

MURKY WATERS

Updated Report

**Water Quality of Platypus Habitat in North Queensland
Analysis of Peterson Creek water samples January 2025 to January 2026**



**Yungaburra Landcare Group
MARCH 2026**

CONTENTS

Acknowledgments	3
Abbreviations	3
Foreword to Revised Edition	4
Background	5
Water Quality Sampling	6
Water Quality Analysis	8
Discussion of water quality data	17
Water Quality and Rainfall	21
Previous Water Quality Testing	23
Comparison with other Tablelands waterways	27
Conclusions	28
What's next ?	30
References	31

Acknowledgments

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This project was made possible by grants from Landcare Australia and from Tablelands Regional Council (TRC) which funded water quality testing from January to July 2025 and from August 2026 to January 2026, respectively. We acknowledge and thank both organisations for their support.

TRC also provided previous water quality data for Peterson Creek, discussed the implications of the data during the project and provided facilities for a workshop co-hosted by YLG and Barron Catchment Care (BCC) to respond to the issues addressed in this report.

Many thanks to Adjunct Richard Pearson (James Cook University) for advice on freshwater ecology, and assistance in selecting water quality attributes and interpreting data. Thanks also to Dr Shelley Templeman (James Cook University), Geoff Williams (Australian Platypus Conservancy), Martine Newman (Wet Tropics Waterways) and Terry Vallance who provided advice and suggestions on planning this project.

We are grateful to Stan Perkowicz for permission to access his property to collect water samples near the source of Peterson Creek and for his warm hospitality during our water sampling visits.

Thanks also to the team at Cairns Regional Council Laboratory for their efficient analysis and reporting of our water samples, and for their helpful support throughout this project.

Notwithstanding the many people who assisted us, we take responsibility for the information and interpretation of water quality data presented in this report.

ABBREVIATIONS USE IN THIS REPORT

BCC	Barron Catchment Care
CRC	Cairns Regional Council
CSIRO	Commonwealth Scientific and Industrial Research Organisation
STP	Sewage Treatment Plant
TRC	Tablelands Regional Council
YLG	Yungaburra Landcare Group

FOREWORD TO UPDATED REPORT

The first edition of the report, released in August 2025, presented the results of water quality testing in Peterson Creek on the Atherton Tablelands in North Queensland undertaken by Yungaburra Landcare Group (YLG) from January to July 2025. The monthly water samples were collected at two locations – near the source of the creek adjacent to Lake Eacham and at Platypus Bend - a popular platypus-viewing spot near Yungaburra.

This revised edition includes additional Peterson Creek water quality data from the same collection sites, plus an additional site midway between the other two sites, from August 2025 to January 2026. This report therefore includes Peterson Creek water quality data over 13 months from January 2025 to January 2026.

This updated report also includes:

- Additional Peterson Creek water quality data collected by the Commonwealth Scientific Research Organization (CSIRO) in 2000 and by the Tableland Regional Council (TRC) in 2017, 2018 and 2024.
- Considerations about access to water quality data collected by TRC as part of their regular Sewage Treatment Plant compliance processes;
- Outcomes of a workshop co-convened by YLG and BCC held in Atherton on 30 January 2026 to explore options for improving water quality in Peterson Creek.

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Background

Part of the Barron River Basin, Peterson Creek is a 9 km long waterway arising near Lake Eacham and flowing into Lake Tinaroo, on the Atherton Tablelands of North Queensland.

The creek traverses agricultural land used for avocado plantations and cattle grazing, before running along the edge of Curtain Fig National Park and the western edge of Yungaburra township (elevation 730 m), and then on to Lake Tinaroo (see map next page).

Yungaburra Landcare Group (YLG) is a local group of volunteers repairing and caring for Peterson Creek and its environs. We focus on tree planting, environmental protection including weed removal, and conservation of land, waterways and natural habitat to enhance biodiversity. We also collaborate with local Dulguburra Yidinji Traditional Owners to recognise and protect cultural values associated with Peterson Creek.

Peterson Creek is well known as a prime location for observing the platypus (*Ornithorhynchus anatinus*) and attracts over 60,000 local and international wildlife enthusiasts annually, many of whom are brought to the creek by wildlife tour operators.

Other aquatic vertebrates living in Peterson Creek include Rakali (water rat), Eastern water dragon and saw-shelled turtle, as well as numerous waterbirds.

Several aquatic weeds, especially Amazonian Frogbit (*Limnobium laevigatum*), require monitoring and removal to prevent them from covering the creek surface and inhibiting platypus movement, as occurred several years ago. YLG volunteers remove aquatic weeds manually from a boat on the creek and from the creek banks.

The sediment load in the creek water increases noticeably during and after heavy rain events, turning the creek a chocolate-orange-brown colour. In drier periods, patches of algal growth appear on the water surface. These changes to the appearance of the creek throughout the year, and the decrease in platypus sightings during the summer wet season, led the YLG to question whether water quality conditions could impact the local platypus population, and/or the outbreaks of aquatic weeds. In response to these concerns, we undertook water sampling and testing at several locations along Peterson Creek from January 2025 to January 2026, funded by Landcare Australia and Tableland Regional Council (TRC).

A Queensland Government policy report focusing on environmental values and water quality objectives in the Barron River Basin (State of Queensland 2020) identifies the following environmental values associated with Peterson Creek:

- Aquatic ecosystems
- Irrigation
- Farm supply
- Stock watering
- Human consumption
- Primary recreation (e.g. swimming)
- Secondary recreation (e.g. boating)
- Visual appreciation
- Cultural and Spiritual values

Water Quality Sampling

The choice of which water quality attributes to measure involved consultations with local Dulguburra Traditional Owners, advice from experts¹ in freshwater ecology, a review of attributes measured in a previous Peterson Creek water quality study commissioned by the TRC (GDH 2020), previous water quality testing undertaken by YLG and the constraints of available funding.

From January 2025 to January 2026, monthly water samples were collected from near the source of Peterson Creek (a narrow, shallow stream adjacent to Lake Eacham) and from Platypus Bend (a deep broad reach near Yungaburra). From August 2025 to January 2026, water samples were also collected near the bridge over Peterson Creek on Pearamon Road, midway between the other two other sampling sites. The three water sampling sites are shown on the map below.

The samples were collected in mid to late afternoon, stored in a refrigerator overnight, and transported in a cooled container to the Cairns Regional Council (CRC) Laboratory the following morning – consistent with the laboratory’s requirement for samples to be delivered within 24 hours of collection. The laboratory provided results of their analyses within 10 days of receipt of the water samples.



¹ See Acknowledgements section for names of experts consulted

The selected water quality attributes and their potential health and ecological implications are summarised in the table below:

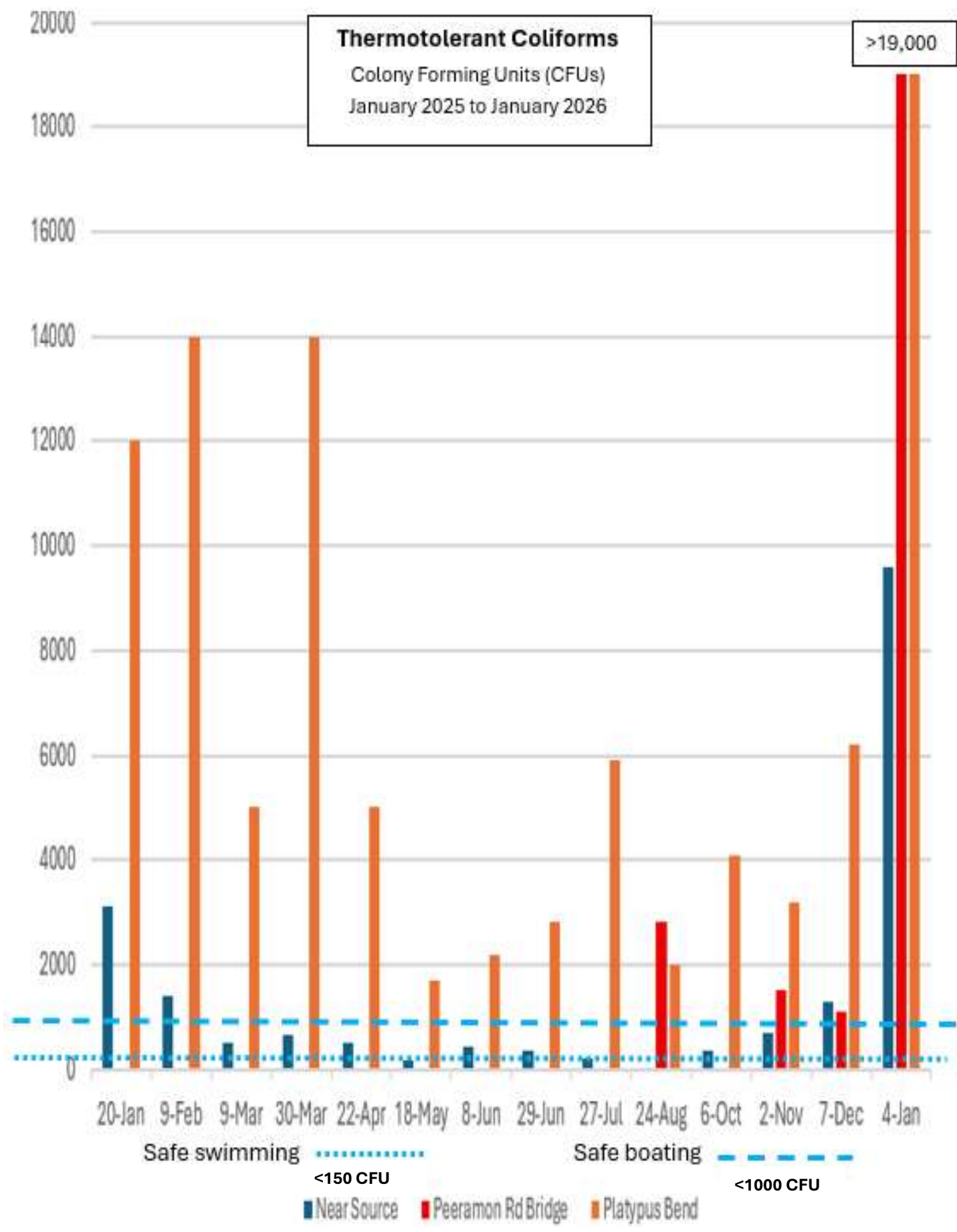
Water Quality Attributes	Potential Health and Ecological Implications
Thermotolerant Coliforms	Indicates potential faecal contamination and presence of pathogenic bacteria; used for assessing water safety for recreation and human contact.
Enterococci	Similar to coliforms; indicates faecal contamination, especially relevant for assessing risks to human health at recreational sites.
Total Suspended Solids	Measures particulate matter; affects water clarity, sedimentation, and habitat quality; elevated levels can indicate erosion or runoff.
Turbidity	Assesses water clarity; high turbidity can reduce light penetration, affect aquatic life, and may carry pollutants.
pH	Measures acidity or alkalinity; influences chemical behaviour of pollutants and biological activity; deviations may harm aquatic life.
Electrical Conductance	Indicates total dissolved salts and mineral content; high conductance can suggest pollution or mineral runoff.
Total Phosphorus	Key nutrient; excess can lead to eutrophication, algal blooms, and oxygen depletion, impacting aquatic ecosystems.
Total Nitrogen	Correlated with nutrient levels; elevated nitrogen can cause eutrophication and algal proliferation.
Ammonia	Toxic at high concentrations; indicates organic pollution and nitrogen cycling; important for assessing water toxicity.
Total Oxidised Nitrogen	Reflects nitrate, nitrite, and other oxidized nitrogen forms; vital for understanding nitrogen dynamics and pollution sources.
Ortho Phosphate	Easily measurable form of phosphate; excess promotes algal growth and eutrophication.
Nitrate	A form of oxidized nitrogen; high levels can cause health issues and contribute to eutrophication.
Nitrite	A reduced form of nitrogen; can be toxic at high levels and indicates ongoing nitrogen cycling or pollution.
Chlorophyll-a	Proxy for phytoplankton (algae) biomass; used as an indicator of trophic status (nutrient enrichment) in aquatic ecosystems.

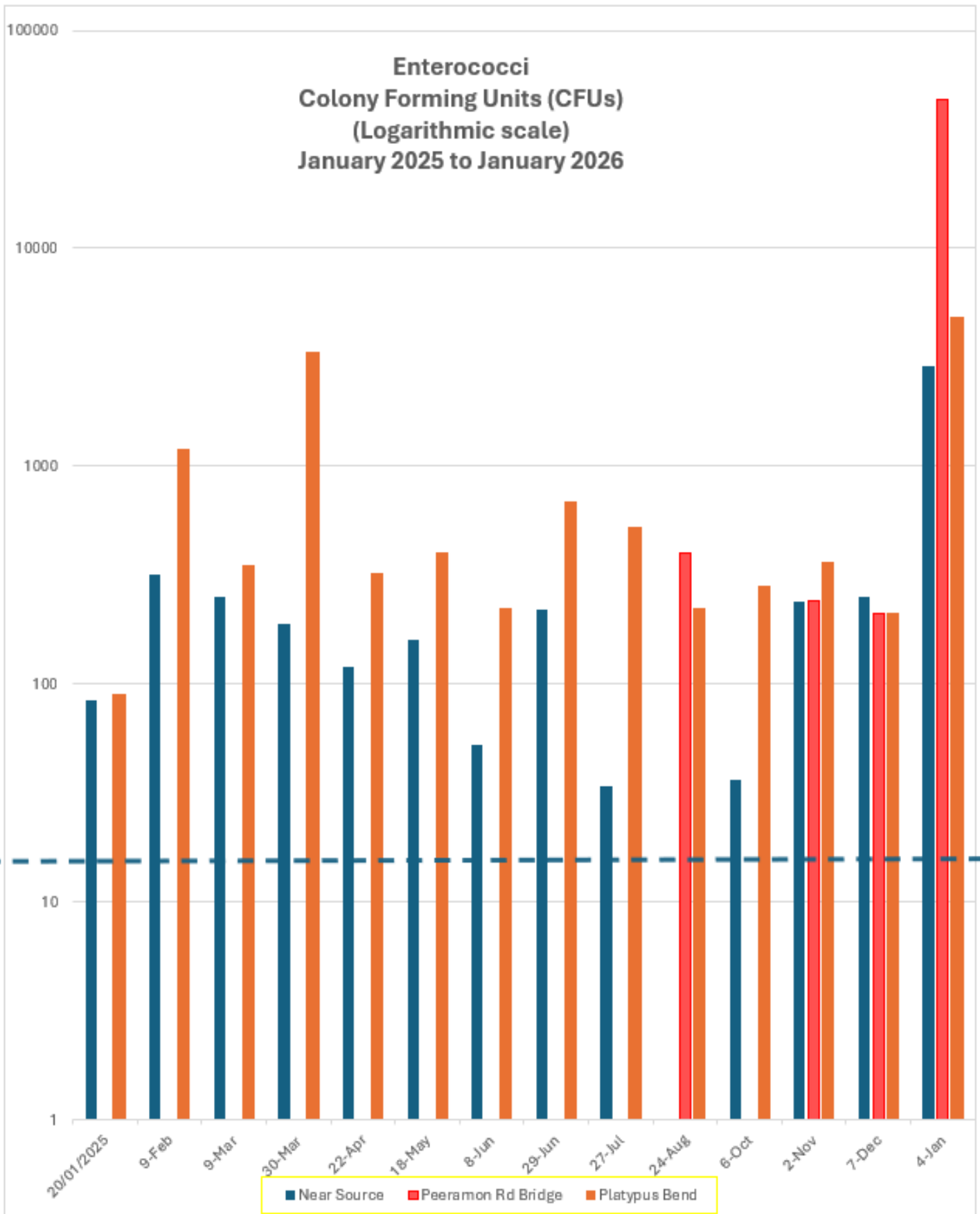
From August 2025 to January 2026 the water sampling regime was modified due to reduced funding during this period, and to enable the additional site adjacent to the Peeramon Road Bridge to be sampled and tested. During these months, the following water quality attributes were tested: Thermotolerant coliforms, Enterococci, Total Suspended Solids, Turbidity, Total Phosphorus and Total Nitrogen. The Platypus Bend site was sampled and tested monthly, while the Near Source and Bridge sites were sampled and tested every second month.

Water Quality Analyses

Results of the Peterson Creek water quality analyses are presented as bar graphs and tables in the pages below. The charts include relevant Water Quality Objectives (WQOs) relevant to each attribute, based on information provided in the Queensland Government's Barron River Basin policy document (State of Queensland, 2020).

For Thermotolerant Coliforms and Enterococci, the WQOs are threshold guidelines focused on recreational use of waterways set by the National Health and Medical Research Council (NHMRC, 2008). The WQOs for the other attributes are expressed as percentile thresholds that consider variability in water flow and condition throughout the year in the Wet Tropics Region. The 80% threshold means that 80% of measured concentrations should be below this threshold over the year.

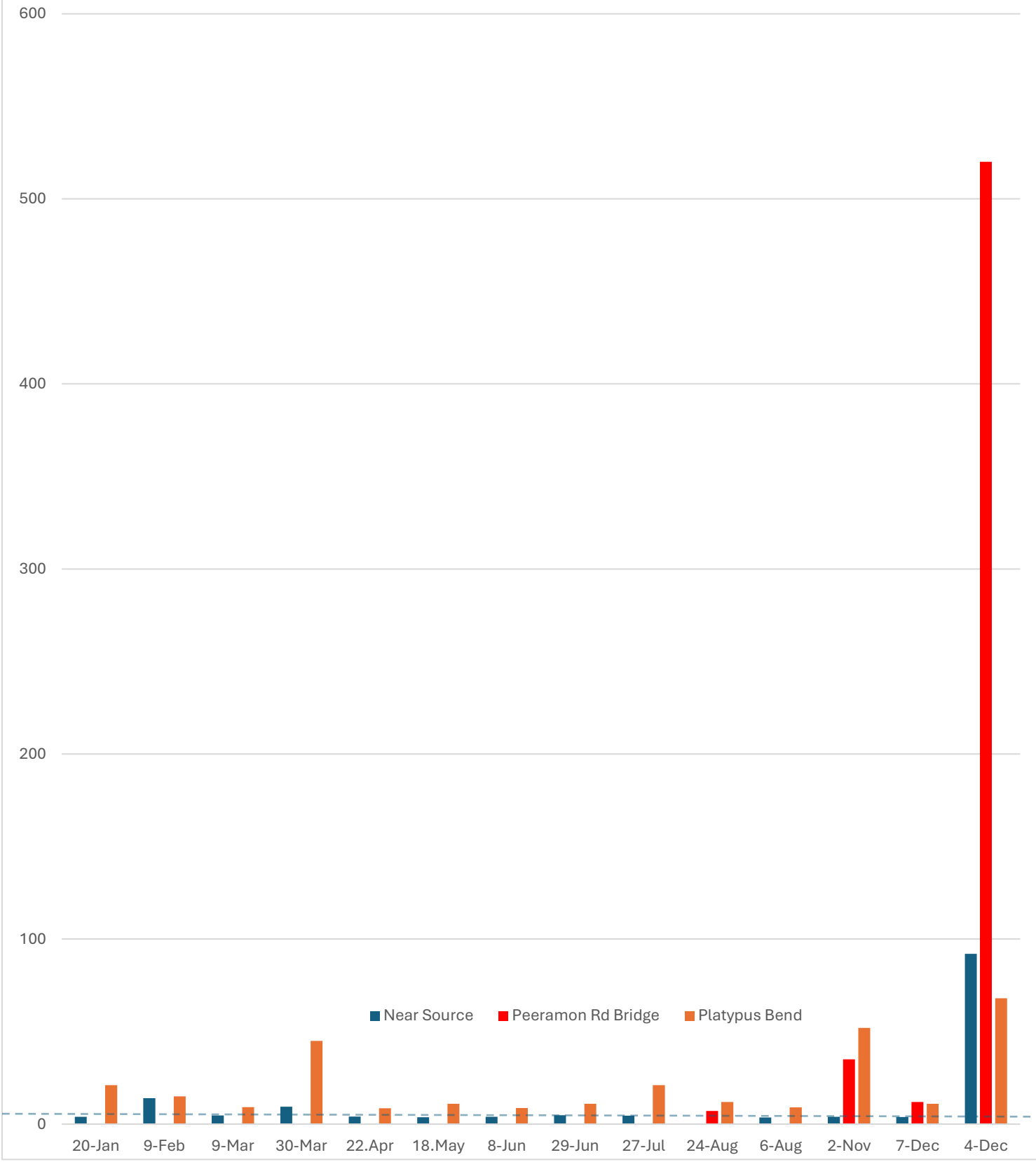




Safe swimming and boating <40 CFU - - - - -

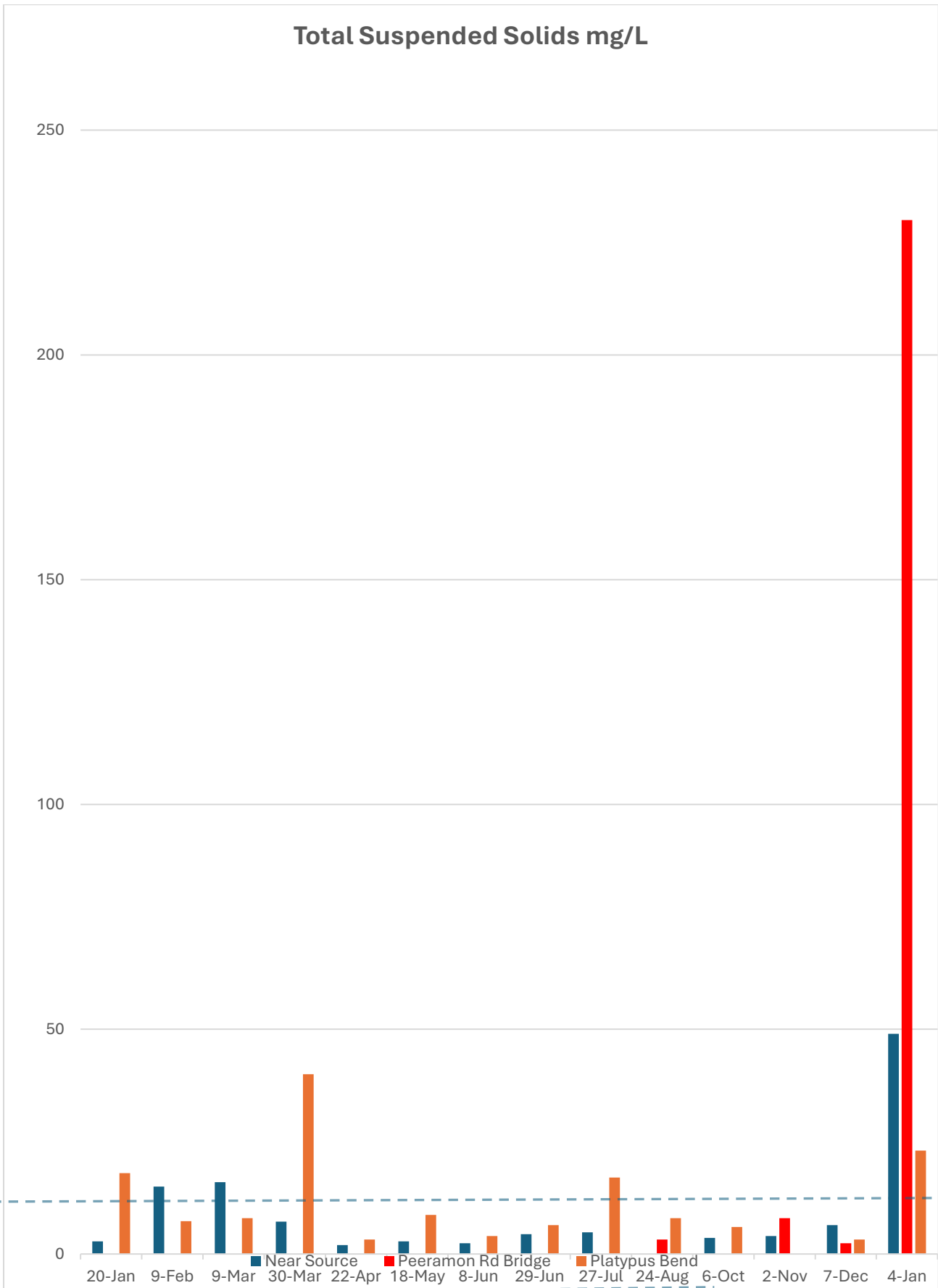
Turbidity

Nephelometric Turbidity Units (NTUs)

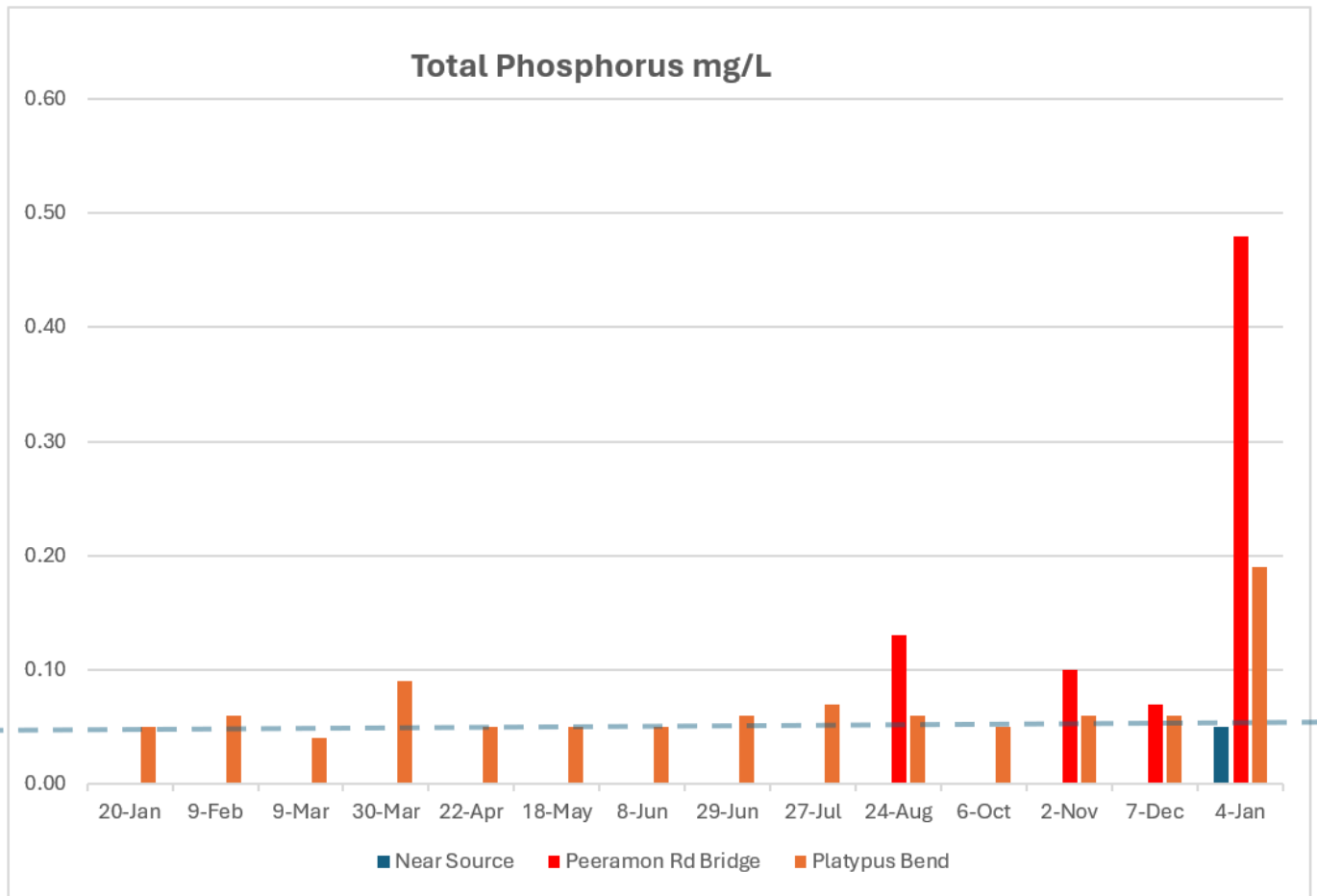


80% WQO

Total Suspended Solids mg/L



80% WQO - - - - -

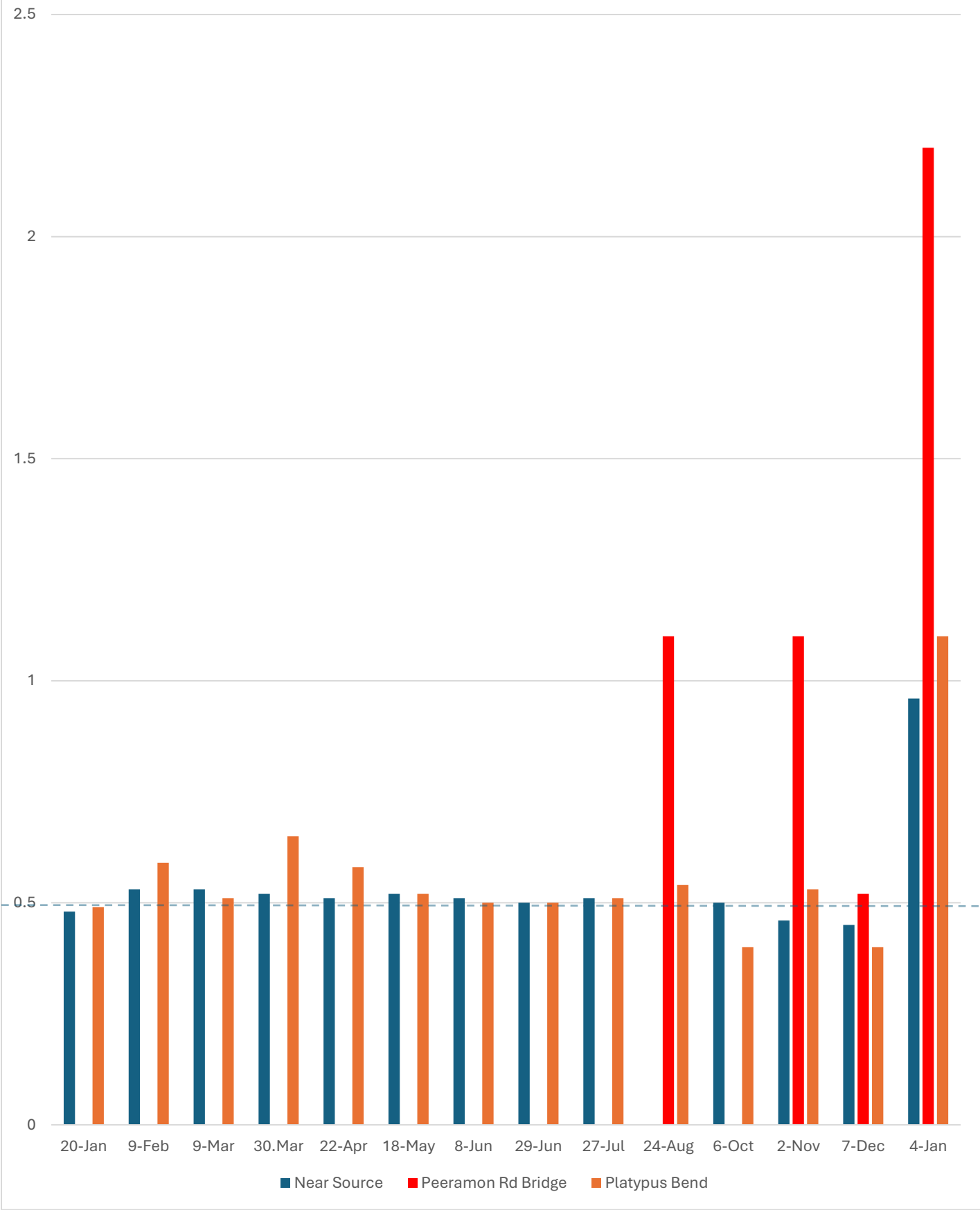


80% WQO ————

Note:

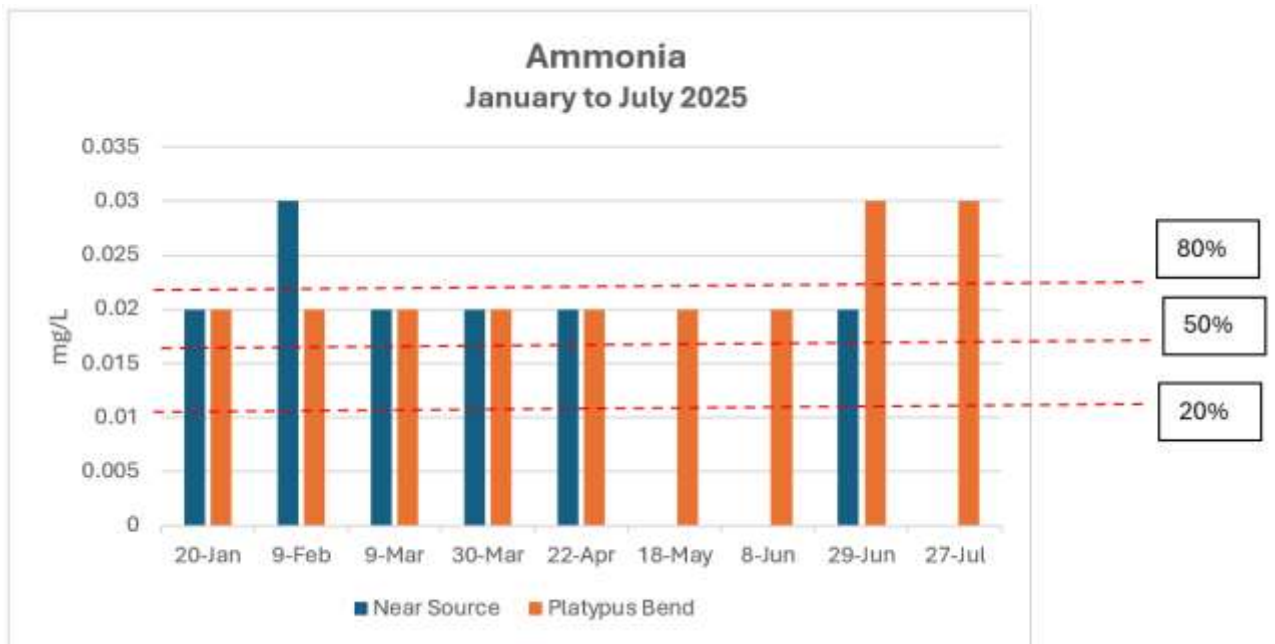
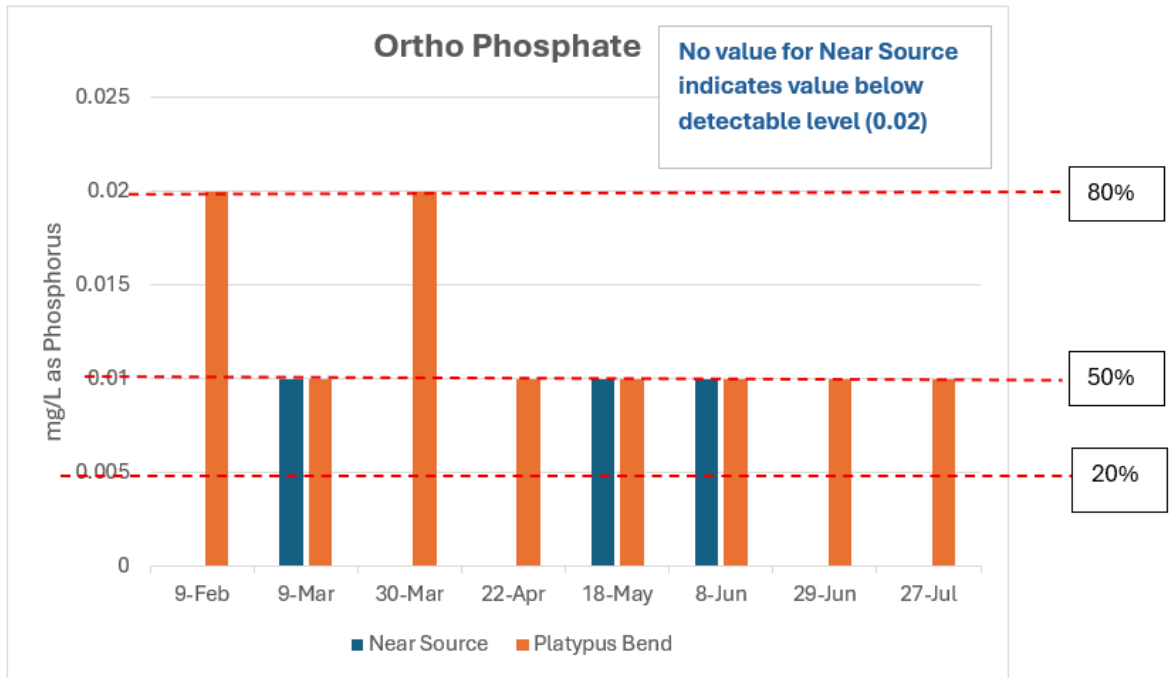
- Concentration of phosphorus was undetectable at the Near Source site except on 4 Jan 2026
- Pearamon Rd Bridge site was only sample four times

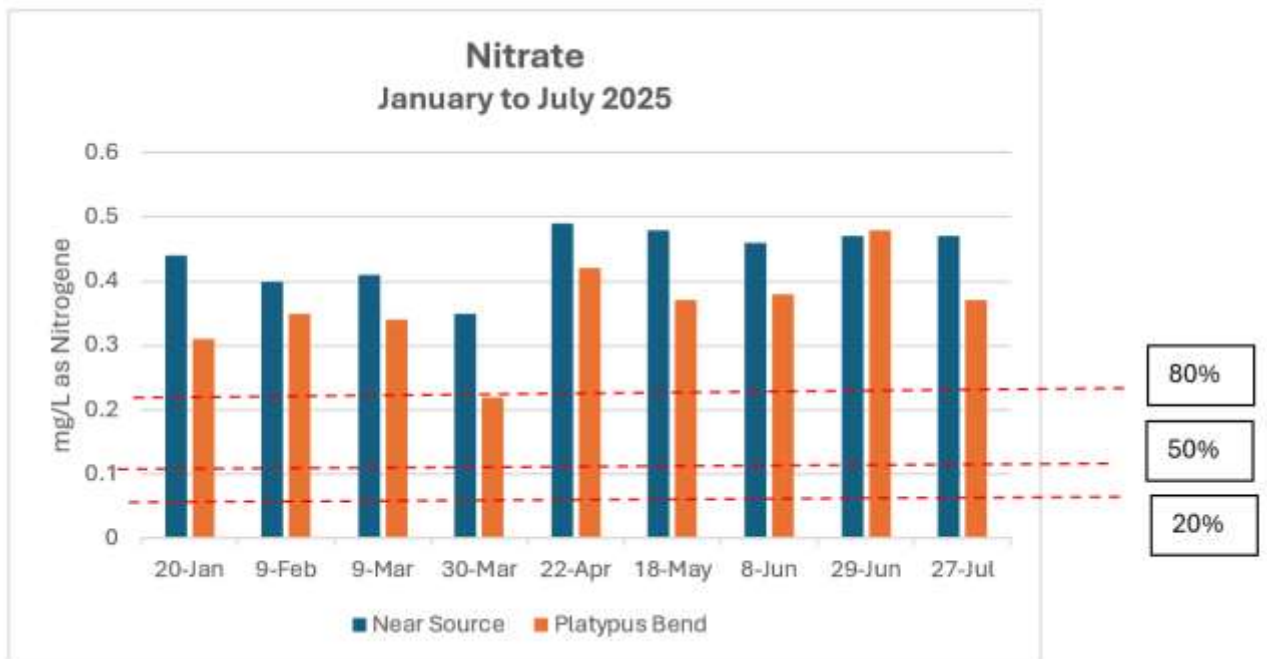
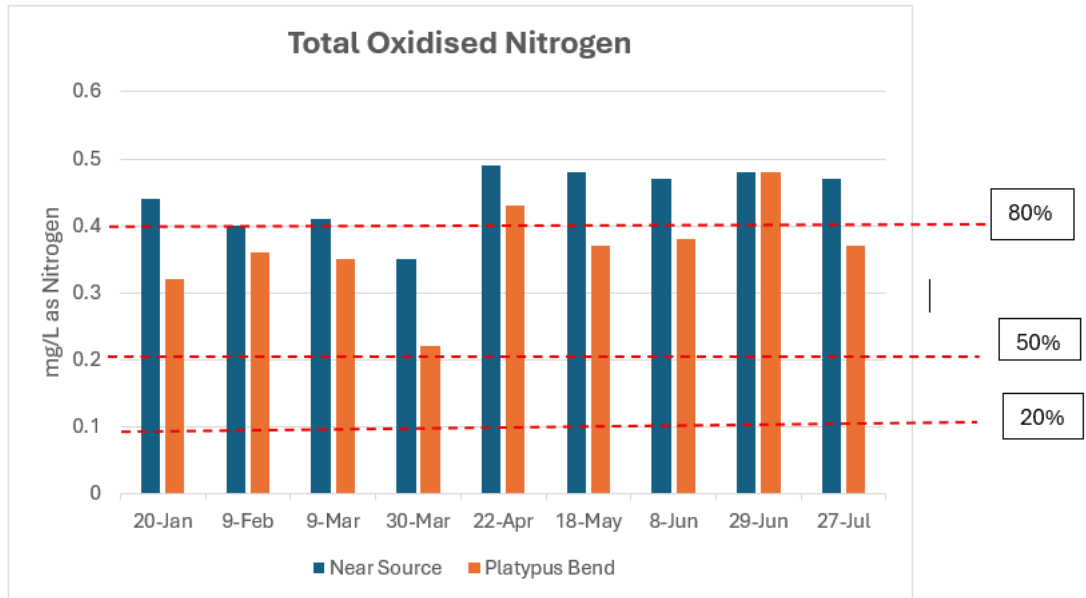
Total Nitrogen mg/L



80% WQO

Note: Peramon Rd Bridge site was only sampled on four occasions.





Nitrite (mg/L as Nitrogen)									
Collection	20-Jan	9-Feb	9-Mar	30-Mar	22-Apr	18-May	8-Jun	29-Jun	27-Jul
Near Source	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
Platypus B	0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.01	<0.01

Values are too low or indeterminate to create a bar chart

Chlorophyll-a (µg/L)

Collection	20-Jan	9-Feb	9-Mar	30-Mar	23-Apr	18-May	8-Jun	30-Jun
Near Source	<1	<1	<2	<2	<2	<2	<2	<2
Platypus Bend	5.6	<1	<2	<2	<2	<2	<2	<2

Values are too low or indeterminate to create a bar chart

Discussion of Water Quality Data

Thermotolerant Coliforms and Enterococci

While the concentrations of these faecal bacteria at the Near Source site exceeded the Australian Health and Medical Research Council (NHMRC) WQOs for recreational use to some extent in some samples, the faecal bacterial concentration at Platypus Bend and at the Pearamon Road Bridge far exceeded these WQOs (NHMRC, 2008) throughout the 13-month sampling period.

In February and March 2025, the concentration of coliforms at Platypus Bend (14,000 CFU) was over 90 times greater than the NHMRC threshold guideline for safe swimming and 14 times greater than the NHMRC threshold for safe boating. In January 2026, the concentrations of coliforms (>19,000 CFU²) at the Pearamon Road Bridge and at Platypus Bend are estimated to have been at least 126 times greater than the NHMRC threshold for safe swimming and at least 19 times greater than the NHMRC threshold for safe boating.

In March 2025 the concentration of enterococci was over 80 times the threshold for safe swimming and boating, while in January 2026 the concentration of enterococci was 320 times the NHMRC threshold for safe swimming and boating.

Each of the above exceptionally high faecal bacterial concentrations occurred soon after periods of heavy rain, though NHMRC thresholds for recreational use of the waterway were exceeded throughout the year, including during the so-called Dry Season.

² This estimate is based on the figures provided by the CRC Laboratory (>10,000 CFU) multiplied by a factor based on the minimum proportional differential between coliform and enterococci concentrations in all other data sets provided by the Laboratory. This was necessary because the Laboratory had mistakenly not completed the analysis procedure for the January 2026 water samples to the same degree of accuracy as for all the samples throughout 2025 (personal communication from CRC laboratory microbiologist).

The highest faecal bacterial concentrations, which occurred in January 2026 at the Peeramon Road Bridge and at Platypus Bend, coincided with recent clearing of land previously used for sugar cane farming in preparation for establishing a commercial avocado orchard upstream of the Peeramon Road Bridge. The combination of cleared land and torrential rain resulted in exceedingly turbid, orange-coloured creek water – see photo below.



The coliform concentration of >19,000 CFU in January 2026 after was found in a water sample collected after very heavy rain following upstream clearing of a former cane farm in preparation for establishing a commercial avocado plantation – which may have contributed into extremely high turbidity.

The coliform concentration for this sample is likely to be far higher than 19,000 CFU because the CRC Laboratory mistakenly did not continue testing the water sample to the required dilution level to obtain an absolute coliform count. After discussions with the CRC microbiologist, it is estimated that the true coliform count may have been 100,000 CFU or higher.

We have been advised by the CRC Laboratory that, while specific coliforms and enterococci measured in the water sample analyses may not pose direct health threats to human or animals, they are, however, indicators of a broader range of potentially harmful faecal bacteria in the water.

These data raise significant concerns regarding the potential health risk to YLG volunteers involved in manual removal of aquatic weeds and indicate the need to avoid direct contact with the creek water during these activities. There are similar concerns for recreational users of the creek, including by recreational fishers, swimmers at Frawley's Pool several hundred metres downstream of Platypus Bend, and visitors taking part in commercial kayaking spotlight tours.

High concentrations of coliforms and enterococci may also indicate a risk to aquatic animals which ingest creek water and are potentially exposed to bacterial infections via their eyes or any open wounds.

Total Suspended Solids and Turbidity

As expected, analysis of the water samples revealed elevated levels of suspended solids and turbidity, particularly at the Pearamon Road Bridge and at Platypus Bend after heavy rain. While levels of suspended solids and turbidity were mostly significantly lower at the Near Source site, some samples were equal to, or exceeded, levels at the Pearamon Road Bridge and Platypus Bend – probably the result of localised rain events near the source.

Suspended solids and turbidity were exceptionally high in January 2026, coinciding with the exceptionally high faecal bacterial concentrations.

Potential ecological impacts of elevated suspended solids and turbidity include:

- smothering macroinvertebrates - which are important food for platypus;
- filling interstitial spaces in gravel beds, thereby reducing macroinvertebrate and fish-breeding habitats;
- absorbing more heat than clearer water, thereby raising water temperature;
- reducing dissolved oxygen concentration.

Total Phosphorus

There are several notable features in the charts of phosphorus concentrations:

1. January 2026 is the only sampling month when total phosphorus was detected at the Near Source site. The limit of detectability of the assays at the CRC lab is 0.02 mg/L.
2. By contrast, concentrations of phosphorus at the other two sites were at or near the 80% WQO threshold, except for March 2025 when phosphorus concentrations were 1.8 times higher than the 80% WQO threshold at Platypus bend and in January 2026 when phosphorus concentrations were almost 10 times higher than the 80% threshold at Pearamon Road Bridge and almost four times higher than the 80% threshold at Platypus Bend.
3. These high phosphorus concentrations after heavy rain far exceed the average (0.06 mg/L) and maximum (0.09 mg/L) concentrations found in platypus habitats in Victoria (0.09 mg/L). It is possible that phosphorus concentrations in Peterson Creek are at or near the tolerance levels for platypus, particularly after periods of heavy rain. As a significant nutrient source, high levels of phosphorus may reduce dissolved oxygen concentrations by promoting plant productivity sufficiently to reduce macroinvertebrate populations on which platypus feed (Serena and Pettigrove, 2005).

Total Nitrogen

Unlike phosphorus, high concentrations of nitrogen were present at or above the 80% WQO threshold at all three sampling sites. The March 2025 measurement for Platypus Bend showed a nitrogen concentration 30% higher than the 80th WQO threshold. The January 2026 measurements for Pearamon Road Bridge and Platypus Bend were over four times and two times the 80% threshold levels, respectively.

These data indicate a high level of background nitrogen entering Peterson Creek, probably from Lake Eacham through seepage or springs, and modest or significant increases in nitrogen concentrations further downstream at times of higher rainfall.

pH

pH levels are consistently higher (more alkaline) in the Platypus Bend samples than in the Near Source samples. The elevated pH at Platypus Bend could result from chemicals washing into the creek or may reflect changes in substrate geology as the creek flows downstream (e.g. more calcareous). However, except for March 2025, all the Platypus Bend samples fall below the 50th percentile threshold for pH, indicating the pH levels within the sampling period are unlikely to threaten the environmental values of Peterson Creek.

Electrical Conductance

Electrical conductance measurements in the Platypus Bend samples are significantly and consistently higher than for the Near Source samples. However, electrical conductance measurements for both sites all fall below the 20th percentile threshold, suggesting that this attribute does not indicate a threat to ecological values of the creek.

Ortho Phosphate

As another indicator of phosphorus availability in the water column, ortho phosphate concentration was below detectable levels at Near Source in February, April and 29 June samples, and at or below concentrations found at Platypus Bend in other samples. Ortho phosphate concentrations at Platypus Bend reached the 80th percentile WQO threshold in February and on 30 March.

Ammonia, Total Oxidised Nitrogen, Nitrate and Nitrite

These water quality attributes are alternative indicators of nitrogen availability in the water column. The respective analyses for ammonia, total oxidised nitrogen and nitrate share some characteristics with the Total Nitrogen chart discussed above. Nitrite concentrations at both sampling site were at, or below, the detectable level of 0.01 mg/L.

Ammonia: Relatively high ammonia concentrations occurred at the Near Source and Platypus Bend sites for six of the eight sampling events, with higher concentrations (50% higher than the 80th percentile WQO threshold) for Near Source in February and for Platypus Bend in June. Ammonia concentrations at Near Source were below the 0.02 mg/L detectable level in May and 29 June, indicating a high degree of variability in ammonia concentrations in water entering Peterson Creek on occasions.

Total Oxidised Nitrogen: Concentrations of total oxidised nitrogen approaching or slightly exceeding the 80th percentile WQO threshold occurred throughout the sampling period, with concentrations at Near Source exceeding concentrations at Platypus Bend in several months. The elevated concentrations are only slightly higher than typically found in streams in the Wet Tropics Region (Pearson and Connolly, 2000), with some variability month to month.

Nitrate: Nitrate concentrations were higher at Near Source than at Platypus Bend for all but the 29 June 2025 sample, and every sample at both sites revealed nitrate concentrations higher (up to 1.4 times) than the 80th percentile WQO threshold for this attribute – though only slightly higher than typically found in streams in the Wet Tropics Region (Pearson and Connolly, 2000).

Chlorophyll-a

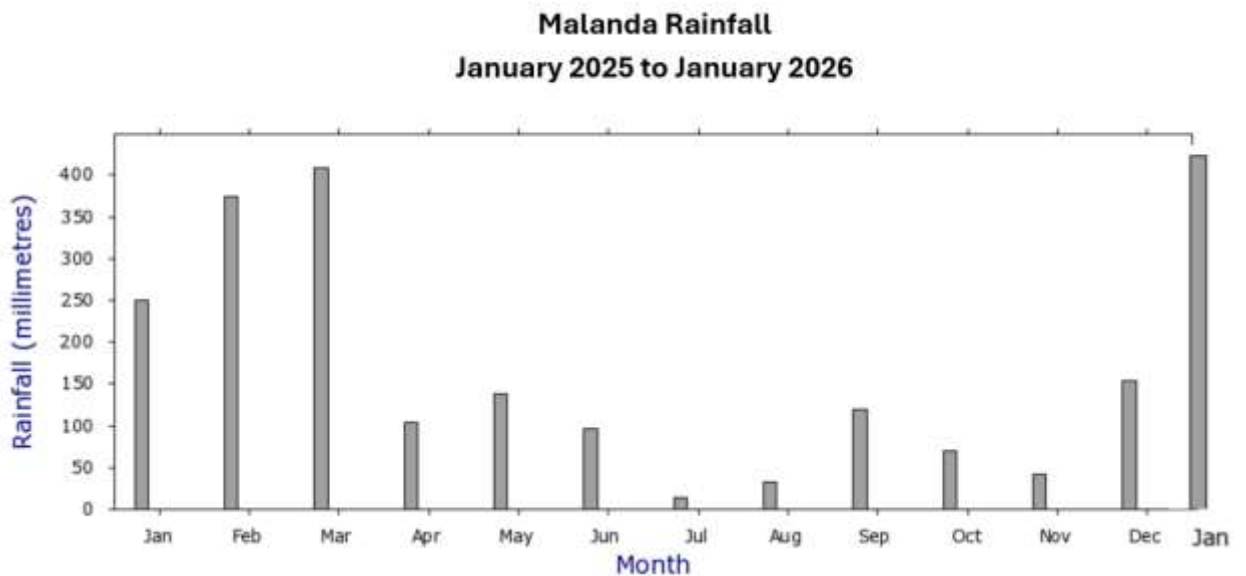
Chlorophyll-a concentration of 5.6 µg/L in January 2025 may indicate a short-term algal bloom or eutrophic event, which would consume nitrate, reduce dissolved oxygen and lower pH (more acidic) – consistent with the January 2025 measurement shown in pH chart. High water

temperatures, reduced flow and relatively low rainfall in January, combined with high nutrient phosphorus levels could explain the short-term eutrophic event. The remaining chlorophyll-a measurements were all $<2 \mu\text{g/L}$, possibly because of low light levels caused by forest cover near the source and turbidity at Platypus Bend.

Water Quality and Rainfall

The graphs below show:

- Monthly rainfall from January 2025 to January 2026 as measured at Malanda, the closest weather station to Peterson Creek (Bureau of Meteorology 2026), 9km from Yungaburra;
- Peterson Creek water levels and stream flow from January 2025 to January 2026, as measured at the Queensland Government water monitoring gauge located at the Old Railway Bridge about 800 metres downstream of Platypus Bend.



01/01/2025 to 01/01/2026

110019B Peterson_Ck Ry Br 100.00

Level (Metres)

2025
AT



Level (Metres) [100.00]

Peterson Creek Water Level January 2025 to January 2026

Water sampling dates: ↑

01/01/2025 to 01/01/2026

110019B Peterson_Ck Ry Br 141.00

Discharge (ML/day)

2025
ATQ



Discharge (ML/day) [141.00]

Peterson Creek Stream Flow January 2025 to January 2026

Water sampling dates: ↑

By comparing these graphs with bar charts of water quality measurements, there appears to be an association between high rainfall, high water levels, increased stream flow and elevated levels of several attributes, including coliforms, enterococci, total suspended solids, turbidity and phosphorus - the highest levels of these attributes occurring at times of highest rainfall, water level and stream flow.

Previous Water Quality Testing of Peterson Creek

Sources of Peterson Creek water quality data from 1999 onwards are listed in the following table and discussed below.

Study Date	Organisation	Study Description
1999	CSIRO	<i>Investigation of Faecal Contamination in Tinaroo Falls Dam Catchment.</i> CSIRO Marine Research Report No.99-BRI
2017/18	TRC	<i>Sewerage Treatment Plant Environmental Impact Monitoring Program: Annual Report 2017-2018 (NRA Consultant's Report)</i>
2019/20	TRC	<i>Peterson Creek Compliance Sampling – Yungaburra Sewerage Treatment Plant Environmental Impact (GDH Consultant's Report)</i>
2023/24	TRC	Sewerage Treatment Plant Environmental Monitoring Program: Annual Monitoring Report July 2023 – June 2024 (NRA Consultant's Report)
2024/2025	TRC	Sewerage Treatment Plant Environmental Monitoring Program: Annual Monitoring Report July 2023 – June 2024 (NRA Consultant's Report)
2024	YLG	Water sampling trial funded by JCU

- ### Investigation of Faecal Contamination in Tinaroo Falls Dam Catchment (R. Leeming, CSIRO Marine Research 1999)

This CSIRO report presents analysis of thermotolerant coliforms and faecal sterol biomarkers from water samples collected on four occasions (1 June and 20 October 1998, 2 February and 9 April 1999) from 30 sites on Tinaroo Falls Dam (Lake Tinaroo) and waterways in the Baron River Catchment, including Peterson Creek. Faecal sterols are chemical signatures of faecal contamination that vary depending on the animal source of contamination.

The study found that coliform concentrations ranged between 220 to 590 CFU in the two Peterson Creek sampling sites (at the Old Railway Bridge downstream of Yungaburra and at the Yungaburra/Atherton Road Bridge). These concentrations exceed the NHMRC threshold for safe swimming (150CFU) but are below the NHMRC threshold for safe boating. The report concluded that only 2% of coliform contamination could be attributed to cattle with the rest coming for “diffuse sources” including birds and humans.

Coliform concentrations in Peterson Creek reported by CSIRO are significantly lower than concentrations reported in subsequent studies.

Interpretation of these results by CSIRO needs to take account of the relatively low flow rate in Peterson Creek as measured by the gauge at the Old Railway Bridge (Queensland Government 2026) when all four water samples were taken.

- **Sewage Treatment Plant Environmental Impact Monitoring Program: Annual Report 2017-2018** (Report to TRC by consultant NRA)

This report was provided to YLG in February 2026, over 12 months after YLG’s request for information relating to water quality testing in Peterson Creek.

The report presents the results of water quality testing relating to TRC’s compliance obligations for each of their STPs in the Tablelands Region over the period July 2017 to June 2018. Water sampling and testing of Peterson Creek is included in this compliance regime because TRC holds a permit to release effluent from the Yungaburra STP, though has not released effluent into the creek for at least 10 years.

TRC’s consultant obtained water samples at two sites on Peterson Creek in December 2017: about 400 metres downstream of Platypus Bend and a further 250 metres downstream adjacent to the Old Railway Bridge. These sites were selected to be respectively upstream (Yun-US1 Control) and downstream (Yun-DS1 Receiving) of the nominal STP release point, even though no effluent releases occurred

The table below shows that concentrations of phosphorous, faecal coliforms and faecal enterococci were all above the water quality guideline thresholds for Peterson Creek at that time, though considerably lower than documented by YLG in the current project – probably reflective of the low/zero rainfall conditions at the time of sampling in December 2017.

Water Quality Analyte	Units	WQO/SQGV ¹	Yun-US1 Control	Yun-DS1 Receiving
Dissolved oxygen	% saturation	85-120 ^a	62.5	78.9
Ammonia as nitrogen	µg/L	10 ^a	15	14
Total oxidised nitrogen	µg/L	50 ^a	70	130
Total phosphorous	µg/L	25 ^a	40	40
Filterable reactive phosphorous	µg/L	8 ^a	6	13
Filtered iron	µg/L	300 ^b	555	534
Total iron	µg/L	200 ^c	1210	1180
Faecal coliforms	CFU/100 mL	10 ^c	430	450
Intestinal enterococci	CFU/100 mL	40 ^d	170	130
Chlorophyll a	µg/L	1.5 ^a	1.0	3.5
Sediment Quality Analyte (<2mm fraction)				
Chromium	mg/kg	80	87.6	93.0
Nickel	mg/kg	21	53.0	52.7

Values **bold** were outside of the acceptable range for the relevant WQO. Values **bold and underlined** were receiving sites that were outside of the acceptable range for the relevant WQO and were elevated compared with control sites.

¹ Yungaburra STP receiving environment classed as ‘moderately disturbed’ for the purposes of WQOs (NRA 2017a, EHP 2014b). SQGVs were adopted from default screening level SQGVs (Simpson *et al.* 2013).

² Region-specific guideline value for the protection of moderately disturbed aquatic ecosystems (EHP 2014b).

³ Default guideline value for the protection of aquatic ecosystems (ANZECC & ARMCANZ 2000).

⁴ Default guideline value for irrigation and farm general water use (ANZECC & ARMCANZ 2000).

⁵ Region-specific guideline value for primary recreation (EHP 2014b).

- **TRC 2019/2020 Consultant’s Report** (Report to TRC by consultant GDH). This report by GHD Pty Ltd, was commissioned by TRC to undertake monthly water quality monitoring of the same two sites monitored in December 2017; it was provided to YLG by TRC in June 2025. The study also included macroinvertebrate and stream sediment sampling in November 2019 and June 2020, both during periods of low rainfall. The water quality attributes tested in this study are shown in the table below.

Physicochemical parameters	Total suspended solids (TSS)
Major ions	Free residual chlorine, total residual chlorine, chloride, sodium
Metals (dissolved and total)	Aluminium, boron, cadmium, chromium, copper, iron, lead, mercury, nickel, zinc
Nutrients	Ammonia, nitrate, nitrite (NO ₂), Total Oxidisable Nitrogen (NO _x), total Kjeldahl nitrogen (TKN), total nitrogen (TN), total phosphorus (TP), reactive phosphorus (RP).
Algal	Cyanophytes (Blue Green Algae), Chlorophyll-a,
Bacteriological	Faecal coliforms, E. coli, Enterococci

Concentrations of all the measured attributes exceeded the WQOs³ used in the GDH study for all or some of the sampling period. Comparisons of key attributes with our current study are summarised below:

- Faecal bacteria concentrations (coliforms and enterococci) in the GDH study exceeded WQOs in every monthly sample, with the maximum concentrations occurring in May and July, in contrast to the maximum concentrations occurring January, February and March in the YLC project. The GDH study measured faecal bacteria as MPNs (Most Probable Numbers), in comparison to CFUs (Colony Forming Units) in our study, so the raw data from the two studies are not directly comparable – though comparison of the monthly variation within each study is valid. MPNs are a statistical estimate of bacterial concentration that can be measured in the field, whereas CFUs are an actual bacterial count undertaken in a laboratory. Both are regarded as legitimate methods of measuring bacterial concentration in freshwater.
- Peak phosphorus concentrations occurred from January to March, reaching a maximum of 0.15 mg/L, significantly higher than the concentration in most samples tested in our study, and similar to the phosphorus concentration we found in January 2026.
- Maximum Total Suspended Solids occurred in January, reaching almost 100 mg/L, less than half the concentration measured in January 2026 during our study.
- The GDH study did not measure turbidity.
- The GDH study provided information on the diversity of macroinvertebrates in Peterson Creek water and substrate, including a comparison between the two sampling sites. However, no macroinvertebrate sampling occurred during periods of high sediment load during and after significant rain events.

Of the WQO “exceedances” referred to in the GDH study, the consultant considered dissolved aluminium to be the most likely to have an ecotoxic effect on aquatic species and suggested that the elevated dissolved aluminium may be caused by natural geological influences or impacts from land use practices further upstream in the catchment, such as runoff from Yungaburra town. However, a James Cook University study of water quality and macroinvertebrates in pristine Wet Tropics streams (Pearson *et al.* 2017) reported that elevated levels of dissolved metals were not implicated in any effects on the biota.

³ WQOs used in the GDH study were based on national and regional guidelines that have since been updated in the State of Queensland (2020) policy document used in our current study.

- **Sewage Treatment Plant Environmental Impact Monitoring Program: Annual Report 2023-2024** (Report to TRC by consultant NRA)

TRC’s consultant NRA analysed monthly water samples collected from the same two sites as in 2017/2018 (the Old Railway Bridge and 250 metres upstream). This NRA study also measured faecal bacteria as MPN/100mL, so direct comparison with faecal bacteria concentrations found in our study is problematic. However, the table below shows that the faecal coliform concentrations at both Peterson Creek sampling sites far exceeded the WQO of 10 MPN/100mL for this criterion in every month. The extent of exceedance varied between 18 times the WQO in November 2023 to 1,300 times the WQO in January 2024.

Sampling date	Faecal coliform concentration Upstream site MPN/100mL	Faecal coliform concentration Downstream site MPN/100mL
17 June 2023	1,100	1,100
14 August 2023	690	820
14 September 2023	740	540
10 October 2023	280	280
13 November 2023	200	180
11 December 2023	230	230
15 January 2023	9,200	13,000
12 February 2024	330	340
18 March 2024	>2,400	>2,400
22 April 2024	980	770
20 May 2024	610	730
17 June 2024	1,700	1,600

Coliform WQO < 10 MPN

- **Sewage Treatment Plant Environmental Impact Monitoring Program: Annual Report 2024-2025** (Report to TRC by consultant NRA)

TRC’s consultant analysed monthly Peterson Creek water samples collected near the Old Railway Bridge and 250 metres upstream from July 2024 to June 2025. As in the 2023-2024 TRC report, this study measured faecal bacteria as MPN/100. However, the table below shows that the faecal coliform concentrations at the Old Railway Bridge exceeded the WQO of 10 MPN/100mL for this criterion in every month. The extent of exceedance varied between 77 times the WQO in October 2024 and June 2025 to 440 times the WQO in December 2024 and March 2025. The faecal concentration of samples collected 250 metres upstream from the Old Railway Bridge are not provided in the TRC report.

Sampling date	Faecal coliform concentration Old Railway Bridge MPN/100mL
15 July 2024	1,700
13 August 2024	1,700
26 September 2024	870
22 October 2024	770
25 November 2024	1,200
16 December 2024	4,400
20 January 2025	1,700
17 February 2025	1,800
17 March 2025	4,400
14 April 2025	820
19 May 2025	2,600
16 June 2025	770

Coliform WQO < 10 MPN

- **YLG Water Quality Analysis, September 2024**

In September 2024, YLG volunteers collected water samples from three sites along Peterson Creek (Near Source, Platypus Bend, and the Peeramom Road Bridge midway between Lake Eacham and Yungaburra). With financial assistance provided by James Cook University’s College of Science and Engineering, these samples were analysed for many of the attributes measured in the current YLG study, though not including coliforms, enterococci, turbidity or chlorophyl-a.

These measurements were similar to the attribute concentrations obtained in the current YLG study during periods of low rainfall. Of note, however, is the phosphorus concentration of 0.05 mg/L at the midway site, suggesting that elevated phosphorus levels commence upstream of that site. This observation could assist in determining the source of elevated phosphorus in future water quality testing projects.

Comparison with other Tablelands waterways

A review of TRC’s Annual STP Monitoring Reports reveals that the challenges faced by Peterson Creek with respect to faecal bacterial contamination are shared by other waterways on the Tablelands.

The table below shows the range of faecal coliform concentrations found in several other Tablelands waterways, as reported in TRC’s 2024-2025 Annual STP Monitoring Report.

Waterway	Faecal coliform concentration
Mazlin Creek (near Atherton)	220 - 570 MPN
The Millstream (near Ravenshoe)	160 - 2,500 MPN
Nth Johnstone River (near Malanda)	190 -6,900 MPN

Coliform WQO
 < 10 MPN

With a target WQO of <10 MPN, these waterways were experiencing exceedances of between 16 and 690 times the target threshold for faecal coliform concentrations during 2024/2025.

Conclusions

Recognising that this study of water quality in Peterson creek was limited to two sampling sites from January to July 2025 and three sites from August 2025 to January 2026 (testing for a reduced suite of water quality criteria during the second sampling period due to funding constraints), YLG has drawn the following conclusions for consideration by our community, government and non-government partners to provide guidance for the better management of the waterway, its environmental values and its biodiversity, including platypus:

1. **Very high faecal bacteria concentrations**

Very high concentrations of thermotolerant coliforms and enterococci, far exceeding National Health and Medical Research Council guidelines for safe swimming and boating, were found in Peterson Creek throughout both sampling periods, and especially during periods of high rainfall.

2. **Consistent with previous water quality studies**

These observations confirm similar findings to previous Peterson Creek water quality studies undertaken since 1999, though the concentrations of thermotolerant coliforms and enterococci found in January 2026 are significantly higher than in previous studies, notwithstanding necessary caution in comparing data obtained under varying climatic conditions.

3. **Health and safety concerns**

These high concentrations of faecal bacteria in Peterson Creek raise health and safety concerns for YLG's volunteers engaged in manual removal of aquatic weeds from the creek, and for other people interacting with creek water, including recreational fishers and participants in commercial kayaking tours.

4. **Potential impact on environmental values**

High faecal bacterial concentrations may also impact other identified environmental values of Peterson Creek, including cultural and spiritual values, aquatic ecosystems, irrigation, farm supply, stock watering and human consumption.

5. **High levels of turbidity**

High levels of turbidity, which at Platypus Bend exceeded the 80th percentile WQO threshold for every sampling event and especially during periods of high rainfall, potentially impact macroinvertebrate habitats and populations, which in turn may limit availability of food for platypus and other aquatic fauna.

6. **Elevation of total suspended solids**

Elevation of total suspended solids, especially associated with high rainfall events, may also impact normal ecological function, including viability of macroinvertebrate populations.

7. **Elevated concentration of phosphorus**

Elevated levels of phosphorus at the Pearamon Road Bridge and at Platypus Bend throughout the 13 month sampling period, especially associated with high rainfall events, and in stark contrast to the mostly negligible concentrations at the Near Source site, may be close to, or exceed, phosphorus concentrations compatible with a viable platypus habitat – based on platypus and water quality surveys undertaken in Victoria. High levels of phosphorus (a known nutrient for plant growth) may also be associated

with infestations of aquatic weeds, including Amazonian frogbit. This finding suggests the need for undertaking precautionary measures to reduce phosphorus from entering Peterson Creek, while seeking to better understand the impact of high concentrations of phosphorus on platypus habitats.

8. Access to TRC Water Quality Data

The challenges faced by YLG to obtain previous Peterson Creek water quality data from TRC indicates a current lack of transparency in managing and communicating this information. This situation may have developed because the data is collected by TRC consultants and officers responsible for meeting compliance requirements for the operation of the various sewage treatment plants on the Tablelands, including Yungaburra STP, rather than for monitoring the water quality and ecological condition of Peterson Creek itself. The result is that, although the STP compliance data have revealed for many years that water quality in Peterson Creek (and other Tablelands waterways) is not meeting national and regional water quality objectives for cultural values, ecological values, aesthetic values, recreational values, irrigation, stock watering etc., few measures have been taken within and beyond TRC to communicate and remediate the poor condition of our waterways. We recognise, however, that TRC has supported this project and is collaborating in current efforts to improve water quality in the Peterson Creek catchment, and we recommend that TRC makes better use of its STP compliance data to communicate water quality in Tablelands creeks and rivers in the future.

9. State Government responsibilities

Queensland Environment Department has identified Environmental Values and Water Quality Objectives for all the waterways of the Barron River Basin, including Peterson Creek; these environmental values are explicitly mentioned in the STP compliance reports. The Queensland Government apparently expects TRC to monitor and achieve these Environmental Values and WQOs, while providing no practical support - other than occasional competitive grants to community groups. This appears to be a major failure of environmental governance in Queensland.

What's Next?

Following the release of the previous edition of this report in August 2025, YLG adopted personal protection initiatives to reduce risks to volunteers removing aquatic weeds from the Creek and installed warning signs at two popular platypus-view sites along Peterson Creek – Platypus Bend and Frawley's Pool. TRC subsequently installed warning signs at popular waterway swimming sites elsewhere on the Tablelands.



This report has been shared with our government, non-government and community partners and made available on the YLG's website (www.petersoncreek.org.au) along with our Strategic Plan 2025 to 2030.

In January 2026 YLG and BCC co-convened a workshop involving 25 representatives of local government, commercial, research and community organisations to consider measures to address the Peterson Creek water quality issues raised in this report. A key outcome of the workshop is the establishment of a Working Group convened by BCC to develop and implement a plan of action in collaboration with landholders in the Peterson Creek catchment. We hope that lessons learned and measures taken to improve water quality in Peterson Creek can also be applied to other catchments on the Tablelands.

References

- BOM 2025. *Daily rainfall graph, January to July 2025*. [Daily Rainfall graph - 031183 - Bureau of Meteorology](#). Accessed 28 July 2025.
- GDH 2020. *TRC Compliance Sampling 2019/2020. Yungaburra STP EIMP Report 2019/2020*. Report to Tablelands Regional Council.
- Leaming, R. *Investigation of Faecal Contamination in Tinaroo Falls Dam Catchment*. CSIRO Marine Research Report No.99-BRI
- NHMRC 2008. *Guidelines for Managing Risks in Recreational Water*. National Health and Medical Research Council, Canberra.
- NRA Consultants. 2019. *Sewage Treatment Plant Environmental Impact Monitoring Program: Annual Report 2017-2018*. Report to Tablelands Regional Council, Atherton.
- NRA Consultants 2024. *Sewage Treatment Plant Environmental Impact Monitoring Program: Annual Report 2023*. Report to Tablelands Regional Council, Atherton.
- NRA Consultants 2025. *Sewage Treatment Plant Environmental Impact Monitoring Program: Annual Report 2024-2025*. Report to Tablelands Regional Council, Atherton.
- Pearson, R. G. and Connolly, N. M. 2000. Nutrient enhancement, food quality and community dynamics in a tropical rainforest stream. *Freshwater Biology*, 43(1), 31–42.
- Pearson, R. G., Connolly, N. M., & Boyero, L. 2015. Ecology of streams in a biogeographic isolate—the Queensland Wet Tropics, Australia. *Freshwater Science*, 34(4), 797–819.
- Queensland Government Water Monitoring Portal https://water-monitoring.information.qld.gov.au/host.htm?ppbm=110019B&rs&1&rslf_org, accessed 19 March 2026.
- Serena, M. & Pettigrove, V. 2005. Relationship of sediment toxicants and water quality to the distribution of platypus populations in urban streams. *Journal of the North American Benthological Society*, 24(3), 679–689.
- State of Queensland 2020. *Barron River Basin Environmental Values and Water Quality Objectives Basin and adjacent coastal waters*. Environmental Protection (Water and Wetland Biodiversity) Policy 2019, prepared by Environmental Policy and Planning Division, Queensland Department of Environment and Science.