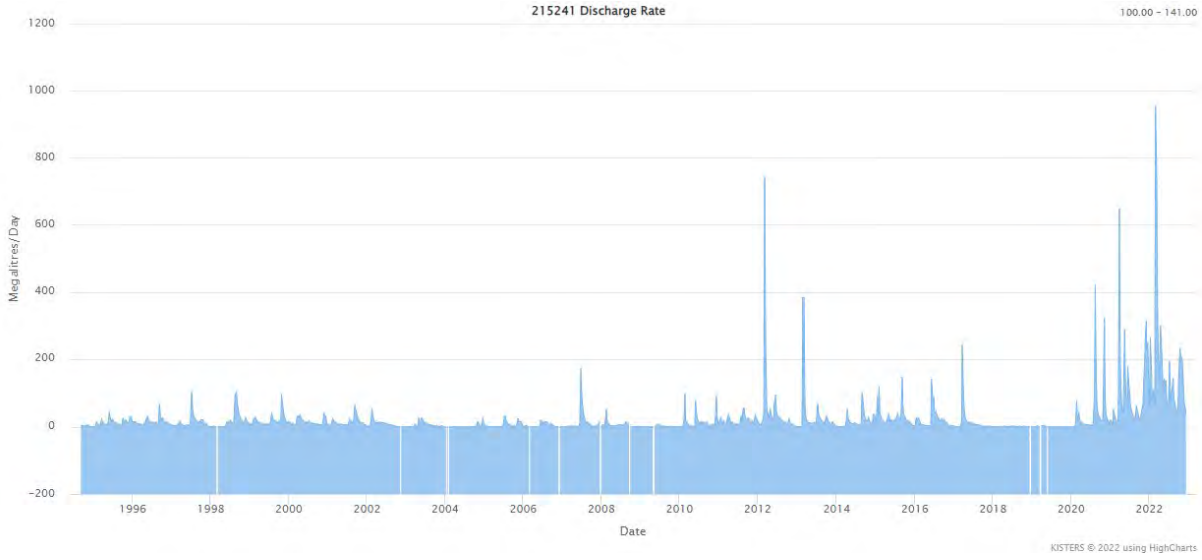


Figure 5-13: Graph of median stream flow at 215238 Reedy Creek at Manar

Figure 5-14: Photo of Mulwaree River at Towers Weir

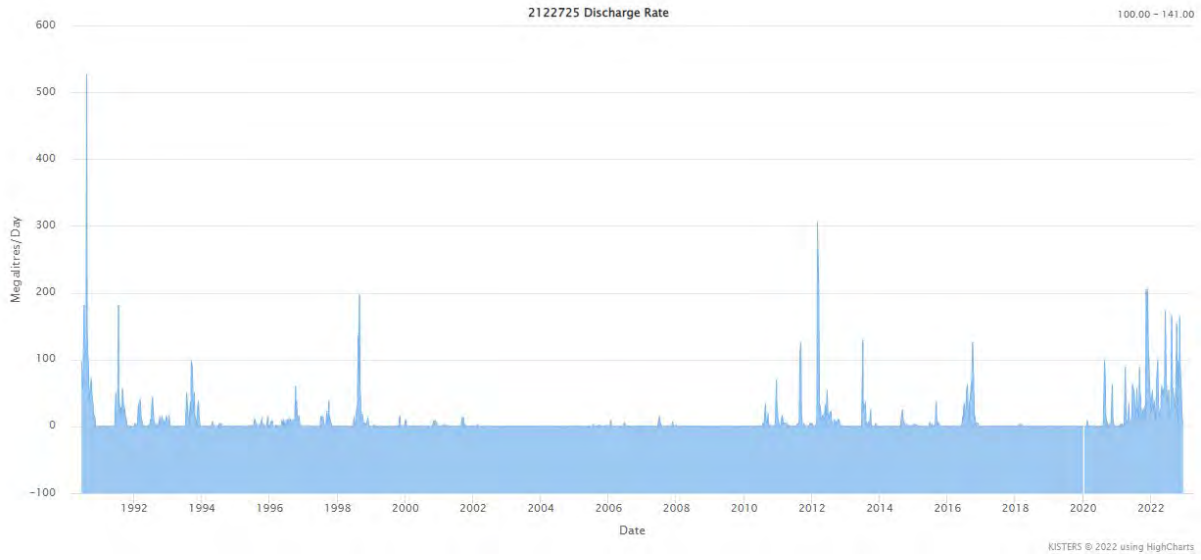
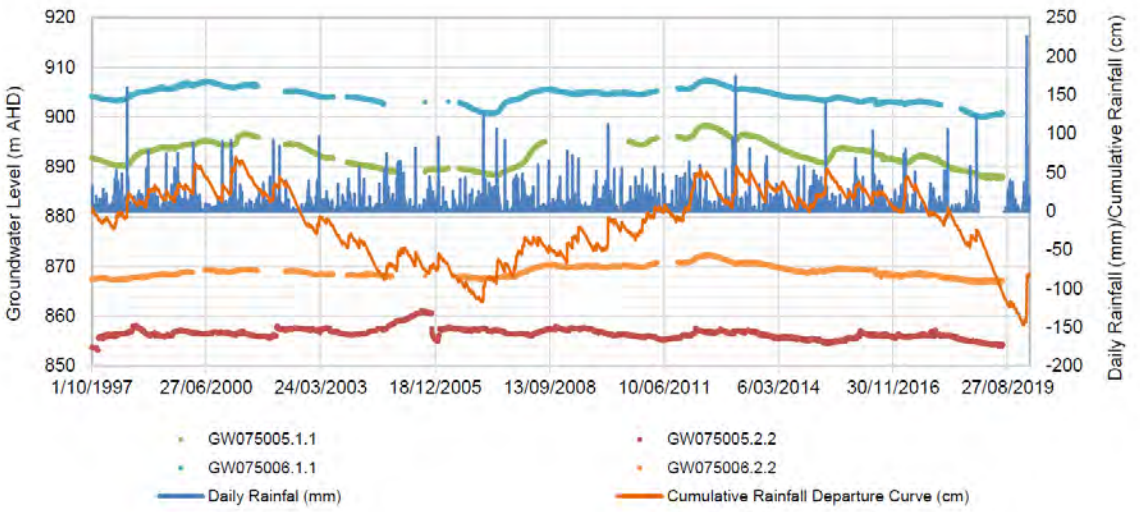
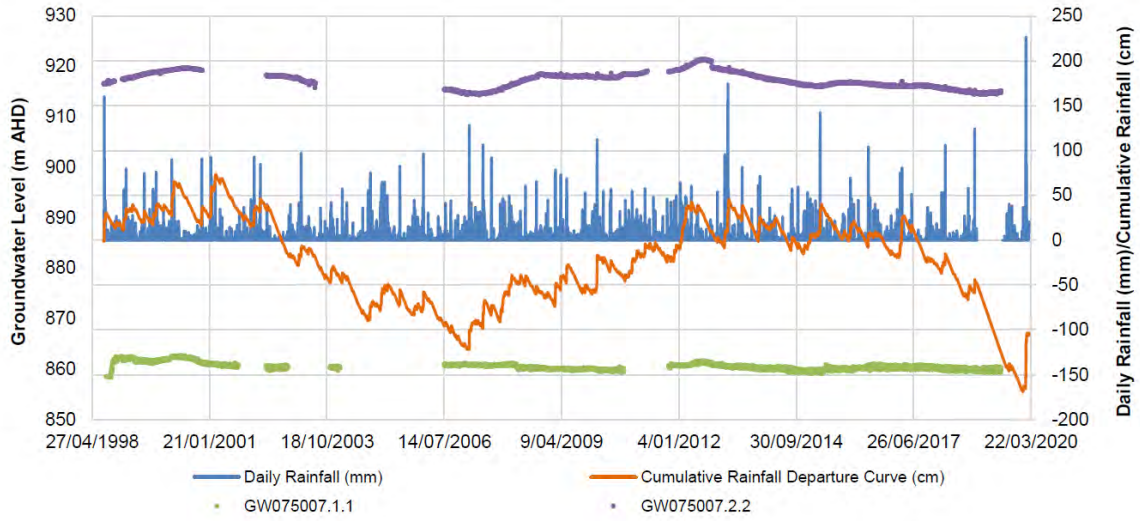
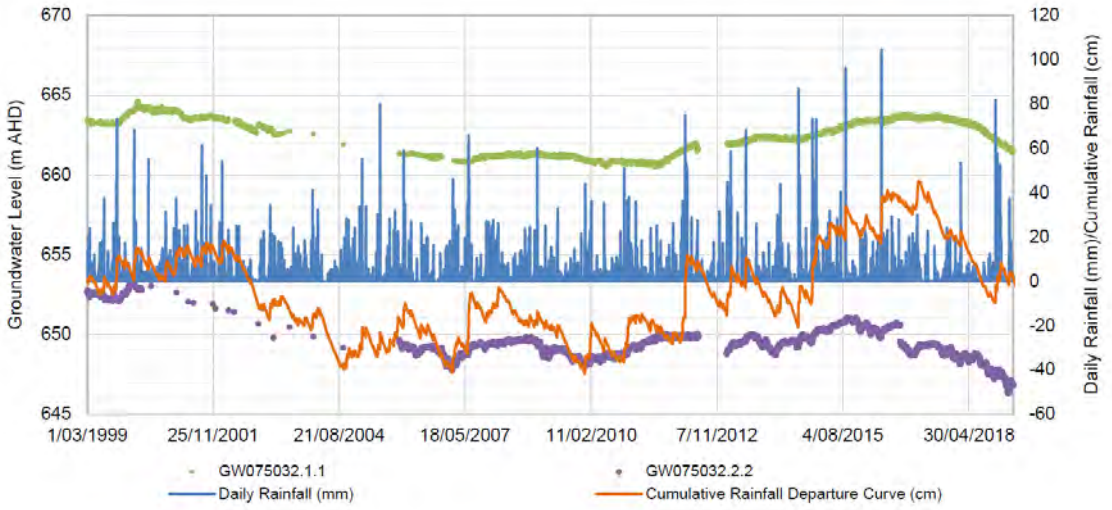


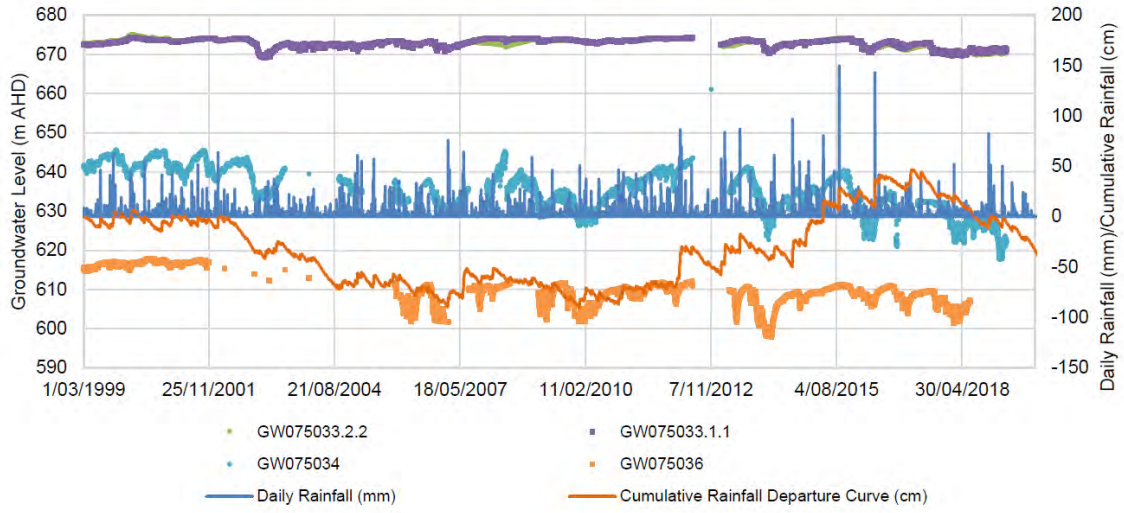
Figure 5-15: Graph of median stream flow at 2122725 Mulwaree River at Towers Weir

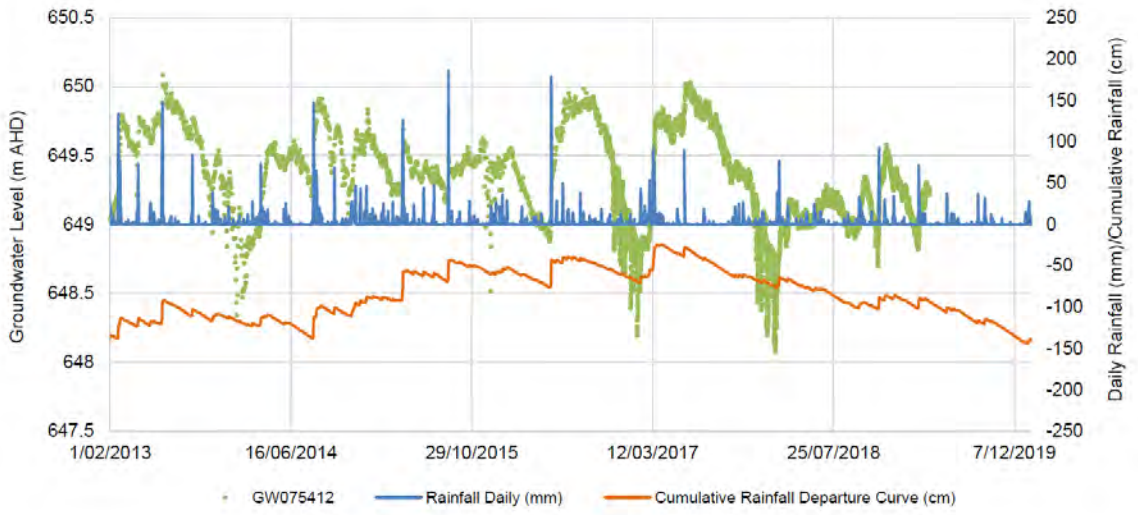
6. Appendix F Groundwater analysis graphs

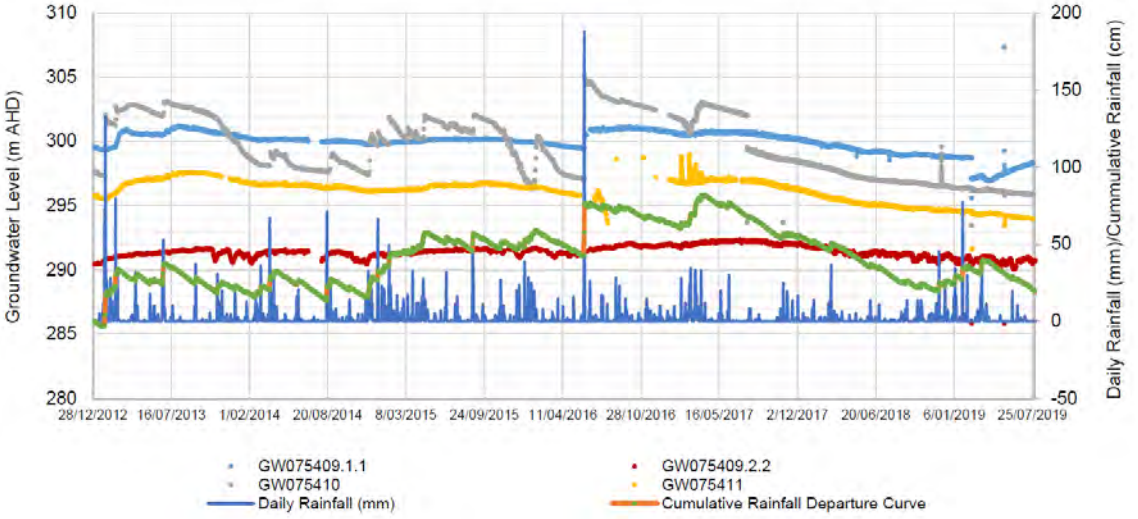


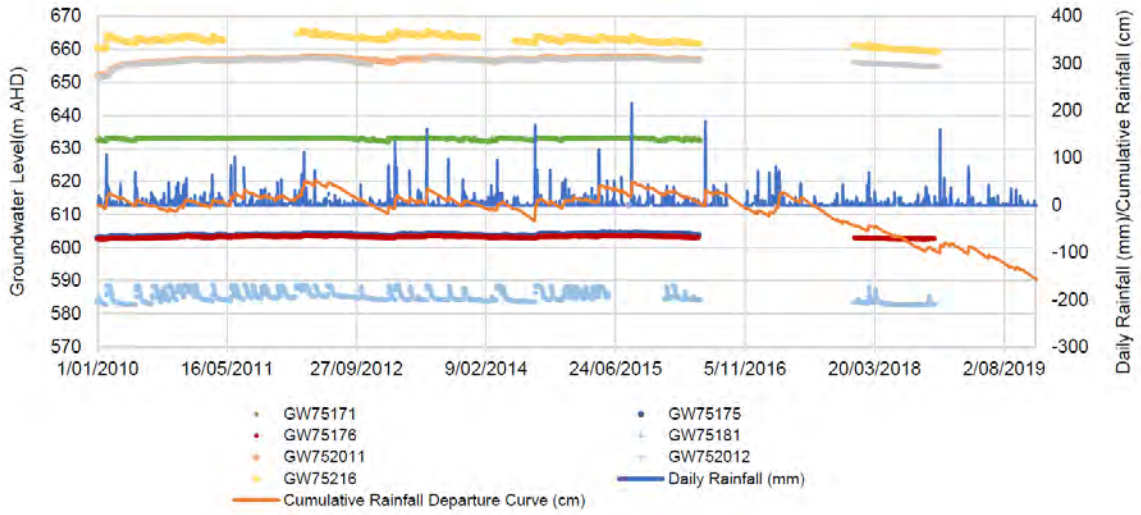


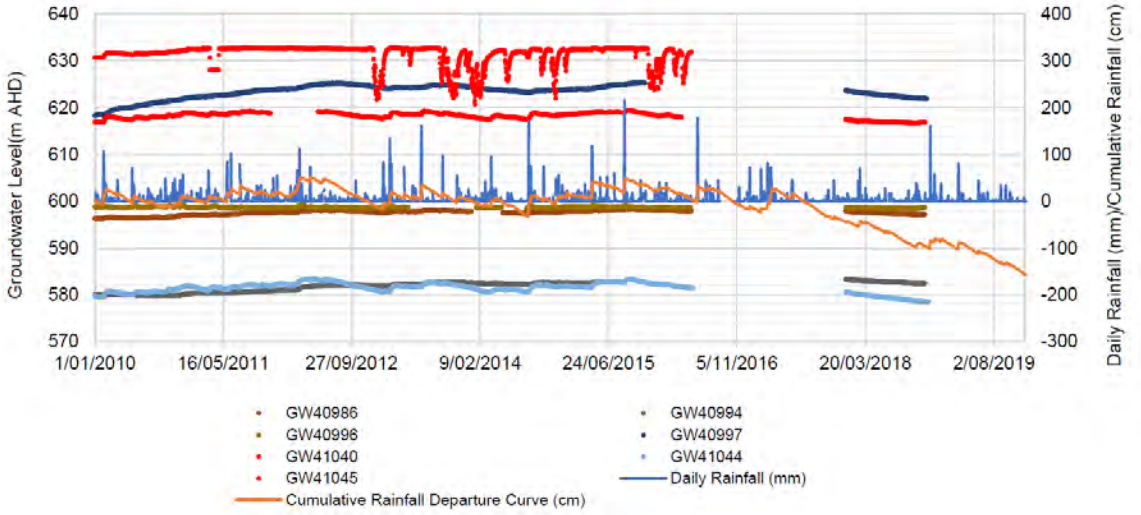

Groundwater Level (m AHD)
Daily Rainfall (mm)/Cumulative Rainfall (cm)
670
665
660
655
650
645
120
100
80
60
40
20
0
-20
-40
-60
1/03/1999
25/11/2001
21/08/2004
18/05/2007
11/02/2010
7/11/2012
4/08/2015
30/04/2018
GW075032.1.1
GW075032.2.2
Daily Rainfall (mm)
Cumulative Rainfall Departure Curve (cm)

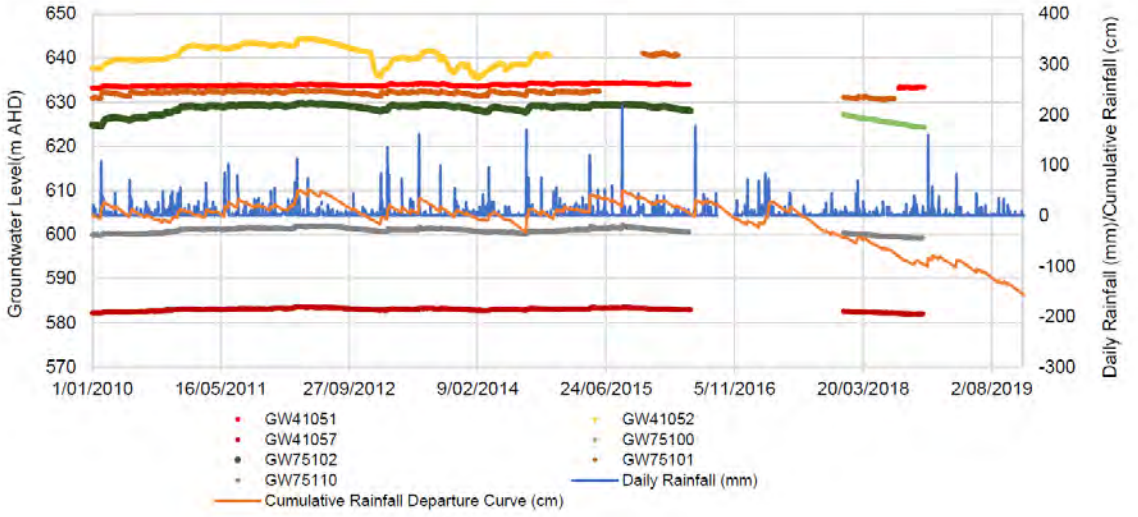

Groundwater Level (m AHD)
Daily Rainfall (mm)/Cumulative Rainfall (cm)
680
670
660
650
640
630
620
610
600
590
200
150
100
50
0
-50
-100
-150
1/03/1999
25/11/2001
21/08/2004
18/05/2007
11/02/2010
7/11/2012
4/08/2015
30/04/2018
GW075033.2.2
GW075033.1.1
GW075034
GW075036
Daily Rainfall (mm)
Cumulative Rainfall Departure Curve (cm)

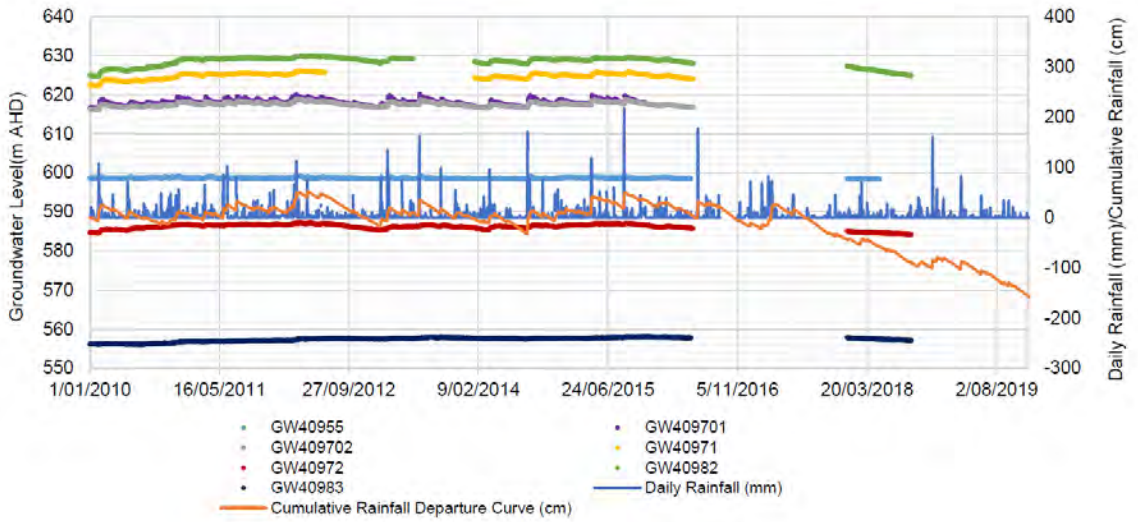

650.5
650
649.5
649
648.5
648
647.5
Groundwater Level (m AHD)
250
200
150
100
50
0
-50
-100
-150
-200
-250
Daily Rainfall (mm)/Cumulative Rainfall (cm)
1/02/2013
16/06/2014
29/10/2015
12/03/2017
25/07/2018
7/12/2019
GW075412
Rainfall Daily (mm)
Cumulative Rainfall Departure Curve (cm)

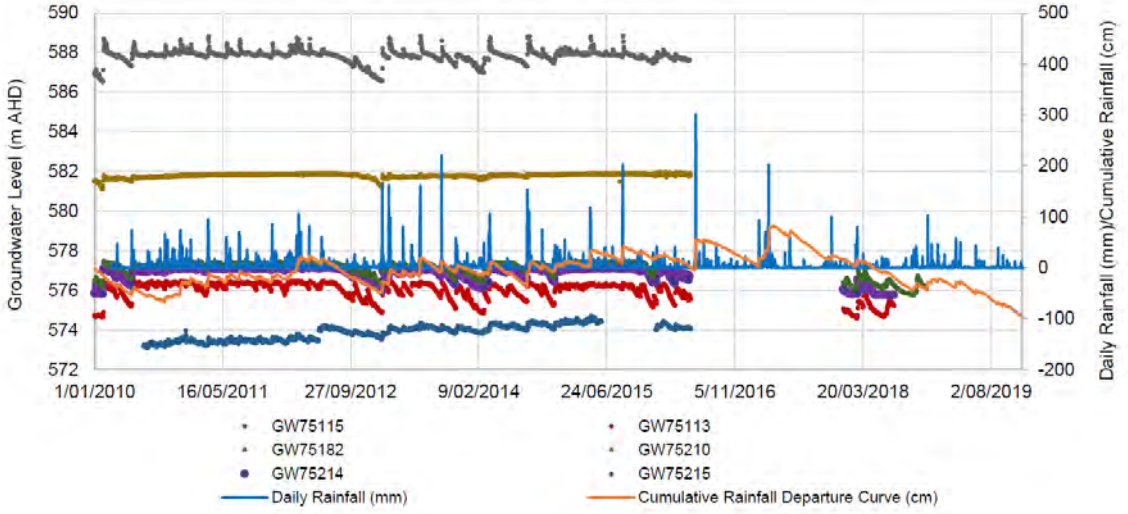

310
305
300
295
290
285
280
Groundwater Level (m AHD)
200
150
100
50
0
-50
Daily Rainfall (mm)/Cummulative Rainfall (cm)
28/12/2012
16/07/2013
1/02/2014
20/08/2014
8/03/2015
24/09/2015
11/04/2016
28/10/2016
16/05/2017
2/12/2017
20/06/2018
6/01/2019
25/07/2019
GW075409.1.1
GW075410
Daily Rainfall (mm)
GW075409.2.2
GW075411
Cumulative Rainfall Departure Curve

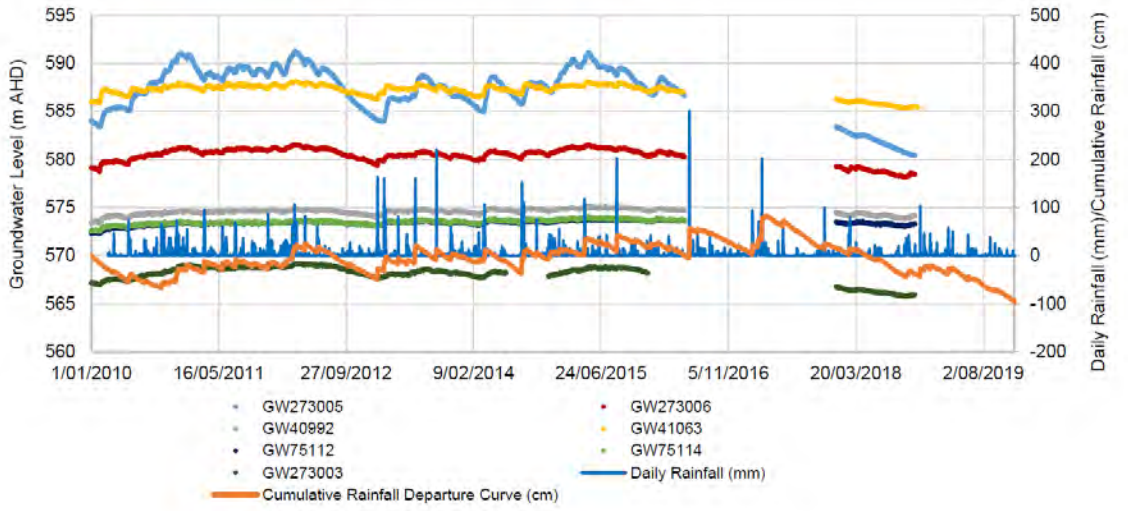

Groundwater Level(m AHD)
Daily Rainfall (mm)/Cumulative Rainfall (cm)
670
660
650
640
630
620
610
600
590
580
570
400
300
200
100
0
-100
-200
-300
1/01/2010
16/05/2011
27/09/2012
9/02/2014
24/06/2015
5/11/2016
20/03/2018
2/08/2019
GW75171
GW75175
GW75176
GW75181
GW752011
GW752012
GW75216
Daily Rainfall (mm)
Cumulative Rainfall Departure Curve (cm)


Groundwater Level(m AHD)
Daily Rainfall (mm)/Cumulative Rainfall (cm)
640
630
620
610
600
590
580
570
400
300
200
100
0
-100
-200
-300
1/01/2010
16/05/2011
27/09/2012
9/02/2014
24/06/2015
5/11/2016
20/03/2018
2/08/2019
GW40986
GW40994
GW40996
GW40997
GW41040
GW41044
GW41045
Daily Rainfall (mm)
Cumulative Rainfall Departure Curve (cm)


Groundwater Level(m AHD)
650
640
630
620
610
600
590
580
570
1/01/2010
16/05/2011
27/09/2012
9/02/2014
24/06/2015
5/11/2016
20/03/2018
2/08/2019
Daily Rainfall (mm)/Cumulative Rainfall (cm)
400
300
200
100
0
-100
-200
-300
GW41051
GW41052
GW41057
GW75100
GW75102
GW75101
GW75110
Daily Rainfall (mm)
Cumulative Rainfall Departure Curve (cm)


Groundwater Level(m AHD)
640
630
620
610
600
590
580
570
560
550
1/01/2010
16/05/2011
27/09/2012
9/02/2014
24/06/2015
5/11/2016
20/03/2018
2/08/2019
Daily Rainfall (mm)/Cumulative Rainfall (cm)
400
300
200
100
0
-100
-200
-300
GW40955
GW409701
GW409702
GW40971
GW40972
GW40982
GW40983
Daily Rainfall (mm)
Cumulative Rainfall Departure Curve (cm)


Groundwater Level (m AHD)
590
588
586
584
582
580
578
576
574
572
Daily Rainfall (mm)/Cumulative Rainfall (cm)
500
400
300
200
100
0
-100
-200
1/01/2010
16/05/2011
27/09/2012
9/02/2014
24/06/2015
5/11/2016
20/03/2018
2/08/2019
GW75115
GW75113
GW75182
GW75210
GW75214
GW75215
Daily Rainfall (mm)
Cumulative Rainfall Departure Curve (cm)


Groundwater Level (m AHD)
595
590
585
580
575
570
565
560
Daily Rainfall (mm)/Cumulative Rainfall (cm)
500
400
300
200
100
0
-100
-200
1/01/2010
16/05/2011
27/09/2012
9/02/2014
24/06/2015
5/11/2016
20/03/2018
2/08/2019
GW273005
GW273006
GW40992
GW41063
GW75112
GW75114
GW273003
Daily Rainfall (mm)
Cumulative Rainfall Departure Curve (cm)

7. Appendix G Water quality analysis – compliance during audit period

7.1. Method

Water quality compliance data for the audit period were obtained from WaterNSW annual water monitoring reports and tabulated below for each sub-catchment using a graded colour scale to assist with visual interpretation. As indicated in the scale below, shades of green correspond to good compliance levels and good water quality (i.e., no or few exceedances of the guidelines). The colour scheme transitions through shades of orange to red (i.e., all routine samples at that site did not meet the guideline value for that analyte during the monitoring period). Grey cells indicate that routine monitoring data were unavailable, e.g., because the site was temporarily inaccessible or monitoring equipment was damaged.

0	10	20	30	40	50	60	70	80	90	100

Good compliance----------Poor compliance

7.2. Blue Mountains

Table 7-1: Blue Mountains storages – percentage of routine samples outside water quality guidelines during audit period

Site	Station Code	Year	Physio-Chemical				Nutrients					Algae
			Dissolved Oxygen	pH	Turbidity	Conductivity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Lake Greaves at Dam Wall	DGC1	2021-22	25	50	0	0	9	45	0	0	18	55
		2020-21	17	100	0		17	33	0	0	17	25
		2019-20	33	92	0		58	67	8	8	17	75
Lake Lower Cascades @ 50m u/s	DLC1	2021-22	50	17	0	0	33	100	17	0	0	33
		2020-21	17	17	0		50	83	0	0	33	17
		2019-20	50	17	0		50	100	0	0	17	0
Lake Top Cascades @ 100m u/s Dam Wall	DTC1	2021-22	25	25	0	0	25	33	0	0	8	58
		2020-21	0	25	0		8	33	0	0	17	58
		2019-20	42	8	0		33	100	50	0	0	33

7.3. Shoalhaven

Table 7-2: Boro Creek sub-catchment – percentage of routine samples outside water quality guidelines during the audit period

Site	Station Code	Year	Physio-Chemical				Nutrients					Algae
			Dissolved Oxygen	pH	Turbidity	Conductivity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Boro Creek at Marlowe	E890	2021-22	100	25	8	0	75	42	100	0	83	25
		2020-21	100	45	9	0	33	33	100	0	67	33
		2019-20	100	27	0	0	36	0	36	0	45	36

Table 7-3: Braidwood sub-catchment – percentage of routine samples outside water quality guidelines during the audit period

Site	Station Code	Year	Physio-Chemical				Nutrients					Algae
			Dissolved Oxygen	pH	Turbidity	Conductivity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Shoalhaven River at Mountview	E860	2021-22	0	0	0	0	8	50	33	0	92	17
		2020-21	17	8	0	0	17	50	58	0	67	8
		2019-20	80	30	0	0	10	20	30	10	40	40
Gillamatong Creek at Braidwood	E891	2021-22	67	0	8	75	58	75	100	50	92	83
		2020-21	92	8	0	75	25	33	100	17	75	67
		2019-20	100	0	0	100	11	11	89	0	33	67

Table 7-4: Bungonia Creek sub-catchment – percentage of samples outside water quality guidelines during the audit period

Site	Station Code	Year	Physio-Chemical				Nutrients					Algae
			Dissolved Oxygen	pH	Turbidity	Conductivity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Shoalhaven River at Fossickers Flats	E847	2021-22	0	0	17	0	55	82	64	0	82	18
		2020-21	8	0	8	8	17	92	75	0	33	25
		2019-20	10	30	10	0	30	70	40	10	30	10
Lake Yarrunga @ Shoalhaven River	DTA5	2021-22	27	0	18		75	92	58	17	92	10
		2020-21	42	0	8		58	92	67	17	75	58
		2019-20	73	9	0		64	82	82	27	82	55

Table 7-5: Kangaroo River sub-catchment – percentage of routine samples outside water quality guidelines during audit period

Site	Station Code	Year	Physio-Chemical				Nutrients					Algae
			Dissolved Oxygen	pH	Turbidity	Conductivity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Yarrunga Creek @ Wildes Meadow	E300	2021-22	92	33	0	0	67	100	100	8	58	33
		2020-21	83	8	0	0	75	100	100	0	0	0
		2019-20	100	50	0	0	92	100	100	8	33	33
Kangaroo River at Hampden Bridge	E706	2021-22	9	18	18	0	70	100	100	30	100	10
		2020-21	8	8	0	0	82	100	91	9	64	17
		2019-20	33	25	0	0	100	100	73	20	82	45
Lake Fitzroy Falls @ Midlake	DFF6	2021-22	9	0	0		83	100	100	0	100	96
		2020-21	8	33	0		67	67	75	0	67	92
		2019-20	17	25	0		64	73	100	0	91	100
Lake Yarrunga@ 100m from Dam Wall	DTA1	2021-22	27	0	0		83	92	92	25	100	29
		2020-21	50	0	8		50	92	75	8	75	67
		2019-20	55	9	0		64	91	64	27	73	45
	DTA8	2021-22	46	31	0		83	100	50	42	100	55

Site	Station Code	Year	Physio-Chemical				Nutrients					Algae
			Dissolved Oxygen	pH	Turbidity	Conductivity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Lake Yarrunga @ Kangaroo R at Bendeela PS		2020-21	33	8	0		92	92	67	50	100	58
		2019-20	36	27	0		75	92	83	0	100	83
Bendeela Pondage	DBP1	2021-22	22	0	0		86	100	86	14	86	88
		2020-21	0	0	0		67	67	50	0	100	83
		2019-20	43	29	0		83	100	67	0	100	100

Table 7-6: Mid Shoalhaven sub-catchment - percentage of routine samples outside water quality guidelines during audit period

Site	Station Code	Year	Physio-Chemical				Nutrients					Algae
			Dissolved Oxygen	pH	Turbidity	Conductivity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Corang River at Meengora	E8311	2021-22	0	17	8	0	50	8	17	0	0	0
		2020-21	45	9	0	0	45	73	64	0	18	9
		2019-20	55	27	0	0	27	36	27	0	9	27
Shoalhaven River at Hillview	E861	2021-22	8	8	8	0	67	75	33	0	75	17
		2020-21	25	0	25	0	50	75	58	8	58	33
		2019-20	9	45	0	9	20	20	27	0	20	27

Table 7-7: Mongarlowe sub-catchment - percentage of routine samples outside water quality guidelines during audit period

Site	Station Code	Year	Physio-Chemical				Nutrients					Algae
			Dissolved Oxygen	pH	Turbidity	Conductivity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Mongarlowe River at Mongarlowe	E822	2021-22	42	17	0	0	8	100	0	0	17	0
		2020-21	75	17	0	0	0	100	25	0	42	0
		2019-20	91	9	0	0	18	36	27	0	9	18

7.4. Upper Nepean

Table 7-8: Lake Cataract sub-catchment - percentage of routine samples outside water quality guidelines during audit period

Site	Station Code	Year	Physio-chemical				Nutrients					Algae
			Conductivity	Dissolved Oxygen	pH	Turbidity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Loddon River Inflow	E676	2021-22	0	33	100	0	38	0	11	0	0	0
		2020-21										
		2019-20										
Cataract River inflow	E609	2021-22	0	83	83	0	92	100	0	0	0	0
		2020-21	0	83	75	0	67	92	0	0	0	0
		2019-20	0	91	27	0	67	92	8	0	0	0
Lake Cataract at Dam Wall	DCA1	2021-22		42	92	0	67	58	0	0	8	0
		2020-21		25	75	0	58	58	0	0	25	25
		2019-20		33	42	0	67	100	0	0	17	17
Lake Cataract @ Cataract arm 5km U/S	DCA2	2021-22		33	100	0	33	67	0	0	17	0
		2020-21										
		2019-20										
Lake Cataract @ Loddon arm 4.5km U/S	DCA3	2021-22		0	100	0	50	50	0	0	0	0
		2020-21										
		2019-20										

Table 7-9: Lake Cordeaux sub-catchment - percentage of routine samples outside water quality guidelines during audit period

Site	Station Code	Year	Physio-chemical				Nutrients					Algae
			Conductivity	Dissolved Oxygen	pH	Turbidity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Goondarin Creek inflow	E608	2021-22	0	42	8	0	25	100	0	0	8	0
		2020-21	0	42	8	0	8	100	0	0	0	0
		2019-20	0	75	17	0	8	100	8	0	8	8
Cordeaux River at causeway between Upper Cordeaux #1 and #2	E680	2021-22	0	25	17	0	25	33	0	0	0	25
		2020-21	0	50	33	0	58	42	0	0	0	8
		2019-20	0	58	17	0	50	83	0	0	0	17
Sandy Creek inflow	E6006	2021-22	0	33	100	0	17	8	0	0	25	0
		2020-21	0	25	100	0	17	8	0	0	58	0
		2019-20	0	82	100	0	9	0	9	0	36	0
Lake Cordeaux at Dam Wall	DCO1	2021-22		33	25	0	50	58	0	0	25	83
		2020-21		42	8	0	50	50	25	0	33	75
		2019-20		42	8	0	50	67	25	0	8	42
Lake Cordeaux @ Jn. of Kentish & Cordeaux River	DCO3	2021-22		29	29	0	33	50	0	0	33	50
		2020-21										
		2019-20										

Table 7-10: Lake Avon sub-catchment - percentage of routine samples outside water quality guidelines during audit period

Site	Station Code	Year	Physio-chemical				Nutrients					Algae
			Conductivity	Dissolved Oxygen	pH	Turbidity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Avon River - Summit Tank	E610	2021-22	0	36	9	0	0	0	0	0	0	9
		2020-21	0	25	17	0	0	0	0	0	0	0
		2019-20	0	50	17	0	17	17	0	0	8	0
Flying Fox #3 Creek	E604	2021-22	0	33	0	0	17	100	8	0	0	8
		2020-21	0	17	0	0	0	100	17	0	0	0
		2019-20	0	60	10	0	10	100	20	0	0	0
Lake Avon at Upper Avon Valve Chamber	DAV7	2021-22		43	36	0	25	50	8	0	8	25
		2020-21		33	25	0	42	75	0	0	8	67
		2019-20		33	58	0	33	42	8	0	17	8
Lake Avon at Dam Wall	DAV1	2021-22		42	83	0	50	75	8	0	0	8
		2020-21		33	58	0	42	100	0	0	0	17
		2019-20		33	25	0	33	100	0	0	25	0
Lake Avon @ 3 km D/S Gallahers Ck Jn	DAV16	2021-22		29	29	0	43	57	0	0	0	0
		2020-21										
		2019-20										

Table 7-11: Lake Nepean sub-catchment - percentage of routine samples outside water quality guidelines during audit period

Site	Station Code	Year	Physio-chemical				Nutrients					Algae
			Conductivity	Dissolved Oxygen	pH	Turbidity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Burke River at inflow to Lake Nepean	E602	2021-22	0	0	42	0	33	8	0	0	0	0
		2020-21	0	17	50	0	8	8	0	0	0	0
		2019-20	0	18	18	0	0	0	0	0	0	0
Nepean River at Macquarie's Crossing	E697	2021-22	0	8	0	0	67	100	92	8	92	8
		2020-21	0	17	0	0	8	100	100	0	17	17
		2019-20	0	42	8	0	25	100	92	0	0	17
Nepean River at inflow to Lake Nepean	E601	2021-22	0	0	0	0	10	100	100	0	20	0
		2020-21	0	0	8	8	0	100	67	0	17	17
		2019-20	0	8	25	0	17	100	92	0	8	0
Little Burke River at inflow to Lake Nepean	E603	2021-22	0	17	92	0	25	8	8	0	0	0
		2020-21										
		2019-20										
Lake Nepean @ 300m u/s of Dam Wall	DNE2	2021-22		38	38	0	50	100	50	0	38	38
		2020-21		50	58	0	67	100	100	0	67	42
		2019-20		50	38	13	50	88	100	0	50	14
Lake Nepean @ junction of Burke arm at thermistor chain	DNE6	2021-22		58	50	0	42	100	50	0	67	58
		2020-21		58	33	0	33	100	92	0	42	50
		2019-20		40	20	0	40	100	100	0	40	0

7.5. Warragamba

Table 7-12: Kowmung River sub-catchment - percentage of routine samples outside water quality guidelines during audit period

Site	Station Code	Year	Physio-chemical				Nutrients					Algae
			Conductivity	Dissolved Oxygen	pH	Turbidity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Kowmung River @ Cedar Ford	E130	2021-22	0	0	0	0	17	100	42	0	17	0
		2020-21	0	8	0	17	17	75	42	0	17	17
		2019-20	0	33	8	0	17	25	25	8	17	8

Table 7-13: Lake Burragorang sub-catchment - percentage of routine samples outside water quality guidelines during audit period

Site	Station Code	Year	Physio-chemical			Nutrients					Algae
			Dissolved Oxygen	pH	Turbidity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Lake Burragorang 9km d/s of DWA15	DWA12	2021-22	43	9	0	9	100	100	13	83	0
		2020-21	46	31	0	12	100	100	4	58	54
		2019-20	48	24	0	14	86	41	0	41	14
Lake Burragorang @ 500m u/s of Dam Wall	DWA2	2021-22	43	4	0	22	100	100	22	65	23
		2020-21	62	19	0	8	100	100	8	38	38
		2019-20	42	27	0	0	77	42	4	23	23
Lake Burragorang @ Wollondilly arm River arm 23km u/s of Dam Wall	DWA27	2021-22	61	17	0	22	100	100	26	87	30
		2020-21	58	35	0	15	100	100	12	54	65
		2019-20	71	38	0	0	85	45	25	40	10
Lake Burragorang @ Wollondilly arm River arm 300m u/s of Nattai River	DWA311	2021-22	80	0	0	40	100	100	40	80	0
		2020-21	50	33	0	17	100	100	0	67	67
		2019-20	50	17	17	0	67	33	17	33	33
Lake Burragorang @ Wollondilly arm River arm 40km u/s of Dam Wall	DWA39	2021-22	80	0	0	60	100	100	60	100	20
		2020-21	50	17	0	33	100	100	17	67	67
		2019-20	100	0	100	50	100	100	50	100	0
Lake Burragorang @ 14km u/s of Dam Wall	DWA9	2021-22	48	0	0	13	100	100	22	74	26
		2020-21	52	8	0	12	100	100	4	48	56
		2019-20	52	35	0	0	83	39	4	39	17

Table 7-14: Little River sub-catchment - percentage of routine samples outside water quality guidelines during audit period

Site	Station Code	Year	Physio-chemical				Nutrients					Algae
			Conductivity	Dissolved Oxygen	pH	Turbidity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Little River @ Fireroad W4I	E243	2021-22	0	0	0	0	0	83	0	0	0	0
		2020-21	0	8	25	0	50	100	50	0	0	0
		2019-20	0	25	0	0	0	0	0	0	8	0

Table 7-15: Lower Coxs sub-catchment - percentage of routine samples outside water quality guidelines during audit period

Site	Station Code	Year	Physio-chemical				Nutrients					Algae
			Conductivity Field	Dissolved Oxygen	pH	Turbidity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Kedumba River @ Maxwells Crossing	E157	2021-22	0	0	0	8	25	100	42	0	8	0
		2020-21	0	8	0	0	25	100	58	0	0	0
		2019-20	0	17	0	0	33	92	50	8	8	8
Lake Burragorang @ 4km u/s of Butchers Creek	DWA15	2021-22		40	20	0	20	100	100	20	60	60
		2020-21		67	50	0	0	100	100	0	17	67
		2019-20		67	33	0	17	83	33	0	33	33
Lake Burragorang @ Kedumba River arm	DWA19	2021-22		60	0	0	20	100	100	0	100	40
		2020-21		67	50	0	0	100	100	0	33	83
		2019-20		100	0	0	50	100	100	0	100	100
Lake Burragorang @ Coxs River arm 37km u/s of Dam Wall	DWA21	2021-22		60	0	0	20	100	100	0	100	60
		2020-21		67	50	0	0	100	100	0	33	83
		2019-20		100	0	0	50	100	100	0	100	100

Table 7-16: Mid Coxs River sub-catchment - percentage of routine samples outside water quality guidelines during audit period

Site	Station Code	Year	Physio-chemical				Nutrients					Algae
			Conductivity	Dissolved Oxygen	pH	Turbidity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Coxs River @ Kelpie Point	E083	2021-22	0	0	9	18	27	82	64	18	64	0
		2020-21	0	8	50	17	8	75	67	0	25	17
		2019-20	67	17	58	0	8	33	50	17	33	25
Coxs River at Glenroy Bridge	E073	2021-22	0	20	40	10	60	100	100	10	60	40
		2020-21										
		2019-20										
Coxs River D/S Lake Lyell	E0114	2021-22	42	58	33	0	42	100	100	0	42	25
		2020-21	92	58	67	0	33	100	100	25	33	33
		2019-20	92	42	92	8	8	83	100	100	100	25

Table 7-17: Mulwaree River - percentage of routine samples outside water quality guidelines during audit period

Site	Station Code	Year	Physio-Chemical				Nutrients					Algae
			Dissolved Oxygen	pH	Turbidity	Conductivity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Mulwaree River @ Towers Weir	E457	2021-22	92	75	8	8	92	58	100	92	92	83
		2020-21	92	92	8	8	67	42	100	58	100	100
		2019-20	100	42	67	0	100	67	100	58	100	58

Table 7-18: Nattai River sub-catchment - percentage of routine samples outside water quality guidelines during audit period

Site	Station Code	Year	Physio-chemical				Nutrients					Algae
			Conductivity	Dissolved Oxygen	pH	Turbidity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Gibbergunyah Creek 400m d/s of Mittagong STP discharge	E203	2021-22	17	33	0	8	100	100	100	17	92	17
		2020-21	17	42	0	0	100	100	100	42	92	0
		2019-20	92	17	0	0	83	100	100	25	92	42
Nattai River at the Crags	E206	2021-22	0	17	0	0	8	100	100	25	67	17
		2020-21	0	0	8	0	17	100	100	25	42	0
		2019-20	67	8	8	0	8	100	100	0	17	0
Nattai River @ Smallwoods Crossing	E210	2021-22	0	8	0	17	75	100	67	0	42	8
		2020-21	8	25	0	25	92	100	100	0	17	25
		2019-20	50	50	0	0	25	50	33	0	8	25

Table 7-19: Prospect Reservoir sub-catchment - percentage of routine samples outside water quality guidelines during audit period

Site	Station Code	Year	Physio-chemical			Nutrients					Algae
			Dissolved Oxygen	pH	Turbidity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Lake Prospect @ midlake	RPR1	2021-22	17	0	0	67	92	25	0	0	76
		2020-21	17	8	0	8	58	8	0	0	100
		2019-20	0	8	0	17	50	8	0	0	17
Lake Prospect @ inlet to RWPS	RPR6	2021-22	14	15	0	40	100	40	0	0	80
		2020-21	17	0	0	0	67	0	0	0	100
		2019-20	0	0	0	0	33	0	0	0	17

Table 7-20: Upper Coxs sub-catchment - percentage of routine samples outside water quality guidelines during audit period

Site	Station Code	Year	Physio-chemical				Nutrients					Algae
			Conductivity	Dissolved Oxygen	pH	Turbidity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Farmers Creek (Mt Walker)	E046	2021-22	0	30	30	20	50	100	100	20	80	40
		2020-21	8	33	25	0	33	100	100	33	75	17
		2019-20	42	0	17	25	33	100	100	67	75	58
Coxs River U/S Lake Lyell	E0115	2021-22	55	36	9	0	18	91	100	0	36	20
		2020-21	92	25	42	0	17	92	92	0	0	0
		2019-20	100	25	100	0	0	17	100	33	75	75
Coxs River at Lithgow (next to the Power Station)	E0321	2021-22	90	40	0	0	60	90	90	0	60	0
		2020-21	100	36	0	0	25	75	92	0	25	8
		2019-20	100	17	83	8	83	100	92	17	25	0

Table 7-21: Upper Wollondilly sub-catchment - percentage of routine samples outside water quality guidelines during audit period

Site	Station Code	Year	Physio-chemical				Nutrients					Algae
			Conductivity	Dissolved Oxygen	pH	Turbidity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Wollondilly River @ u/s Goulburn Weir	E490	2021-22	67	92	0	0	67	67	100	25	92	83
		2020-21										
		2019-20										

Table 7-22: Werri Berri Creek sub-catchment - percentage of routine samples outside water quality guidelines during audit period

Site	Station Code	Year	Physio-chemical				Nutrients					Algae
			Conductivity	Dissolved Oxygen	pH	Turbidity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Werriberri Creek @ Werombi	E531	2021-22	33	42	0	0	67	75	67	0	42	25
		2020-21	25	75	0	0	100	100	83	0	17	8
		2019-20	8	100	50	0	33	8	17	0	33	17

Table 7-23: Wingecarribee River sub-catchment - percentage of routine samples outside water quality guidelines during audit period

Site	Station Code	Year	Physio-Chemical				Nutrients					Algae
			Dissolved Oxygen	pH	Turbidity	Conductivity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Caalang Ck @ Maugers	E301	2021-22	50	8	0	0	42	100	100	0	8	0
		2020-21	33	8	0	0	33	100	100	0	0	0
		2019-20	92	25	0	0	17	83	83	0	17	25

Site	Station Code	Year	Physio-Chemical				Nutrients					Algae
			Dissolved Oxygen	pH	Turbidity	Conductivity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Wingecarribee River @ Berrima	E332	2021-22	0	67	0	8	75	92	100	8	100	100
		2020-21	0	83	8	0	83	100	100	8	100	100
		2019-20	0	58	0	8	92	100	100	0	58	58
Wingecarribee Lake at outlet	DWI1	2021-22	18	0	0		58	83	100	0	83	98
		2020-21	33	0	0		33	75	83	0	92	92
		2019-20	42	17	0		75	100	100	0	100	92

Table 7-24: Wollondilly River sub-catchment - percentage of routine samples outside water quality guidelines during audit period

Site	Station Code	Year	Physio-chemical				Nutrients					Algae
			Conductivity	Dissolved Oxygen	pH	Turbidity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Wollondilly River @ Murrays Flat	E409	2021-22	83	75	0	0	82	100	100	55	100	83
		2020-21	83	75	0	8	42	75	100	8	75	92
		2019-20	100	67	17	8	25	17	100	50	83	83
Wollondilly River at ford 1km u/s Paddys River	E433	2021-22	0	83	25	0	58	58	75	8	58	8
		2020-21										
		2019-20										
Wollondilly River @ Golden Valley	E450	2021-22	67	17	0	8	83	100	100	33	100	73
		2020-21	58	33	42	0	25	42	100	0	50	83
		2019-20	83	33	17	0	33	25	92	0	8	67
Wollondilly River @ Joorilands	E488	2021-22	25	0	17	25	42	83	100	25	75	25
		2020-21	25	0	33	17	33	42	100	0	42	17
		2019-20	100	8	92	0	8	25	92	0	17	58

7.6. Woronora

Table 7-25: Woronora streams and storages – percentage of routine samples outside guidelines

Site	Station Code	Year	Physio-chemical				Nutrients					Algae
			Dissolved Oxygen	pH	Turbidity	Conductivity	Nitrogen Ammoniacal	Nitrogen Oxidised	Nitrogen Total	Phosphorus Soluble Reactive	Phosphorus Total	Chlorophyll-a
Waratah Rivulet d/s of Flatrock Crossing	E6131	2021-22	67	17	0	0	33	8	8	0	0	0
		2020-21	75	8	0	0	8	8	8	0	0	0
		2019-20	58	8	0	0	0	25	8	0	0	0
Woronora River	E677	2021-22	55	91	0	0	0	0	0	0	0	0
		2020-21	67	100	0	0	8	8	8	0	8	0
		2019-20	91	82	0	0	0	0	0	0	0	0
Lake Woronora @ Honeysuckle Ck Junction	DWO_ THMD	2021-22	22	33	0		33	100	17	0	0	67
		2020-21										
		2019-20										
Lake Woronora at Dam Wall	DWO1	2021-22	33	42	0		50	100	8	0	0	33
		2020-21	25	50	0		92	100	0	0	0	8
		2019-20	42	33	0		42	100	0	0	8	33

8. Appendix H Water quality analysis – audit to pre-audit comparison

8.1. Method

Table 8-1: Method for water quality analysis

Step	Description of method
1 Obtain data	Raw water quality data was obtained from WaterNSW in MS Excel format for routine storage and stream monitoring sites across the Catchment as follows: • The query included results for routine monitoring sites and analytes consistent with those referenced in the WaterNSW annual water monitoring reports. • The query included results for routine monitoring sample types: R, P and C. • The query included results for storage depths of 0 m, 1 m, 2 m, 3 m, 4 m, 5 m, 6 m, 0-3 m composite and 0-6 m composite samples. • Sample results below detection limit were converted by WaterNSW to their numeric value (e.g., <0.01 converted to 0.01).
2 Calculate medians	Median values were calculated and tabulated by the auditor for each resultant dataset. Median values for each analyte at each site are tabulated in section 8.3. Median values were rounded to match the significant figures in each corresponding guideline. Results shown in the tables as 'n/a' were for sites added to the routine water quality monitoring program during the 2019-2022 audit period.
3. Highlight exceedances	Median values that exceeded ANZECC & ARMCANZ (2000) water quality guidelines were highlighted in red text in the tables for each site (see section 8.3).
4. Compare medians	Where an exceedance was recorded, the median value during the audit period was compared to the median value from the preceding years. A comment was added in the tables in section 8.3 consistent with the categories in Table 8-2.
5. Summarise findings	Key findings were tabulated in section 0 for storages and streams using the graphic symbols in Table 8-2.
6. Identify priority sites	High priority sites were identified. These had at least three analytes with poor condition (outside guidelines by more than 5% - see Table 8-3) and were the same or worse in the audit period than previous years (based on median values).

Table 8-2: Categorisation of median water quality values

↓	Worse - Median water quality results exceeded guidelines in the current audit period and previous years, and median result was worse in the current audit period (unless 'acceptable')
–	Stable - Median water quality results exceeded guidelines in the current audit period and previous years, and have the same median values (unless 'acceptable')
↓	Worse - Median water quality result for the current audit period exceeded guidelines, whereas median result for the previous years complied with guidelines (unless 'acceptable')
↑	Improved - Median water quality results exceeded guidelines in the current audit period and previous years, and median result was better in the current audit period (unless 'acceptable')
↑	Improved - Median water quality result for previous years exceeded guidelines whereas median result for the current audit period was within guidelines (unless 'acceptable')
A	Acceptable - Both median values are within 5% of the guideline value
	Median water quality results for the current audit period and previous years did not exceed guidelines
x	No data available for the years prior to the audit period, so comparison is not possible

Refer to Table 8-3 for guideline values and values 5% outside guidelines.

Table 8-3: ANZECC & ARMCANZ (2000) water quality guidelines for streams and storages, and guidelines ±5%

Analyte	Units	Storages		Streams	
		Guidelines	Guidelines ±5%	Guidelines	Guidelines ±5%
Chlorophyll-a	µg/L	<5.0	<5.3	<5.0	<5.3
Dissolved oxygen	% sat	90 - 110	86 - 116	90 - 110	86 - 116
pH	pH units	6.5 – 8.0	6.2 - 8.4	6.5 – 8.0	6.2 - 8.4
Conductivity	mS/cm	<0.35	<0.37	<0.35	<0.37
Turbidity	NTU	<20.0	<21.0	<25.0	<26.3
Ammoniacal nitrogen	mg/L	<0.01	<0.01	<0.013	<0.014
Oxidised nitrogen	mg/L	<0.01	<0.01	<0.015	<0.016
Total nitrogen	mg/L	<0.35	<0.37	<0.250	<0.263
Total phosphorus	mg/L	<0.01	<0.01	<0.02	<0.02
Phosphorus soluble reactive	mg/L	<0.005	<0.005	<0.015	<0.016

8.2. Summary tables of results for storages and streams

The two tables below summarise results of water quality analysis for storages and streams.

Table 8-4: Summary table for storages- Median water quality in the audit period compared to the pre-audit period

Site	Chl-a	DO	pH	Cond	Turb	NH4	NOx	TN	TP	PSR
DAV1			A				↓			
DAV16	x	x	x	x	x	x	x	x	x	x
DAV7			A				↓			
DBP1	↑			↑		–	↓	↓	–	
DCA1			↓			↓	↓			
DCA2	x	x	x	x	x	x	x	x	x	x
DCA3	x	x	x	x	x	x	x	x	x	x
DCO1	↓					↓	↓			
DCO3	x	x	x	x	x	x	x	x	x	x
DFF6	↑					↓	↓	↓	↓	
DGC1	A	A	↓				↑			
DLC1							–			
DNE2		↓	A			↓	↓	↓		
DNE6	x	x	x	x	x	x	x	x	x	x
DTA1		↓				↓	↓	↓	↓	
DTA5		A				–	↓	↓	–	
DTA8	↑					–	↓	↓	↓	
DTC1		A					–			
DWA12		A					↓	↓		
DWA15	A	A					↓	↓		
DWA19	↓	↓					↓	↓	↓	
DWA2		↓					↓	↓		
DWA21	↓	↓					↓	↓		
DWA27		↓					↓	↓		
DWA311		A					↓	↓	↓	
DWA39		↓					↓	↓	↓	
DWA9		↓					↓	↓		
DWI1	↑						↓	↓		
DWO_THM	x	x	x	x	x	x	x	x	x	x
DWO1			A				↓			

Table 8-5: Summary table for streams - Median water quality in the audit period compared to the pre-audit period

Site	Chl-a	DO	pH	Cond	Turb	NH4	NOx	TN	TP	PSR
E0114		A	A	↑			↓	↓	–	
E0115			↑	↑			↓	↓	–	
E0321			↑	↑		↑	↑	↑		
E046							↑	↑	–	↑
E073			A	↑			↓	↓	–	↑
E083								↓		
E130							↓			
E157							↓	↑		
E203				↑		↓	↑	↑	–	
E206							↑	↑		
E210						↓	↓	↓		
E243							↓			
E300		↑				↑	↓	↓	↓	
E301		A					↓	↓		
E306		↑				↓	↓	↓	↓	
E3151		↓		–		↑	↓	↓	–	↑
E332	↑	↓				–	↓	↓	–	
E409	↑	↓		↑		↓	↓	↓	↑	
E4122		↑		↑		↓	↓	↓	↑	
E433		↓				↓		↓		
E450	↓			↑		A	↓	↓	↓	
E457	–	↓		↑		↑	↓	↓	↓	↓
E488				A			↓	↓		
E490	↓	↓		↑		↓	↓	↓	↓	
E520						↓	↓	↓		
E531		↑		A		↓	↓	↓		
E6006			↓							
E601							↓	↓		
E602										
E603	x	x	x	x	x	x	x	x	x	x
E604							↑			
E608							↑			
E609		A	A			↓	↑			
E610										
E6131		A								
E676	x	x	x	x	x	x	x	x	x	x
E677		A	↓							
E680						A	↑			
E697							↓	↓		
E7021							↓	↓	–	
E706						↓	↓	↓	–	
E7061							↓	↓		
E822		A					↓			
E8311										
E847							↓	↓		
E860									↓	
E861						A	↓			
E890		↓				A		↓	–	
E891	↓	↓		↓				↓	↓	
RPR1							↓	A		
RPR6	↓						↓			

8.3. Median results for each site

8.3.1. Storages

DAV1

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	2.5	2.4	
Dissolved oxygen	90 - 110% sat	102	96	
pH	6.5 – 8.0 pH units	7.0	6.4	Worse but acceptable - within 5% of guideline
Conductivity	<0.35 mS/cm	0.07	0.06	
Turbidity	<20.0 NTU	1.0	0.4	
Ammoniacal nitrogen	<0.01 mg/L	0.01	0.01	
Oxidised nitrogen	<0.01 mg/L	0.02	0.03	Worse in audit period, both medians outside guideline
Total nitrogen	<0.35 mg/L	0.17	0.18	
Total phosphorus	<0.01 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.005 mg/L	0.001	0.001	

DAV16

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	n/a	3.3	Unknown
Dissolved oxygen	90 - 110% sat	n/a	100	Unknown
pH	6.5 – 8.0 pH units	n/a	6.6	Unknown
Conductivity	<0.35 mS/cm	n/a	0.07	Unknown
Turbidity	<20.0 NTU	n/a	0.47	Unknown
Ammoniacal nitrogen	<0.01 mg/L	n/a	0.01	Unknown
Oxidised nitrogen	<0.01 mg/L	n/a	0.02	Unknown
Total nitrogen	<0.35 mg/L	n/a	0.17	Unknown
Total phosphorus	<0.01 mg/L	n/a	0.01	Unknown
Phosphorus soluble reactive	<0.005 mg/L	n/a	0.001	Unknown

DAV7

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	4.2	4.7	
Dissolved oxygen	90 - 110% sat	101	93	
pH	6.5 – 8.0 pH units	7.2	6.4	Worse but acceptable - within 5% of guideline
Conductivity	<0.35 mS/cm	0.07	0.07	
Turbidity	<20.0 NTU	1.1	0.6	
Ammoniacal nitrogen	<0.01 mg/L	0.01	0.01	
Oxidised nitrogen	<0.01 mg/L	0.01	0.02	Worse – median in audit period outside guideline
Total nitrogen	<0.35 mg/L	0.17	0.18	
Total phosphorus	<0.01 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.005 mg/L	0.001	0.001	

DBP1

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	13.5	11.6	Improved in audit period, both medians outside guideline
Dissolved oxygen	90 - 110% sat	95	93	
pH	6.5 – 8.0 pH units	7.1	7.0	
Conductivity	<0.35 mS/cm	0.97	0.10	Improved – median in audit period within guideline
Turbidity	<20.0 NTU	5.9	4.4	
Ammoniacal nitrogen	<0.01 mg/L	0.02	0.02	Stable (same median outside guideline)
Oxidised nitrogen	<0.01 mg/L	0.08	0.12	Worse in audit period, both medians outside guideline
Total nitrogen	<0.35 mg/L	0.39	0.41	Worse in audit period, both medians outside guideline
Total phosphorus	<0.01 mg/L	0.02	0.02	Stable (same median outside guideline)
Phosphorus soluble reactive	<0.005 mg/L	0.002	0.002	

DCA1

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	3.4	2.7	
Dissolved oxygen	90 - 110% sat	98	90	
pH	6.5 – 8.0 pH units	6.8	6.1	Worse – median in audit period outside guideline
Conductivity	<0.35 mS/cm	0.08	0.09	
Turbidity	<20.0 NTU	1.1	1.0	
Ammoniacal nitrogen	<0.01 mg/L	0.01	0.02	Worse – median in audit period outside guideline
Oxidised nitrogen	<0.01 mg/L	0.01	0.04	Worse – median in audit period outside guideline
Total nitrogen	<0.35 mg/L	0.20	0.23	
Total phosphorus	<0.01 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.005 mg/L	0.001	0.001	

DCA2

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	n/a	2.5	Unknown
Dissolved oxygen	90 - 110% sat	n/a	93	Unknown
pH	6.5 – 8.0 pH units	n/a	6.1	Unknown
Conductivity	<0.35 mS/cm	n/a	0.09	Unknown
Turbidity	<20.0 NTU	n/a	0.8	Unknown
Ammoniacal nitrogen	<0.01 mg/L	n/a	0.01	Unknown
Oxidised nitrogen	<0.01 mg/L	n/a	0.02	Unknown
Total nitrogen	<0.35 mg/L	n/a	0.19	Unknown
Total phosphorus	<0.01 mg/L	n/a	0.01	Unknown
Phosphorus soluble reactive	<0.005 mg/L	n/a	0.001	Unknown

DCA3

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	n/a	3.9	Unknown
Dissolved oxygen	90 - 110% sat	n/a	92	Unknown
pH	6.5 – 8.0 pH units	n/a	6.1	Unknown
Conductivity	<0.35 mS/cm	n/a	0.09	Unknown
Turbidity	<20.0 NTU	n/a	0.7	Unknown
Ammoniacal nitrogen	<0.01 mg/L	n/a	0.01	Unknown
Oxidised nitrogen	<0.01 mg/L	n/a	0.01	Unknown
Total nitrogen	<0.35 mg/L	n/a	0.16	Unknown
Total phosphorus	<0.01 mg/L	n/a	0.01	Unknown
Phosphorus soluble reactive	<0.005 mg/L	n/a	0.001	Unknown

DCO1

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	5.0	5.9	Worse – median in audit period outside guideline
Dissolved oxygen	90 - 110% sat	98	91	
pH	6.5 – 8.0 pH units	7.4	6.8	
Conductivity	0.35 mS/cm	0.09	0.09	
Turbidity	<20.0 NTU	1.8	1.4	
Ammoniacal nitrogen	<0.01 mg/L	0.01	0.02	Worse – median in audit period outside guideline
Oxidised nitrogen	<0.01 mg/L	0.01	0.02	Worse – median in audit period outside guideline
Total nitrogen	<0.35 mg/L	0.24	0.27	
Total phosphorus	<0.01 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.005 mg/L	0.001	0.001	

DCO3

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	n/a	5.2	Unknown
Dissolved oxygen	90 - 110% sat	n/a	94	Unknown
pH	6.5 – 8.0 pH units	n/a	6.9	Unknown
Conductivity	<0.35 mS/cm	n/a	0.09	Unknown
Turbidity	<20.0 NTU	n/a	1.3	Unknown
Ammoniacal nitrogen	<0.01 mg/L	n/a	0.01	Unknown
Oxidised nitrogen	<0.01 mg/L	n/a	0.01	Unknown
Total nitrogen	<0.35 mg/L	n/a	0.22	Unknown
Total phosphorus	<0.01 mg/L	n/a	0.01	Unknown
Phosphorus soluble reactive	<0.005 mg/L	n/a	0.001	Unknown

DFF6

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	11.3	9.5	Improved in audit period, both medians outside guideline
Dissolved oxygen	90 - 110% sat	97	92	
pH	6.5 – 8.0 pH units	7.6	7.4	
Conductivity	<0.35 mS/cm	0.08	0.09	
Turbidity	<20.0 NTU	5.2	4.2	
Ammoniacal nitrogen	<0.01 mg/L	0.01	0.02	Worse – median in audit period outside guideline
Oxidised nitrogen	<0.01 mg/L	0.03	0.12	Worse in audit period, both medians outside guideline
Total nitrogen	<0.35 mg/L	0.40	0.54	Worse in audit period, both medians outside guideline
Total phosphorus	<0.01 mg/L	0.010	0.02	Worse – median in audit period outside guideline
Phosphorus soluble reactive	<0.005 mg/L	0.001	0.001	

DGC1

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	2.7	5.1	Worse but acceptable - within 5% of guideline
Dissolved oxygen	90 - 110% sat	87	94	Improved and acceptable – medians within 5% of guideline
pH	6.5 – 8.0 pH units	6	5.2	Worse in audit period, both medians outside guideline
Conductivity	<0.35 mS/cm	0.03	0.03	
Turbidity	<20.0 NTU	1.8	1.5	
Ammoniacal nitrogen	<0.01 mg/L	0.01	0.01	
Oxidised nitrogen	<0.01 mg/L	0.02	0.01	Improved – median in audit period within guideline
Total nitrogen	<0.35 mg/L	0.17	0.15	
Total phosphorus	<0.01 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.005 mg/L	0.002	0.002	

DLC1

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	2.2	2.6	
Dissolved oxygen	90 - 110% sat	93	93	
pH	6.5 – 8.0 pH units	7.5	6.8	
Conductivity	<0.35 mS/cm	0.07	0.06	
Turbidity	<20.0 NTU	1.2	1.0	
Ammoniacal nitrogen	<0.01 mg/L	0.01	0.01	
Oxidised nitrogen	<0.01 mg/L	0.05	0.05	Stable (same median outside guideline)
Total nitrogen	<0.35 mg/L	0.20	0.25	
Total phosphorus	<0.01 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.005 mg/L	0.001	0.001	

DNE2

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	3.3	2.6	
Dissolved oxygen	90 - 110% sat	98	84	Worse – median in audit period outside guideline
pH	6.5 – 8.0 pH units	7.2	6.4	Worse but acceptable – medians within 5% of guideline
Conductivity	<0.35 mS/cm	0.08	0.07	
Turbidity	<20.0 NTU	1.7	3.9	
Ammoniacal nitrogen	<0.01 mg/L	0.01	0.02	Worse – median in audit period outside guideline
Oxidised nitrogen	<0.01 mg/L	0.17	0.21	Worse in audit period, both medians outside guideline
Total nitrogen	<0.35 mg/L	0.35	0.43	Worse – median in audit period outside guideline
Total phosphorus	<0.01 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.005 mg/L	0.002	0.002	

DNE6

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	n/a	3.4	Unknown
Dissolved oxygen	90 - 110% sat	n/a	85	Unknown
pH	6.5 – 8.0 pH units	n/a	6.4	Unknown
Conductivity	<0.35 mS/cm	n/a	0.07	Unknown
Turbidity	<20.0 NTU	n/a	2.9	Unknown
Ammoniacal nitrogen	<0.01 mg/L	n/a	0.01	Unknown
Oxidised nitrogen	<0.01 mg/L	n/a	0.18	Unknown
Total nitrogen	<0.35 mg/L	n/a	0.41	Unknown
Total phosphorus	<0.01 mg/L	n/a	0.01	Unknown
Phosphorus soluble reactive	<0.005 mg/L	n/a	0.002	Unknown

DTA1

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	4.3	4.1	
Dissolved oxygen	90 - 110% sat	88	85	Worsen in audit period, both medians outside guideline; although pre-audit period median is within 5% of guideline
pH	6.5 – 8.0 pH units	7.2	7.0	
Conductivity	<0.35 mS/cm	0.10	0.12	
Turbidity	<20.0 NTU	3.4	4.3	
Ammoniacal nitrogen	<0.01 mg/L	0.02	0.03	Worse in audit period, both medians outside guideline
Oxidised nitrogen	<0.01 mg/L	0.09	0.12	Worse in audit period, both medians outside guideline
Total nitrogen	<0.35 mg/L	0.37	0.46	Worse in audit period, both medians outside guideline; although pre-audit period median is within 5% of guideline
Total phosphorus	<0.01 mg/L	0.01	0.02	Worse – median in audit period outside guideline
Phosphorus soluble reactive	<0.005 mg/L	0.003	0.003	

DTA5

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	4.3	3.5	
Dissolved oxygen	90 - 110% sat	87	88	Improved but acceptable - both medians are within 5% of guideline
pH	6.5 – 8.0 pH units	7.3	7.2	
Conductivity	<0.35 mS/cm	0.10	0.12	
Turbidity	<20.0 NTU	4.1	4.8	
Ammoniacal nitrogen	<0.01 mg/L	0.02	0.02	Stable (same median outside guideline)
Oxidised nitrogen	<0.01 mg/L	0.06	0.09	Worse in audit period, both medians outside guideline
Total nitrogen	<0.35 mg/L	0.36	0.46	Worse in audit period, both medians outside guideline

Analyte	Guidelines	Median values		Trend
Total phosphorus	<0.01 mg/L	0.02	0.02	Stable (same median outside guideline)
Phosphorus soluble reactive	<0.005 mg/L	0.003	0.003	

DTA8

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	8.7	7.1	Improved in audit period, both medians outside guideline
Dissolved oxygen	90 - 110% sat	92	90	
pH	6.5 – 8.0 pH units	7.1	6.9	
Conductivity	<0.35 mS/cm	0.10	0.10	
Turbidity	<20.0 NTU	5.3	4.9	
Ammoniacal nitrogen	<0.01 mg/L	0.02	0.02	Stable (same median outside guideline)
Oxidised nitrogen	<0.01 mg/L	0.08	0.14	Worse in audit period, both medians outside guideline
Total nitrogen	<0.35 mg/L	0.35	0.38	Worse – median in audit period outside guideline
Total phosphorus	<0.01 mg/L	0.02	0.03	Worse in audit period, both medians outside guideline
Phosphorus soluble reactive	<0.005 mg/L	0.004	0.005	

DTC1

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	3.2	4.5	
Dissolved oxygen	90 - 110% sat	89	94	Improved and acceptable – medians within 5% of guideline
pH	6.5 – 8.0 pH units	7.4	6.7	
Conductivity	<0.35 mS/cm	0.06	0.04	
Turbidity	<20.0 NTU	1.0	1.0	
Ammoniacal nitrogen	<0.01 mg/L	0.01	0.01	
Oxidised nitrogen	<0.01 mg/L	0.02	0.02	Stable (same median outside guideline)
Total nitrogen	<0.35 mg/L	0.24	0.22	
Total phosphorus	<0.01 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.005 mg/L	0.001	0.001	

DWA12

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	3.0	3.6	
Dissolved oxygen	90 - 110% sat	96	89	Worse but acceptable – medians within 5% of guideline
pH	6.5 – 8.0 pH units	7.9	7.4	
Conductivity	<0.35 mS/cm	0.18	0.19	
Turbidity	<20.0 NTU	1.8	3.9	
Ammoniacal nitrogen	<0.01 mg/L	0.01	0.01	
Oxidised nitrogen	<0.01 mg/L	0.03	0.31	Worse in audit period, both medians outside guideline
Total nitrogen	<0.35 mg/L	0.29	0.58	Worse – median in audit period outside guideline
Total phosphorus	<0.01 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.005 mg/L	0.001	0.002	

DWA15

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	5.2	4.0	Improved and acceptable – medians within 5% of guideline
Dissolved oxygen	90 - 110% sat	92	87	Worse but acceptable – medians within 5% of guideline
pH	6.5 – 8.0 pH units	7.7	7.4	
Conductivity	<0.35 mS/cm	0.16	0.19	
Turbidity	<20.0 NTU	3.3	2.6	
Ammoniacal nitrogen	<0.01 mg/L	0.01	0.01	
Oxidised nitrogen	<0.01 mg/L	0.04	0.26	Worse in audit period, both medians outside guideline
Total nitrogen	<0.35 mg/L	0.30	0.55	Worse – median in audit period outside guideline
Total phosphorus	<0.01 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.005 mg/L	0.001	0.002	

DWA19

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	5.9	7.3	Worse in audit period, both medians outside guideline
Dissolved oxygen	90 - 110% sat	92	76	Worse – median in audit period outside guideline
pH	6.5 – 8.0 pH units	7.7	7.2	
Conductivity	<0.35 mS/cm	0.16	0.17	
Turbidity	<20.0 NTU	2.6	3.7	
Ammoniacal nitrogen	<0.01 mg/L	0.01	0.01	
Oxidised nitrogen	<0.01 mg/L	0.01	0.26	Worse – median in audit period outside guideline
Total nitrogen	<0.35 mg/L	0.31	0.57	Worse – median in audit period outside guideline
Total phosphorus	<0.01 mg/L	0.01	0.02	Worse – median in audit period outside guideline
Phosphorus soluble reactive	<0.005 mg/L	0.001	0.002	

DWA2

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	3.2	3.4	
Dissolved oxygen	90 - 110% sat	96	82	Worse – median in audit period outside guideline
pH	6.5 – 8.0 pH units	7.8	7.3	
Conductivity	<0.35 mS/cm	0.18	0.19	
Turbidity	<20.0 NTU	1.4	4.0	
Ammoniacal nitrogen	<0.01 mg/L	0.01	0.01	
Oxidised nitrogen	<0.01 mg/L	0.03	0.28	Worse in audit period, both medians outside guideline
Total nitrogen	<0.35 mg/L	0.29	0.59	Worse – median in audit period outside guideline
Total phosphorus	<0.01 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.005 mg/L	0.001	0.002	

DWA21

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	5.0	6.7	Worse – median in audit period outside guideline
Dissolved oxygen	90 - 110% sat	95	73	Worse – median in audit period outside guideline
pH	6.5 – 8.0 pH units	7.7	7.2	
Conductivity	<0.35 mS/cm	0.16	0.18	
Turbidity	<20.0 NTU	2.1	2.6	
Ammoniacal nitrogen	<0.01 mg/L	0.01	0.01	
Oxidised nitrogen	<0.01 mg/L	0.01	0.26	Worse – median in audit period outside guideline
Total nitrogen	<0.35 mg/L	0.29	0.58	Worse – median in audit period outside guideline
Total phosphorus	<0.01 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.005 mg/L	0.001	0.002	

DWA27

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	2.9	3.3	
Dissolved oxygen	90 - 110% sat	96	83	Worse – median in audit period outside guideline
pH	6.5 – 8.0 pH units	7.9	7.4	
Conductivity	<0.35 mS/cm	0.19	0.20	
Turbidity	<20.0 NTU	1.8	4.5	
Ammoniacal nitrogen	<0.01 mg/L	0.01	0.01	
Oxidised nitrogen	<0.01 mg/L	0.03	0.31	Worse in audit period, both medians outside guideline
Total nitrogen	<0.35 mg/L	0.29	0.64	Worse – median in audit period outside guideline
Total phosphorus	<0.01 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.005 mg/L	0.001	0.002	

DWA311

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	4.5	3.6	
Dissolved oxygen	90 - 110% sat	92	87	Worse but acceptable – medians within 5% of guideline
pH	6.5 – 8.0 pH units	7.7	7.4	
Conductivity	<0.35 mS/cm	0.18	0.21	
Turbidity	<20.0 NTU	3.5	4.3	
Ammoniacal nitrogen	<0.01 mg/L	0.01	0.01	
Oxidised nitrogen	<0.01 mg/L	0.06	0.30	Worse in audit period, both medians outside guideline
Total nitrogen	<0.35 mg/L	0.32	0.68	Worse – median in audit period outside guideline
Total phosphorus	<0.01 mg/L	0.01	0.02	Worse – median in audit period outside guideline
Phosphorus soluble reactive	<0.005 mg/L	0.001	0.001	

DWA39

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	4.6	4.5	
Dissolved oxygen	90 - 110% sat	96	79	Worse – median in audit period outside guideline
pH	6.5 – 8.0 pH units	7.9	7.3	
Conductivity	<0.35 mS/cm	0.20	0.20	
Turbidity	<20.0 NTU	3.7	8.4	
Ammoniacal nitrogen	<0.01 mg/L	0.01	0.01	
Oxidised nitrogen	<0.01 mg/L	0.01	0.33	Worse – median in audit period outside guideline
Total nitrogen	<0.35 mg/L	0.31	0.71	Worse – median in audit period outside guideline
Total phosphorus	<0.01 mg/L	0.01	0.02	Worse – median in audit period outside guideline
Phosphorus soluble reactive	<0.005 mg/L	0.002	0.003	

DWA9

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	2.9	3.2	
Dissolved oxygen	90 - 110% sat	95	79	Worse – median in audit period outside guideline
pH	6.5 – 8.0 pH units	7.8	7.2	
Conductivity	<0.35 mS/cm	0.18	0.19	
Turbidity	<20.0 NTU	1.4	7.3	
Ammoniacal nitrogen	<0.01 mg/L	0.01	0.01	
Oxidised nitrogen	<0.01 mg/L	0.04	0.31	Worse in audit period, both medians outside guideline
Total nitrogen	<0.35 mg/L	0.29	0.61	Worse – median in audit period outside guideline
Total phosphorus	<0.01 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.005 mg/L	0.001	0.002	

DWI1

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	10.9	8.5	Improved in audit period, both medians outside guideline
Dissolved oxygen	90 - 110% sat	95	90	
pH	6.5 – 8.0 pH units	7.5	7.3	
Conductivity	<0.35 mS/cm	0.08	0.08	
Turbidity	<20.0 NTU	7.1	4.5	
Ammoniacal nitrogen	<0.01 mg/L	0.01	0.01	
Oxidised nitrogen	<0.01 mg/L	0.02	0.12	Worse in audit period, both medians outside guideline
Total nitrogen	<0.35 mg/L	0.40	0.48	Worse in audit period, both medians outside guideline
Total phosphorus	<0.01 mg/L	0.02	0.02	
Phosphorus soluble reactive	<0.005 mg/L	0.001	0.001	

DWO_THMD

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	n/a	4.7	Unknown
Dissolved oxygen	90 - 110% sat	n/a	93	Unknown
pH	6.5 – 8.0 pH units	n/a	6.5	Unknown
Conductivity	<0.35 mS/cm	n/a	0.11	Unknown
Turbidity	<20.0 NTU	n/a	1.2	Unknown
Ammoniacal nitrogen	<0.01 mg/L	n/a	0.01	Unknown
Oxidised nitrogen	<0.01 mg/L	n/a	0.07	Unknown
Total nitrogen	<0.35 mg/L	n/a	0.25	Unknown
Total phosphorus	<0.01 mg/L	n/a	0.01	Unknown
Phosphorus soluble reactive	<0.005 mg/L	n/a	0.001	Unknown

DWO1

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	1.1	2.0	
Dissolved oxygen	90 - 110% sat	100	90	
pH	6.5 – 8.0 pH units	6.9	6.4	Worse but acceptable – medians within 5% of guideline
Conductivity	0.35 mS/cm	0.11	0.11	
Turbidity	<20.0 NTU	1	1.3	
Ammoniacal nitrogen	<0.01 mg/L	0.01	0.02	
Oxidised nitrogen	<0.01 mg/L	0.07	0.08	Worse in audit period, both medians outside guideline
Total nitrogen	<0.35 mg/L	0.20	0.30	
Total phosphorus	<0.01 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.005 mg/L	0.002	0.001	

8.3.2. Streams

E0114

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	3.4	2.9	
Dissolved oxygen	90 - 110% sat	90	89	Worse but acceptable – medians within 5% of guideline
pH	6.5 – 8.0 pH units	8.4	8.1	Improved but acceptable – medians within 5% of guideline
Conductivity	<0.35 mS/cm	0.56	0.48	Improved in audit period, both medians outside guideline
Turbidity	<25.0 NTU	1.2	1.2	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.009	
Oxidised nitrogen	<0.015 mg/L	0.064	0.124	Worse in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	0.390	0.460	Worse in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.03	0.03	Stable (same median outside guideline)
Phosphorus soluble reactive	<0.015 mg/L	0.014	0.009	

E0115

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	4.8	2.1	
Dissolved oxygen	90 - 110% sat	100	90	
pH	6.5 – 8.0 pH units	8.8	7.9	Improved – median in audit period within guideline
Conductivity	<0.35 mS/cm	0.90	0.41	Improved in audit period, both medians outside guideline
Turbidity	<25.0 NTU	2.1	2.1	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.006	
Oxidised nitrogen	<0.015 mg/L	0.010	0.032	Worse – median in audit period outside guideline
Total nitrogen	<0.250 mg/L	0.360	0.450	Worse in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.03	0.03	Stable (same median outside guideline)

Analyte	Guidelines		Median values	Trend
Phosphorus soluble reactive	<0.015 mg/L	0.010	0.002	

E0321

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	2.0	1.7	
Dissolved oxygen	90 - 110% sat	96	91	
pH	6.5 – 8.0 pH units	8.6	7.6	Improved – median in audit period within guideline
Conductivity	<0.35 mS/cm	1.18	0.69	Improved in audit period, both medians outside guideline
Turbidity	<25.0 NTU	3.6	3.9	
Ammoniacal nitrogen	<0.013 mg/L	0.054	0.012	Improved – median in audit period within guideline
Oxidised nitrogen	<0.015 mg/L	0.370	0.045	Improved in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	0.530	0.400	Improved in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.02	0.02	
Phosphorus soluble reactive	<0.015 mg/L	0.006	0.003	

E046

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	2.7	2.6	
Dissolved oxygen	90 - 110% sat	93	91	
pH	6.5 – 8.0 pH units	7.7	7.6	
Conductivity	<0.35 mS/cm	0.26	0.18	
Turbidity	<25.0 NTU	2.6	3.6	
Ammoniacal nitrogen	<0.013 mg/L	0.012	0.011	
Oxidised nitrogen	<0.015 mg/L	0.971	0.752	Improved in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	1.480	1.220	Improved in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.06	0.06	Stable (same median outside guideline)
Phosphorus soluble reactive	<0.015 mg/L	0.022	0.012	Improved – median in audit period within guideline

E073

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	3.6	3.2	
Dissolved oxygen	90 - 110% sat	98	91	
pH	6.5 – 8.0 pH units	8.4	8.3	Improved but acceptable – medians within 5% of guideline
Conductivity	<0.35 mS/cm	0.64	0.42	Improved in audit period, both medians outside guideline
Turbidity	<25.0 NTU	1.7	2.9	
Ammoniacal nitrogen	<0.013 mg/L	0.006	0.011	
Oxidised nitrogen	<0.015 mg/L	0.026	0.101	Worse in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	0.370	0.650	Worse in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.04	0.04	Stable (same median outside guideline)
Phosphorus soluble reactive	<0.015 mg/L	0.022	0.012	Improved – median in audit period within guideline

E083

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	2.2	2.8	
Dissolved oxygen	90 - 110% sat	97	101	
pH	6.5 – 8.0 pH units	7.8	7.9	
Conductivity	<0.35 mS/cm	0.22	0.21	
Turbidity	<25.0 NTU	3.2	3.9	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.005	
Oxidised nitrogen	<0.015 mg/L	0.007	0.100	
Total nitrogen	<0.250 mg/L	0.210	0.290	Worse – median in audit period outside guideline
Total phosphorus	<0.02 mg/L	0.01	0.00	
Phosphorus soluble reactive	<0.015 mg/L	0.003	0.005	

E130

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	0.0	1.4	
Dissolved oxygen	90 - 110% sat	96	101	
pH	6.5 – 8.0 pH units	7.5	7.5	
Conductivity	<0.35 mS/cm	0.09	0.09	
Turbidity	<25.0 NTU	1.9	2.5	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.008	
Oxidised nitrogen	<0.015 mg/L	0.021	0.137	Worse in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	0.165	0.240	
Total phosphorus	<0.02 mg/L	0.01	0.02	
Phosphorus soluble reactive	<0.015 mg/L	0.003	0.005	

E157

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	0.6	0.5	
Dissolved oxygen	90 - 110% sat	94	99	
pH	6.5 – 8.0 pH units	7.2	7.2	
Conductivity	<0.35 mS/cm	0.08	0.09	
Turbidity	<25.0 NTU	2.4	2.7	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.008	
Oxidised nitrogen	<0.015 mg/L	0.194	0.206	Worse in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	0.310	0.275	Improved in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.015 mg/L	0.002	0.002	

E203

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	2.9	2.4	
Dissolved oxygen	90 - 110% sat	93	90	
pH	6.5 – 8.0 pH units	7.5	7.5	
Conductivity	<0.35 mS/cm	0.39	0.29	Improved – median in audit period within guideline
Turbidity	<25.0 NTU	3.9	7.0	
Ammoniacal nitrogen	<0.013 mg/L	0.025	0.064	Worse in audit period, both medians outside guideline
Oxidised nitrogen	<0.015 mg/L	1.790	1.090	Improved in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	2.800	1.695	Improved in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.06	0.06	Stable (same median outside guideline)
Phosphorus soluble reactive	<0.015 mg/L	0.010	0.009	

E206

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	2.1	1.9	
Dissolved oxygen	90 - 110% sat	98	98	
pH	6.5 – 8.0 pH units	7.7	7.7	
Conductivity	<0.35 mS/cm	0.33	0.26	
Turbidity	<25.0 NTU	1.7	2.9	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.009	
Oxidised nitrogen	<0.015 mg/L	0.671	0.530	Improved in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	0.930	0.840	Improved in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.02	0.03	
Phosphorus soluble reactive	<0.015 mg/L	0.005	0.008	

E210

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	2.8	1.9	
Dissolved oxygen	90 - 110% sat	90	99	
pH	6.5 – 8.0 pH units	7.4	7.5	
Conductivity	<0.35 mS/cm	0.29	0.27	
Turbidity	<25.0 NTU	4.5	9.4	
Ammoniacal nitrogen	<0.013 mg/L	0.011	0.028	Worse – median in audit period outside guideline
Oxidised nitrogen	<0.015 mg/L	0.062	0.140	Worse in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	0.315	0.355	Worse in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.015 mg/L	0.002	0.002	

E243

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	0.5	0.4	
Dissolved oxygen	90 - 110% sat	94	98	
pH	6.5 – 8.0 pH units	6.9	6.7	
Conductivity	<0.35 mS/cm	0.13	0.13	
Turbidity	<25.0 NTU	1.1	0.8	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.006	
Oxidised nitrogen	<0.015 mg/L	0.005	0.083	Worse – median in audit period outside guideline
Total nitrogen	<0.250 mg/L	0.060	0.140	
Total phosphorus	<0.02 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.015 mg/L	0.003	0.002	

E300

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	3.2	3.0	
Dissolved oxygen	90 - 110% sat	81	83	Improved in audit period, both medians outside guideline
pH	6.5 – 8.0 pH units	6.5	7.0	
Conductivity	<0.35 mS/cm	0.08	0.08	
Turbidity	<25.0 NTU	5.4	3.5	
Ammoniacal nitrogen	<0.013 mg/L	0.025	0.018	Improved in audit period, both medians outside guideline
Oxidised nitrogen	<0.015 mg/L	0.899	1.415	Worse in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	1.055	1.840	Worse in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.02	0.06	Worse – median in audit period outside guideline
Phosphorus soluble reactive	<0.015 mg/L	0.002	0.002	

E301

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	1.9	1.5	
Dissolved oxygen	90 - 110% sat	95	89	Worse but acceptable – medians within 5% of guideline
pH	6.5 – 8.0 pH units	6.8	7.1	
Conductivity	<0.35 mS/cm	0.08	0.08	
Turbidity	<25.0 NTU	5.2	2.8	
Ammoniacal nitrogen	<0.013 mg/L	0.008	0.010	
Oxidised nitrogen	<0.015 mg/L	0.638	0.781	Worse in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	0.760	0.815	Worse in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.02	0.01	
Phosphorus soluble reactive	<0.015 mg/L	0.004	0.003	

E306

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	3.1	3.0	
Dissolved oxygen	90 - 110% sat	75	76	Improved in audit period, both medians outside guideline
pH	6.5 – 8.0 pH units	7.4	7.3	
Conductivity	<0.35 mS/cm	0.33	0.34	
Turbidity	<25.0 NTU	14.2	8.7	
Ammoniacal nitrogen	<0.013 mg/L	0.008	0.045	Worse – median in audit period outside guideline
Oxidised nitrogen	<0.015 mg/L	0.010	0.195	Worse – median in audit period outside guideline
Total nitrogen	<0.250 mg/L	0.380	0.740	Worse in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.03	0.04	Worse in audit period, both medians outside guideline
Phosphorus soluble reactive	<0.015 mg/L	0.004	0.008	

E3151

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	2.8	2.7	
Dissolved oxygen	90 - 110% sat	71	65	Worse in audit period, both medians outside guideline
pH	6.5 – 8.0 pH units	7.5	7.5	
Conductivity	<0.35 mS/cm	0.57	0.57	Stable (same median outside guideline)
Turbidity	<25.0 NTU	8.8	8.2	
Ammoniacal nitrogen	<0.013 mg/L	0.025	0.020	Improved in audit period, both medians outside guideline
Oxidised nitrogen	<0.015 mg/L	0.928	1.930	Worse in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	1.320	2.300	Worse in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.05	0.05	Stable (same median outside guideline)
Phosphorus soluble reactive	<0.015 mg/L	0.019	0.013	Improved – median in audit period within guideline

E332

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	20.5	15.5	Improved in audit period, both medians outside guideline
Dissolved oxygen	90 - 110% sat	85	79	Worse in audit period, both medians outside guideline
pH	6.5 – 8.0 pH units	7.4	7.4	
Conductivity	<0.35 mS/cm	0.24	0.23	
Turbidity	<25.0 NTU	10.9	11.6	
Ammoniacal nitrogen	<0.013 mg/L	0.036	0.036	Stable (same median outside guideline)
Oxidised nitrogen	<0.015 mg/L	0.140	0.235	Worse in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	0.780	0.940	Worse in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.04	0.04	Stable (same median outside guideline)
Phosphorus soluble reactive	<0.015 mg/L	0.002	0.004	

E409

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	9.2	8.6	Improved in audit period, both medians outside guideline
Dissolved oxygen	90 - 110% sat	81	79	Worse in audit period, both medians outside guideline
pH	6.5 – 8.0 pH units	7.6	7.6	
Conductivity	<0.35 mS/cm	0.77	0.53	Improved in audit period, both medians outside guideline
Turbidity	<25.0 NTU	3.6	7.8	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.011	
Oxidised nitrogen	<0.015 mg/L	0.004	0.203	Worse – median in audit period outside guideline
Total nitrogen	<0.250 mg/L	0.620	0.990	Worse in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.04	0.03	Improved in audit period, both medians outside guideline

Analyte	Guidelines		Median values	Trend
Phosphorus soluble reactive	<0.015 mg/L	0.009	0.008	

E4122

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	5.0	3.4	
Dissolved oxygen	90 - 110% sat	60	77	Improved in audit period, both medians outside guideline
pH	6.5 – 8.0 pH units	7.4	7.4	
Conductivity	<0.35 mS/cm	0.49	0.38	Improved in audit period, both medians outside guideline
Turbidity	<25.0 NTU	2.9	6.1	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.021	Worse – median in audit period outside guideline
Oxidised nitrogen	<0.015 mg/L	0.003	0.038	Worse in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	0.545	0.630	Worse in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.03	0.02	Improved – median in audit period within guideline
Phosphorus soluble reactive	<0.015 mg/L	0.004	0.006	

E433

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	3.4	3.5	
Dissolved oxygen	90 - 110% sat	83	71	Worse in audit period, both medians outside guideline
pH	6.5 – 8.0 pH units	7.1	6.8	
Conductivity	<0.35 mS/cm	0.22	0.19	
Turbidity	<25.0 NTU	1.7	4.5	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.015	Worse – median in audit period outside guideline
Oxidised nitrogen	<0.015 mg/L	0.002	0.013	
Total nitrogen	<0.250 mg/L	0.280	0.440	Worse in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.01	0.02	
Phosphorus soluble reactive	<0.015 mg/L	0.002	0.003	

E450

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	3.5	8.1	Worse – median in audit period outside guideline
Dissolved oxygen	90 - 110% sat	92	94	
pH	6.5 – 8.0 pH units	7.8	7.8	
Conductivity	<0.35 mS/cm	0.46	0.41	Improved in audit period, both medians outside guideline
Turbidity	<25.0 NTU	2.6	6.7	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.014	Worse but acceptable – medians within 5% of guideline
Oxidised nitrogen	<0.015 mg/L	0.011	0.076	Worse – median in audit period outside guideline
Total nitrogen	<0.250 mg/L	0.495	0.840	Worse in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.01	0.03	Worse – median in audit period outside guideline
Phosphorus soluble reactive	<0.015 mg/L	0.002	0.004	

E457

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	9.8	9.8	Stable (same median outside guideline)
Dissolved oxygen	90 - 110% sat	89	83	Worse in audit period, both medians outside guideline, but pre-audit period was within 5% of guideline
pH	6.5 – 8.0 pH units	8.0	7.7	
Conductivity	<0.35 mS/cm	0.82	0.60	Improved in audit period, both medians outside guideline
Turbidity	<25.0 NTU	4.2	6.2	
Ammoniacal nitrogen	<0.013 mg/L	0.051	0.031	Improved in audit period, both medians outside guideline
Oxidised nitrogen	<0.015 mg/L	0.020	0.027	Worse in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	1.030	1.325	Worse in audit period, both medians outside guideline

Analyte	Guidelines	Median values		Trend
Total phosphorus	<0.02 mg/L	0.06	0.09	Worse in audit period, both medians outside guideline
Phosphorus soluble reactive	<0.015 mg/L	0.024	0.033	Worse in audit period, both medians outside guideline

E488

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	4.5	3.5	
Dissolved oxygen	90 - 110% sat	101	100	
pH	6.5 – 8.0 pH units	8.0	7.9	
Conductivity	<0.35 mS/cm	0.37	0.33	Improved and acceptable – medians within 5% of guideline
Turbidity	<25.0 NTU	5.5	6.3	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.008	
Oxidised nitrogen	<0.015 mg/L	0.005	0.057	Worse – median in audit period outside guideline
Total nitrogen	<0.250 mg/L	0.470	0.560	Worse in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.01	0.02	
Phosphorus soluble reactive	<0.015 mg/L	0.001	0.003	

E490

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	5.4	7.0	Worse in audit period, both medians outside guideline
Dissolved oxygen	90 - 110% sat	90	82	Worse – median in audit period outside guideline
pH	6.5 – 8.0 pH units	8.0	7.7	
Conductivity	<0.35 mS/cm	0.61	0.42	Improved in audit period, both medians outside guideline
Turbidity	<25.0 NTU	2.0	7.9	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.014	Worse but acceptable – medians within 5% of guideline
Oxidised nitrogen	<0.015 mg/L	0.003	0.018	Worse – median in audit period outside guideline
Total nitrogen	<0.250 mg/L	0.620	0.800	Worse in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.02	0.03	Worse – median in audit period outside guideline
Phosphorus soluble reactive	<0.015 mg/L	0.005	0.006	

E520

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	0.6	1.5	
Dissolved oxygen	90 - 110% sat	108	99	
pH	6.5 – 8.0 pH units	7.4	7.3	
Conductivity	<0.35 mS/cm	0.16	0.16	
Turbidity	<25.0 NTU	3.5	4.5	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.017	Worse – median in audit period outside guideline
Oxidised nitrogen	<0.015 mg/L	0.034	0.110	Worse in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	0.200	0.350	Worse – median in audit period outside guideline
Total phosphorus	<0.02 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.015 mg/L	0.004	0.003	

E531

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	2.2	2.7	
Dissolved oxygen	90 - 110% sat	74	83	Improved in audit period, both medians outside guideline
pH	6.5 – 8.0 pH units	6.9	6.8	
Conductivity	<0.35 mS/cm	0.36	0.31	Improved and acceptable – medians within 5% of guideline
Turbidity	<25.0 NTU	3.9	4.7	
Ammoniacal nitrogen	<0.013 mg/L	0.008	0.021	Worse – median in audit period outside guideline
Oxidised nitrogen	<0.015 mg/L	0.032	0.090	Worse in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	0.220	0.350	Worse – median in audit period outside guideline
Total phosphorus	<0.02 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.015 mg/L	0.002	0.002	

E6006

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	0.4	0.3	
Dissolved oxygen	90 - 110% sat	91	91	
pH	6.5 – 8.0 pH units	5.7	5.8	Worse in audit period, both medians outside guideline
Conductivity	<0.35 mS/cm	0.09	0.12	
Turbidity	<25.0 NTU	2.2	1.8	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.009	
Oxidised nitrogen	<0.015 mg/L	0.002	0.002	
Total nitrogen	<0.250 mg/L	0.050	0.020	
Total phosphorus	<0.02 mg/L	0.01	0.02	
Phosphorus soluble reactive	<0.015 mg/L	0.001	0.002	

E601

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	1.0	1.5	
Dissolved oxygen	90 - 110% sat	102	96	
pH	6.5 – 8.0 pH units	7.3	7.4	
Conductivity	<0.35 mS/cm	0.11	0.10	
Turbidity	<25.0 NTU	3.3	3.2	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.006	
Oxidised nitrogen	<0.015 mg/L	0.227	0.270	Worse in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	0.375	0.390	Worse in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.015 mg/L	0.003	0.002	

E602

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	0.4	0.3	
Dissolved oxygen	90 - 110% sat	103	95	
pH	6.5 – 8.0 pH units	6.5	6.6	
Conductivity	<0.35 mS/cm	0.08	0.07	
Turbidity	<25.0 NTU	2.1	1.7	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.005	
Oxidised nitrogen	<0.015 mg/L	0.003	0.002	
Total nitrogen	<0.250 mg/L	0.060	0.045	
Total phosphorus	<0.02 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.015 mg/L	0.002	0.002	

E603

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	n/a	0.6	Unknown
Dissolved oxygen	90 - 110% sat	n/a	94	Unknown
pH	6.5 – 8.0 pH units	n/a	5.9	Unknown
Conductivity	<0.35 mS/cm	n/a	0.09	Unknown
Turbidity	<25.0 NTU	n/a	0.9	Unknown
Ammoniacal nitrogen	<0.013 mg/L	n/a	0.005	Unknown
Oxidised nitrogen	<0.015 mg/L	n/a	0.002	Unknown
Total nitrogen	<0.250 mg/L	n/a	0.050	Unknown
Total phosphorus	<0.02 mg/L	n/a	0.01	Unknown
Phosphorus soluble reactive	<0.015 mg/L	n/a	0.001	Unknown

E604

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	0.5	0.5	
Dissolved oxygen	90 - 110% sat	98	93	
pH	6.5 – 8.0 pH units	7.0	6.9	
Conductivity	<0.35 mS/cm	0.14	0.13	
Turbidity	<25.0 NTU	1.0	0.5	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.005	
Oxidised nitrogen	<0.015 mg/L	0.120	0.118	Improved in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	0.190	0.195	
Total phosphorus	<0.02 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.015 mg/L	0.002	0.002	

E608

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	0.4	0.4	
Dissolved oxygen	90 - 110% sat	96	90	
pH	6.5 – 8.0 pH units	7.0	7.0	
Conductivity	<0.35 mS/cm	0.15	0.15	
Turbidity	<25.0 NTU	2.7	2.6	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.006	
Oxidised nitrogen	<0.015 mg/L	0.089	0.085	Improved in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	0.140	0.140	
Total phosphorus	<0.02 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.015 mg/L	0.004	0.003	

E609

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	0.5	0.4	
Dissolved oxygen	90 - 110% sat	91	87	Worse but acceptable – medians within 5% of guideline
pH	6.5 – 8.0 pH units	6.4	6.4	Stable and acceptable – medians within 5% of guideline
Conductivity	<0.35 mS/cm	0.12	0.12	
Turbidity	<25.0 NTU	4.2	3.1	
Ammoniacal nitrogen	<0.013 mg/L	0.014	0.018	Worse in audit period, both medians outside guideline, but pre-audit period was within 5% of guideline
Oxidised nitrogen	<0.015 mg/L	0.039	0.030	Improved in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	0.090	0.105	
Total phosphorus	<0.02 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.015 mg/L	0.003	0.002	

E610

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	0.3	0.3	
Dissolved oxygen	90 - 110% sat	96	91	
pH	6.5 – 8.0 pH units	7.0	7.0	
Conductivity	<0.35 mS/cm	0.11	0.10	
Turbidity	<25.0 NTU	1.4	0.8	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.005	
Oxidised nitrogen	<0.015 mg/L	0.003	0.002	
Total nitrogen	<0.250 mg/L	0.050	0.040	
Total phosphorus	<0.02 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.015 mg/L	0.003	0.002	

E6131

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	0.3	0.3	
Dissolved oxygen	90 - 110% sat	94	88	Worse but acceptable – medians within 5% of guideline
pH	6.5 – 8.0 pH units	7.2	7.1	
Conductivity	<0.35 mS/cm	0.21	0.20	
Turbidity	<25.0 NTU	3.0	1.9	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.005	
Oxidised nitrogen	<0.015 mg/L	0.008	0.004	
Total nitrogen	<0.250 mg/L	0.060	0.050	
Total phosphorus	<0.02 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.015 mg/L	0.003	0.002	

E676

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	n/a	0.3	Unknown
Dissolved oxygen	90 - 110% sat	n/a	92	Unknown
pH	6.5 – 8.0 pH units	n/a	5.3	Unknown
Conductivity	<0.35 mS/cm	n/a	0.08	Unknown
Turbidity	<25.0 NTU	n/a	2.3	Unknown
Ammoniacal nitrogen	<0.013 mg/L	n/a	0.012	Unknown
Oxidised nitrogen	<0.015 mg/L	n/a	0.002	Unknown
Total nitrogen	<0.250 mg/L	n/a	0.120	Unknown
Total phosphorus	<0.02 mg/L	n/a	0.01	Unknown
Phosphorus soluble reactive	<0.015 mg/L	n/a	0.003	Unknown

E677

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	0.6	0.2	
Dissolved oxygen	90 - 110% sat	90	88	Worse but acceptable – medians within 5% of guideline
pH	6.5 – 8.0 pH units	6.0	5.2	Worse in audit period, both medians outside guideline
Conductivity	<0.35 mS/cm	0.18	0.18	
Turbidity	<25.0 NTU	1.3	0.4	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.005	
Oxidised nitrogen	<0.015 mg/L	0.002	0.002	
Total nitrogen	<0.250 mg/L	0.090	0.070	
Total phosphorus	<0.02 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.015 mg/L	0.001	0.002	

E680

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	1.8	3.0	
Dissolved oxygen	90 - 110% sat	98	92	
pH	6.5 – 8.0 pH units	7.0	6.9	
Conductivity	<0.35 mS/cm	0.10	0.11	
Turbidity	<25.0 NTU	1.5	1.3	
Ammoniacal nitrogen	<0.013 mg/L	0.008	0.014	Worse but acceptable – medians within 5% of guideline
Oxidised nitrogen	<0.015 mg/L	0.026	0.013	Improved – median in audit period within guideline
Total nitrogen	<0.250 mg/L	0.140	0.150	
Total phosphorus	<0.02 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.015 mg/L	0.002	0.002	

E697

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	2.5	2.3	
Dissolved oxygen	90 - 110% sat	99	94	
pH	6.5 – 8.0 pH units	7.2	7.2	
Conductivity	<0.35 mS/cm	0.10	0.10	
Turbidity	<25.0 NTU	4.5	3.6	
Ammoniacal nitrogen	<0.013 mg/L	0.006	0.010	
Oxidised nitrogen	<0.015 mg/L	0.289	0.406	Worse in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	0.460	0.520	Worse in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.02	0.02	
Phosphorus soluble reactive	<0.015 mg/L	0.002	0.003	

E7021

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	1.6	1.1	
Dissolved oxygen	90 - 110% sat	96	93	
pH	6.5 – 8.0 pH units	6.7	6.8	
Conductivity	<0.35 mS/cm	0.10	0.10	
Turbidity	<25.0 NTU	4.7	2.9	
Ammoniacal nitrogen	<0.013 mg/L	0.009	0.011	
Oxidised nitrogen	<0.015 mg/L	0.033	0.042	Worse in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	0.220	0.380	Worse – median in audit period outside guideline
Total phosphorus	<0.02 mg/L	0.03	0.03	Stable (same median outside guideline)
Phosphorus soluble reactive	<0.015 mg/L	0.009	0.008	

E706

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	2.6	1.9	
Dissolved oxygen	90 - 110% sat	104	97	
pH	6.5 – 8.0 pH units	7.1	7.1	
Conductivity	<0.35 mS/cm	0.11	0.11	
Turbidity	<25.0 NTU	4.4	3.0	
Ammoniacal nitrogen	<0.013 mg/L	0.019	0.026	Worse in audit period, both medians outside guideline
Oxidised nitrogen	<0.015 mg/L	0.112	0.159	Worse in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	0.320	0.340	Worse in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.03	0.03	Stable (same median outside guideline)
Phosphorus soluble reactive	<0.015 mg/L	0.011	0.010	

E7061

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	1.1	0.7	
Dissolved oxygen	90 - 110% sat	96	94	
pH	6.5 – 8.0 pH units	6.8	6.8	
Conductivity	<0.35 mS/cm	0.09	0.09	
Turbidity	<25.0 NTU	3.8	2.1	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.011	
Oxidised nitrogen	<0.015 mg/L	0.030	0.037	Worse in audit period, both medians outside guideline
Total nitrogen	<0.250 mg/L	0.165	0.410	Worse – median in audit period outside guideline
Total phosphorus	<0.02 mg/L	0.02	0.02	
Phosphorus soluble reactive	<0.015 mg/L	0.004	0.003	

E822

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	0.9	0.9	
Dissolved oxygen	90 - 110% sat	93	89	Worse but acceptable – medians within 5% of guideline
pH	6.5 – 8.0 pH units	7.1	6.9	
Conductivity	<0.35 mS/cm	0.06	0.06	
Turbidity	<25.0 NTU	1.9	1.9	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.006	
Oxidised nitrogen	<0.015 mg/L	0.010	0.041	Worse – median in audit period outside guideline
Total nitrogen	<0.250 mg/L	0.120	0.200	
Total phosphorus	<0.02 mg/L	0.01	0.02	
Phosphorus soluble reactive	<0.015 mg/L	0.004	0.004	

E8311

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	1.1	1.2	
Dissolved oxygen	90 - 110% sat	96	92	
pH	6.5 – 8.0 pH units	6.8	7.1	
Conductivity	<0.35 mS/cm	0.06	0.08	
Turbidity	<25.0 NTU	2.2	2.7	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.013	
Oxidised nitrogen	<0.015 mg/L	0.002	0.004	
Total nitrogen	<0.250 mg/L	0.180	0.180	
Total phosphorus	<0.02 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.015 mg/L	0.001	0.003	

E847

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	2.35	2.6	
Dissolved oxygen	90 - 110% sat	103	100	
pH	6.5 – 8.0 pH units	7.5	7.5	
Conductivity	<0.35 mS/cm	0.11	0.13	
Turbidity	<25.0 NTU	4.4	5.7	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.009	
Oxidised nitrogen	<0.015 mg/L	0.011	0.066	Worse – median in audit period outside guideline
Total nitrogen	<0.250 mg/L	0.240	0.350	Worse – median in audit period outside guideline
Total phosphorus	<0.02 mg/L	0.01	0.02	
Phosphorus soluble reactive	<0.015 mg/L	0.004	0.005	

E860

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	2.0	1.8	
Dissolved oxygen	90 - 110% sat	100	94	
pH	6.5 – 8.0 pH units	7.6	7.4	
Conductivity	<0.35 mS/cm	0.09	0.08	
Turbidity	<25.0 NTU	2.9	4.5	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.005	
Oxidised nitrogen	<0.015 mg/L	0.003	0.011	
Total nitrogen	<0.250 mg/L	0.200	0.235	
Total phosphorus	<0.02 mg/L	0.02	0.03	Worse – median in audit period outside guideline
Phosphorus soluble reactive	<0.015 mg/L	0.007	0.008	

E861

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	3.4	3.1	
Dissolved oxygen	90 - 110% sat	102	95	
pH	6.5 – 8.0 pH units	7.6	7.6	
Conductivity	<0.35 mS/cm	0.11	0.12	
Turbidity	<25.0 NTU	3.2	4.3	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.014	Worse but acceptable – medians within 5% of guideline
Oxidised nitrogen	<0.015 mg/L	0.002	0.028	Worse – median in audit period outside guideline
Total nitrogen	<0.250 mg/L	0.215	0.240	
Total phosphorus	<0.02 mg/L	0.02	0.02	
Phosphorus soluble reactive	<0.015 mg/L	0.004	0.006	

E890

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	4.2	3.4	
Dissolved oxygen	90 - 110% sat	69	59	Worse in audit period, both medians outside guideline
pH	6.5 – 8.0 pH units	6.5	6.6	
Conductivity	<0.35 mS/cm	0.11	0.18	
Turbidity	<25.0 NTU	6.2	4.8	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.014	Worse but acceptable – medians within 5% of guideline
Oxidised nitrogen	<0.015 mg/L	0.005	0.009	
Total nitrogen	<0.250 mg/L	0.280	0.600	Worse in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.03	0.03	Stable (same median outside guideline)
Phosphorus soluble reactive	<0.015 mg/L	0.006	0.005	

E891

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	8.0	12.0	Worse in audit period, both medians outside guideline
Dissolved oxygen	90 - 110% sat	80	68	Worse in audit period, both medians outside guideline
pH	6.5 – 8.0 pH units	7.3	7.4	
Conductivity	<0.35 mS/cm	0.50	0.41	Worse in audit period, both medians outside guideline
Turbidity	<25.0 NTU	4.7	4.6	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.011	
Oxidised nitrogen	<0.015 mg/L	0.005	0.013	
Total nitrogen	<0.250 mg/L	0.470	0.980	Worse in audit period, both medians outside guideline
Total phosphorus	<0.02 mg/L	0.04	0.06	Worse in audit period, both medians outside guideline
Phosphorus soluble reactive	<0.015 mg/L	0.012	0.010	

RPR1

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	3.2	7.3	Worse – median in audit period outside guideline
Dissolved oxygen	90 - 110% sat	99	98	
pH	6.5 – 8.0 pH units	7.8	7.5	
Conductivity	<0.35 mS/cm	0.19	0.16	
Turbidity	<25.0 NTU	1.1	1.6	
Ammoniacal nitrogen	<0.013 mg/L	0.010	0.005	
Oxidised nitrogen	<0.015 mg/L	0.010	0.018	Worse – median in audit period outside guideline
Total nitrogen	<0.250 mg/L	0.220	0.260	Worse but acceptable – medians within 5% of guideline
Total phosphorus	<0.02 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.015 mg/L	0.001	0.001	

RPR6

Analyte	Guidelines	Median values		Trend
		Pre-audit period	Audit period	
Chlorophyll-a	<5.0 µg/L	3.5	6.2	Worse – median in audit period outside guideline
Dissolved oxygen	90 - 110% sat	99	98	
pH	6.5 – 8.0 pH units	7.7	7.5	
Conductivity	<0.35 mS/cm	0.19	0.16	
Turbidity	<25.0 NTU	1.4	1.9	
Ammoniacal nitrogen	<0.013 mg/L	0.005	0.005	
Oxidised nitrogen	<0.015 mg/L	0.008	0.017	Worse – median in audit period outside guideline
Total nitrogen	<0.250 mg/L	0.220	0.250	
Total phosphorus	<0.02 mg/L	0.01	0.01	
Phosphorus soluble reactive	<0.015 mg/L	0.001	0.001	

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