

**Upper Mary River Catchment & Kenilworth District
Waterwatch Report
2013 – 2016**



Upper Mary River, Crystal Waters, October 2016

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MRCCC Catchment Officers, April 2017 version:2

This report prepared with the assistance of the Sunshine Coast Council Partnership Program

Introduction

Hello to the Upper Mary River Catchment and Kenilworth District Waterwatch network volunteers.

Some of the original volunteers of the Upper Mary River Catchment and Kenilworth District Waterwatch networks have now collected over 100 water quality samples from their sites which earn those volunteers a gold medal for their Waterwatching century! Without this committed volunteer effort we would not have access to this valuable water quality information that we have today.

The past 3 years has seen the boom-bust weather cycle continue. Following the record breaking floods of early 2013, the entire catchment experienced a severe summer drought in early 2014. Some long-term locals believe the last summer drought occurred in the 1950's. This drought broke in late May 2014, which placed enormous pressure on rural communities through the rest of 2014 as pasture reserves were very low, coupled with shocking cattle prices. Then in February 2015 Cyclone Marcia came through following an unusual path along the Great Dividing Range (from a trajectory of Yeppoon to Monto to Upper Kandanga in the Mary River Catchment) providing some welcome relief and flash flooding in the Mary Valley. In May 2015, a few extraordinarily severe storm cells hit the catchment (and in Brisbane) creating havoc. This was followed by an early break in Spring with decent rain which set things up nicely for late 2015, early 2016 – although it forgot to rain again until almost June 2016. A decent start to the 2016 Spring, with unusually good falls in August, then led to virtually non-existent rain over Summer until ex Tropical Cyclone Debbie arrived in March 2017.

Only data from currently active sites are included in this report, which presents the long term data for each site and an indication of change over the past 3 years from June 2013 to June 2016. This report covers the geographical area of the Sunshine Coast hinterland contained within the Mary River Catchment – consisting of the Upper Mary Catchment (containing the Maleny Plateau, Blackall Range, Conondale and Obi Obi districts), Kenilworth to Belli Park.

There is now enough long-term data from many sites within these networks to draw some statistically valid conclusions about differences in general physical and chemical characteristics of water quality between a number of sub-catchments in the Upper Mary Catchment and Kenilworth District.

The Upper Mary Catchment report card scores have indicated that 10 of the 16 sites have maintained a score of A over the past three years. New Upper Mary Catchment Waterwatch sites received either A or B scores and new Kenilworth District Waterwatch sites received C scores, further data collection is required for all new Waterwatch sites. In the Kenilworth District Waterwatch network, all Mary River sites received A scores. Electrical conductivity (salinity) compliance was excellent for most Upper Mary Catchment sites during this reporting period. Please keep recording any noticeable plants (weeds or new plants) and animal sightings (eg. turtles) observations on datasheets. Even if you do not know what these are, please note it down and take photographs if possible.



Waterwatch sites monitored in the Upper Mary River Catchment and Kenilworth District Waterwatch Networks

Upper Mary River Catchment Waterwatch Network			
Site Code	Creek Name	Location	Water Type
BAL500	Balgowlah Creek	Broken Bridge Road, Balgowlah Creek	Southern Upland Waters (>150m)
BOO750	Booloumba Creek	Upstream of campgrounds	Southern Lowland Waters (<150m)
BOO800	Booloumba Creek	Downstream of campgrounds	Southern Lowland Waters (<150m)
BOO830	Booloumba Creek	Downstream of causeways	Southern Lowland Waters (<150m)
CHI800	Chinaman Creek	Cambrook	Southern Lowland Waters (<150m)
LOB990	Lobster Creek	Confluence with Booloumba Creek	Southern Lowland Waters (<150m)
LYC700	Little Yabba Creek	Upstream of campground	Southern Lowland Waters (<150m)
LYC800	Little Yabba Creek	Downstream of campground	Southern Lowland Waters (<150m)
LYC990	Little Yabba Creek	Confluence with Mary River	Southern Lowland Waters (<150m)
MAR020	Mary River	Crystal Waters causeway	Southern Upland Waters (>150m)
MAR120	Mary River	Cambrook	Southern Lowland Waters (<150m)
OBI500	Obi Obi Creek	Upstream of Skene Creek	Southern Lowland Waters (<150m)
SKE010	Skene Creek	Russell Family Park, Montville	Southern Upland Acid Waters
SKE011	Skene Creek	Russell Family Park, middle of lagoon	Southern Upland Acid Waters
SKE900	Skene Creek	Confluence with Obi Obi Creek	Southern Upland Acid Waters
SUB950	Scrub Creek	Kennedy Lane, Upper Mary tributary	Southern Upland Waters (>150m)

Kenilworth District Waterwatch Network			
Site Code	Creek Name	Location	Water Type
BEL200	Belli Creek	Belli Creek Crossing 1, Belli Park	Southern Lowland Waters (<150m)
BEL250	Belli Creek	Belli Creek Crossing 2, Belli Park	Southern Lowland Waters (<150m)
BTR400	Tributary of Belli Creek	Belli Creek, Belli Park	Southern Lowland Waters (<150m)
CED600	Cedar Creek	Murray Rd causeway, Belli Park	Southern Lowland Waters (<150m)
COE500	Coolabine Creek	Hunsley Rd, Coolabine	Southern Lowland Waters (<150m)
COG450	Coonoongibber Creek	Callemonda Rd, Brooloo	Southern Lowland Waters (<150m)
ECO750	East Coolabine Creek	Coolabine	Southern Lowland Waters (<150m)
MAR148	Mary River	Upstream of Walli Ck Rd, Kenilworth	Southern Lowland Waters (<150m)
MAR150	Mary River	Upstream of Walli Ck Rd, Kenilworth	Southern Lowland Waters (<150m)
MAR240	Mary River	Pickering Bridge, Moy Pocket	Southern Lowland Waters (<150m)
MAR290	Mary River	Old Moy Pocket Rd, Moy Pocket	Southern Lowland Waters (<150m)
MAR300	Mary River	Walker Rd, Moy Pocket	Southern Lowland Waters (<150m)
OAK800	Oakey Creek	McGinn Rd, Moy Pocket	Southern Lowland Waters (<150m)
OBI940	Obi Obi Creek	Houston Bridge, Coolabine	Southern Lowland Waters (<150m)
WAL195	Walli Creek	End of Walli Creek Rd	Southern Lowland Waters (<150m)
YAB680	Yabba Creek	Imbil township	Southern Lowland Waters (<150m)

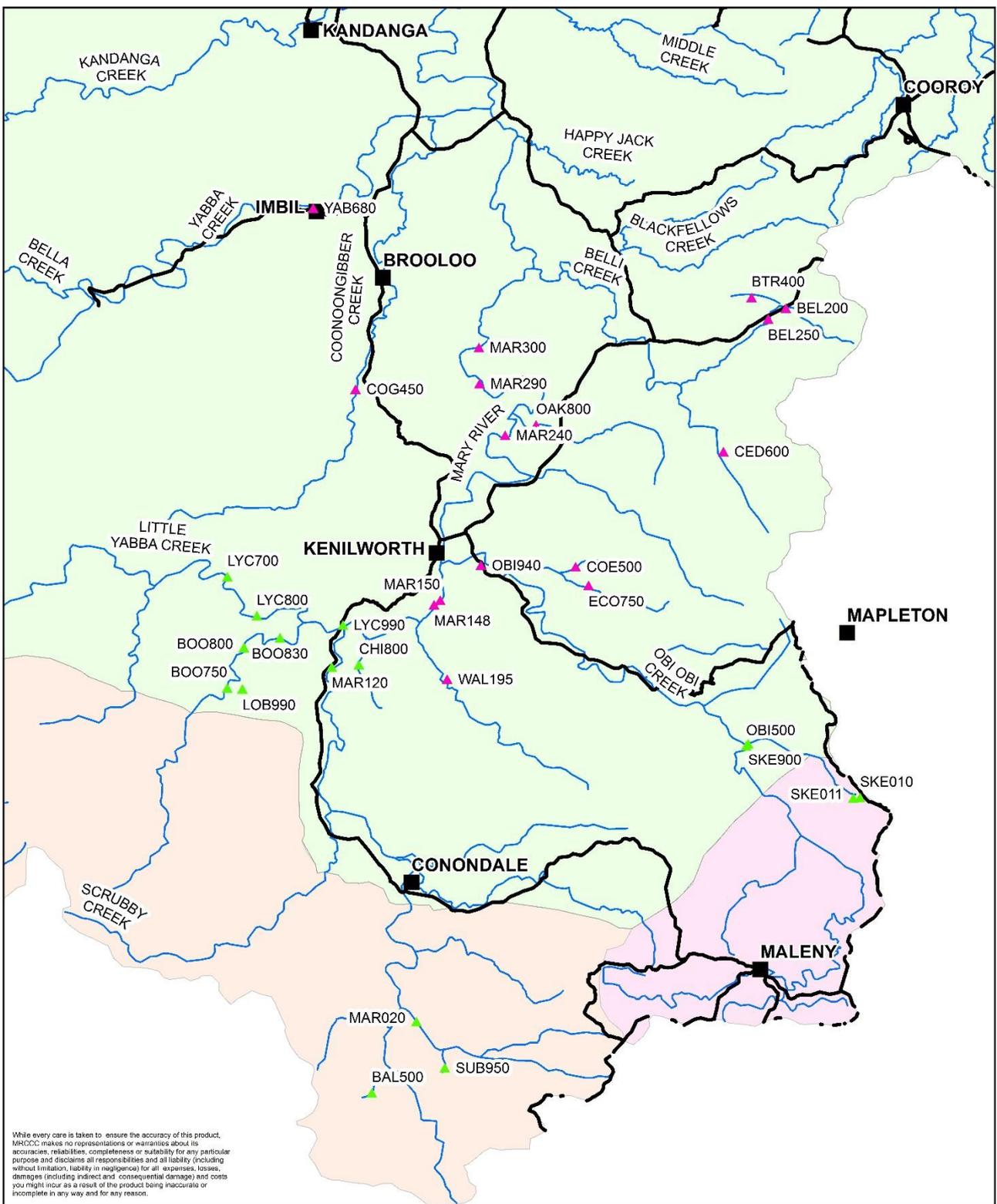
Volunteers

The MRCCC extends our thanks to the dedicated Waterwatch volunteers past and present for their continued effort, assistance and involvement in the Waterwatch network during 2013 – 2016. Contributors to this report are: Bronwyn McAdam from Queensland Parks and Wildlife Service (QPWS), Taleeta Laird (QPWS), Dominic Tyrrell (QPWS), Lyn and Scott Woolbank, Susan and John Bailey, Eric Anderson, Roger Westcott, Di Collier, Kacey Walker, Christopher Lee, Karen Turner, Carsten Villesen, Phil and Laney Grove, Nina Cox, Kathleen and Steve Dennis, Marie and Geoff Farr, Colleen and Des King, Ian Mackay, Mary Ann and Don Law, Graeme White and Matt Baxter. Thank you to Caitlin Mill, David Lade from Sauers Produce & Garden Centre Gympie and Tony Gordon from Sauers Produce & Garden Centre Cooroy for transporting the Waterwatch kit and being pick up points. Thanks to Mapleton Reality, Barung Landcare and the Conondale Store for being pick up points for the Waterwatch kit.

A special mention to Lyn and Scott Woolbank, Sue and John Bailey, Colleen and Des King, Ian Mackay and QPWS staff for contributing over 10 years of Waterwatch data collection; Scott, Lyn, Sue and John were inaugural Waterwatch volunteers in 2002 back when these Waterwatch networks were formed. These volunteers put in an effort over and above what was required and we always knew we could ask and rely on them to sort out a problem. Lyn and Scott Woolbank and Sue and John Bailey have retired from Waterwatch data collection in 2016, the Mary River Catchment Coordinating Committee greatly appreciates their contribution to the Waterwatch Program and wishes them the best for the future.



Chinaman Creek, Cambroon, April 2017



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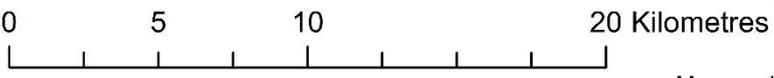
Upper Mary Catchment and Kenilworth Waterwatch Network Site Locations



- ▲ Upper Mary Sites
- ▲ Kenilworth Sites
- Major Roads

Water Type

- Southern Lowland <150m
- Southern Upland >150m
- Southern Upland Acid >150m



Map produced by Shaun Fisher on the 27th of April 2017

Monitoring Methods

Sites monitored by the network volunteers are visited monthly. The volunteers use a TPS WP-81 to measure the temperature, pH and electrical conductivity, a TPS WP-82 to measure dissolved oxygen and a turbidity tube to measure turbidity. Volunteers are trained to follow the techniques as outlined in the Mary River Catchment Coordinating Committee's (MRCCC) Quality Assurance Manual. The network coordinator verifies all data before being entered into the Waterwatch database. Each equipment kit is maintained and calibrated monthly by MRCCC staff with occasional shadow testing against other equipment.

Each of the sub-catchments monitored in the Mary Catchment is unique in terms of its geology, flow regime and land use. It is therefore expected that the water in a sub-catchment would have its own unique baseline levels of the various parameters measured by Waterwatch. Some differences between sub-catchments in the Mary Catchment are recognized in the water quality guidelines scheduled in the Environment Protection Policy (Water) for the Mary Basin, under the Environment Protection Act.

The sites in the Upper Mary Waterwatch network are compared against the Mary Basin freshwater guidelines for all sites below 150m elevation, the upland freshwater guidelines for all sites above 150m elevation and the southern upland acid waters above 150m elevation. These three sets of water quality guidelines are listed below. A specific set of pH guideline values for the eastern tributaries of the Mary which drain the Maleny/Mapleton plateau, have been developed due to long term data displaying significant difference in the pH values compared to the other Upper Mary Waterwatch sites. All Waterwatch sites in the Kenilworth District network are compared against the southern lowland water below 150m elevation freshwater guidelines.

Water Quality Guideline Values	
Southern Upland Acid Waters Upland (>150m) freshwaters draining acid red soils of the Maleny/Mapleton plateau	Electrical Conductivity 0 – 580 $\mu\text{S}/\text{cm}$ pH 6.0 – 8.0 Dissolved Oxygen 90 – 110 % saturation Turbidity 0 – 25 NTU Summer Temperature 18 – 28 °C Winter Temperature 13 – 21 °C
Southern Upland Waters Upland (>150m) freshwaters in the main trunk of the Mary River and all tributaries which drain into the Mary River upstream of Conondale except for Southern Upland Acid Waters.	Electrical Conductivity 0 – 580 $\mu\text{S}/\text{cm}$ pH 6.5 – 8.2 Dissolved Oxygen 90 – 110 % saturation Turbidity 0 – 25 NTU Summer Temperature 18 – 28 °C Winter Temperature 13 – 21 °C
Southern Lowland Waters Lowland (<150m) freshwaters in the main trunk of the Mary River and all tributaries which drain into the Mary River downstream of Conondale	Electrical Conductivity 0 – 580 $\mu\text{S}/\text{cm}$ pH 6.5 – 8.0 Dissolved Oxygen 85 – 110 % saturation Turbidity 0 – 50 NTU Summer Temperature 18 – 28 °C Winter Temperature 13 – 21 °C



Marv River, Charles St Park Kenilworth, October 2015

Upper Mary Catchment and Kenilworth District Waterwatch Results

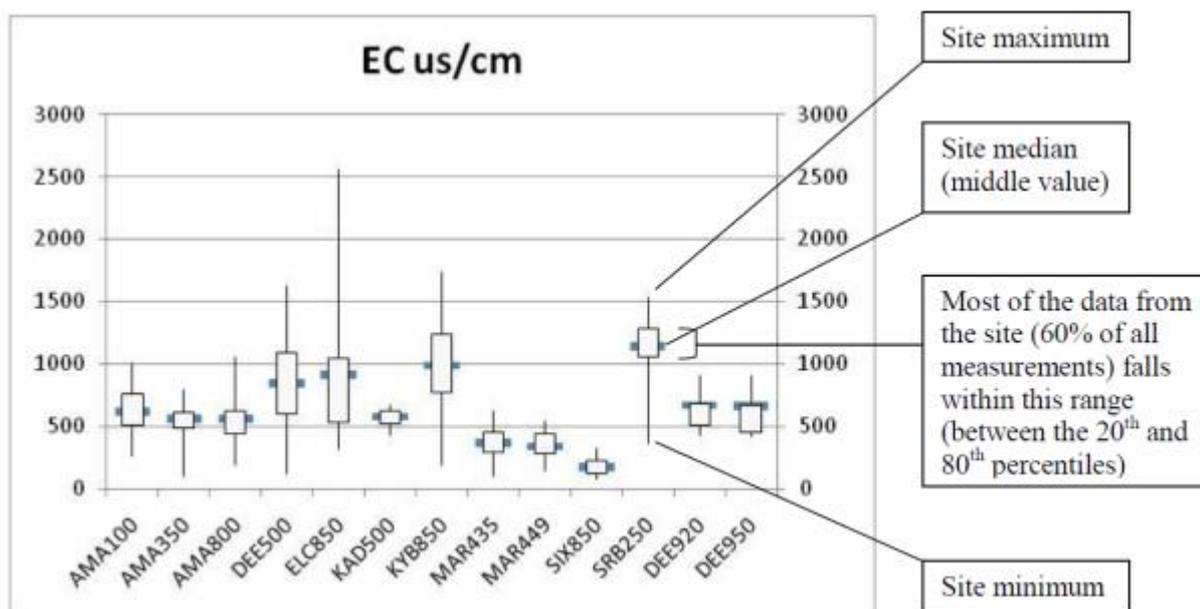
Results – inter-site comparisons

Within each Waterwatch network, the spread of pH, electrical conductivity and dissolved oxygen values are compared across all the sites in the network. These inter-site comparisons use a modified box and whisker graph to look at the spread of values recorded for each parameter at each site.

For each site on the graph:

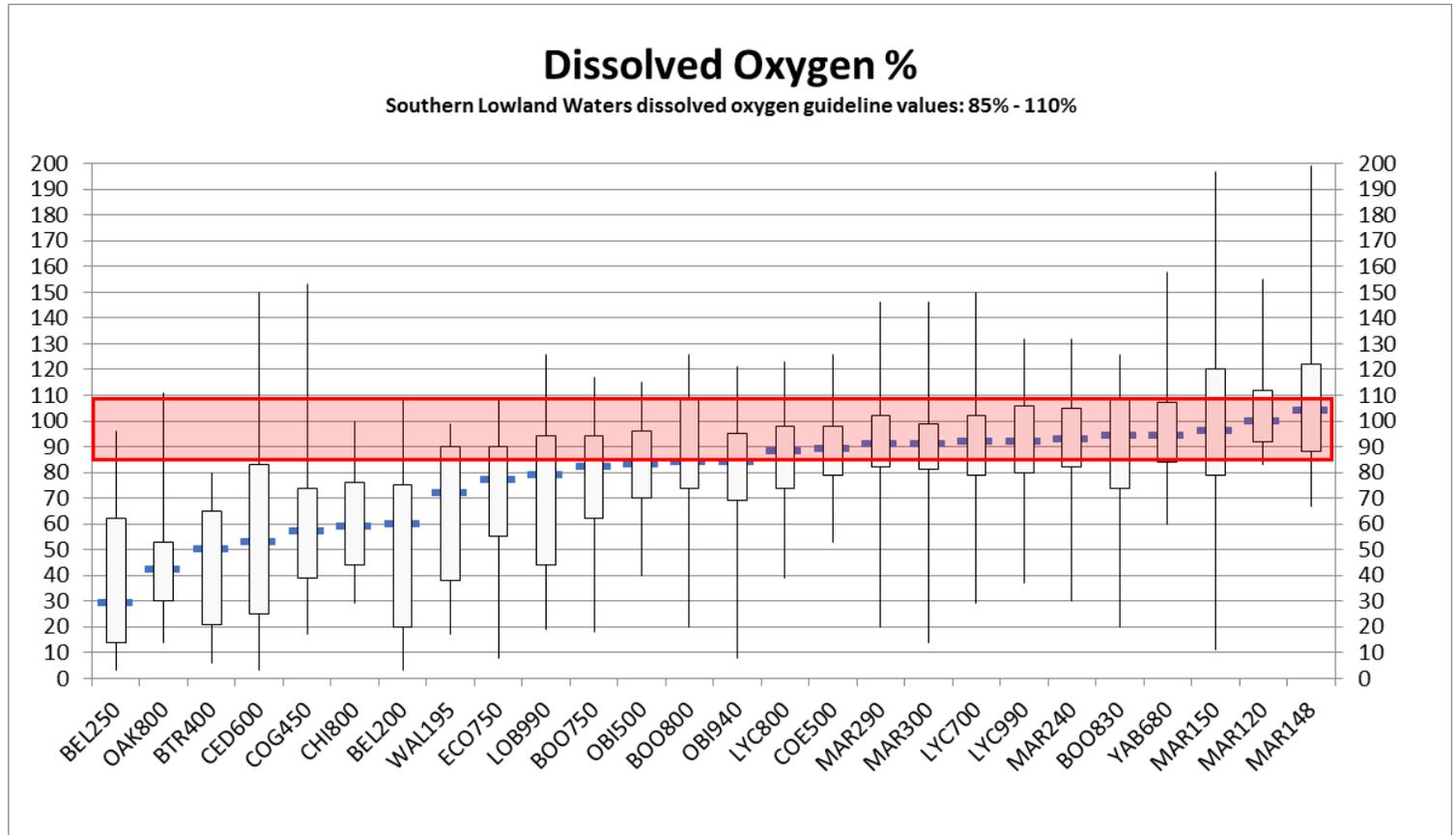
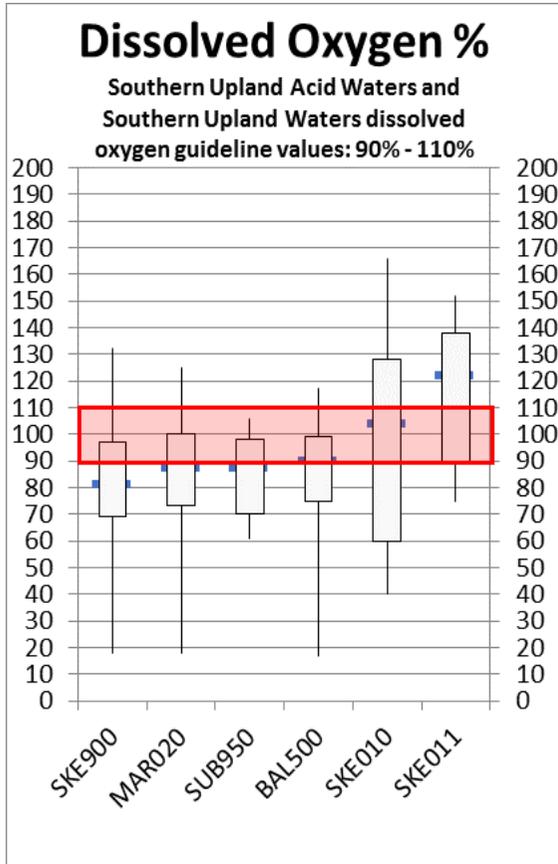
- The vertical line (whiskers) shows the range between the maximum and minimum values recorded at the site.
- The vertical boxes show the range between the 20th and 80th percentiles at each site.
- The horizontal bars show the median value 50th percentile for each site.

The comparison is useful for identifying sites that are unusually variable or have generally higher or lower values than other sites in the network.



Waterfalls at Moy Pocket quarry, January 2013

**Long-term inter-site comparison of dissolved oxygen levels (all data collected) in the
Upper Mary Catchment and Kenilworth District Waterwatch Networks**



Long-term inter-site comparison of dissolved oxygen levels (all data collected) in the Upper Mary Catchment and Kenilworth District Waterwatch Networks

- These graphs illustrate all the long-term data collected from each site, not just the last three year's data – the red rectangle represents the scheduled dissolved oxygen guideline level. Southern Upland Acid Waters and Southern Upland Waters dissolved oxygen guideline values are: 90% - 100%. Southern Lowland Waters dissolved oxygen guideline values are: 85% - 110%.
- Dissolved oxygen levels can change remarkably over the course of a day. In disturbed waterways with high nutrient and light levels dissolved oxygen can vary over a wide range eg. 30% to 150%. In undisturbed waterways the oxygen levels are generally maintained within a smaller range between 80 to 110% oxygen saturation.

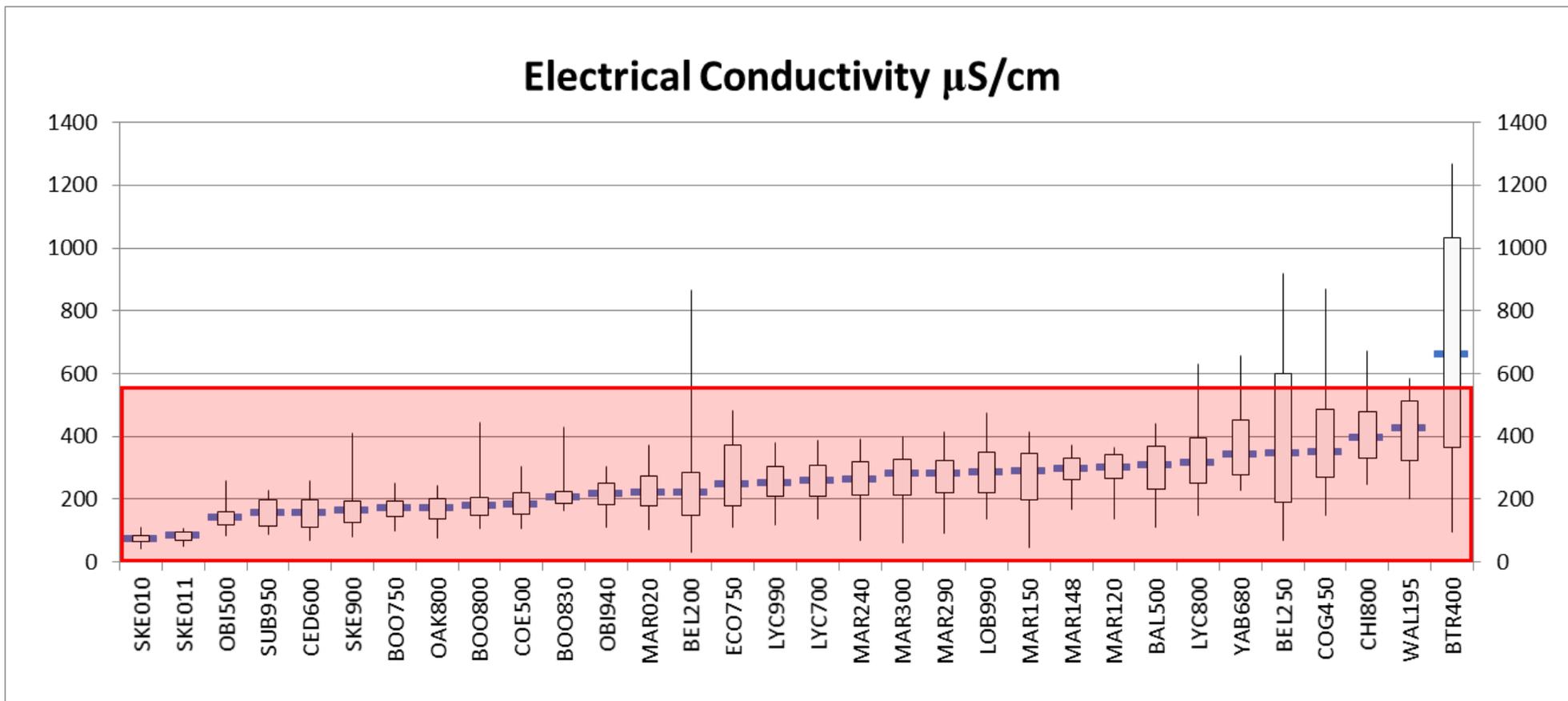
Upper Mary Catchment Waterwatch Network Dissolved Oxygen results

- Skene Creek – middle of the lagoon at Russell Family Park (SKE011) shows an overall high level of dissolved oxygen with a median value of approximately 120% which is above guideline levels which is not necessarily an indicator of good stream health . High levels of aquatic weed growth in sunny open conditions will produce high levels of oxygen in the afternoon. The SKE010 site demonstrates high levels of variation with oxygen levels fluctuating between 40 to over 160 % saturation.
- A majority of these sites the median levels tend to sit at the lower end of the scheduled guidelines, even in relatively undisturbed areas. In most cases, this is likely to be due to the ephemeral nature of the creeks, and high inputs of organic matter from vegetation. The LYC700, BOO830, MAR120 median values sit well within the guidelines, however the MAR120 Mary River site displays exceptionally high dissolved oxygen saturation levels at times exceeding 150% saturation. The BOO830 site can drop to near catastrophic levels of approximately 20% saturation.

Kenilworth District Waterwatch Network Dissolved Oxygen results

- The more ephemeral creeks, with high carbon inputs from leaf litter (eg. Belli, Walli, Cedar, East Coolabine, Coonoon Gibber) have generally lower dissolved oxygen levels, accompanied by much more variability in oxygen level.
- Waterways with a more consistent flow regime generally show higher overall dissolved oxygen levels (eg. Obi Obi, Yabba, main trunk of the Mary River).
- Mary River sites are consistently within the dissolved oxygen water quality guidelines with less overall variation for dissolved oxygen, however Mary River sites can still experience extreme fluctuations in dissolved oxygen levels (eg MAR148 and MAR150).

Long-term inter-site comparison of electrical conductivity (salinity)
in the Upper Mary Catchment and Kenilworth District Waterwatch Networks



Long-term inter-site comparison of electrical conductivity (salinity) in the Upper Mary Catchment and Kenilworth District Waterwatch Networks

- This graph illustrates all the long-term data collected from each site, not just recent data. The red line represents the electrical conductivity guideline level of 580 μ S/cm – electrical conductivity (salinity) should be below this level to meet guideline values. There is no electrical conductivity guideline difference between upland acid, upland and lowland sites.
- This graph reflects the variation in conditions experienced at these sites over the time the data has been collected. Some of these sites have a long history of data, including a long period of drought and low flows.

Upper Mary Catchment Waterwatch Network Electrical Conductivity (salinity) results

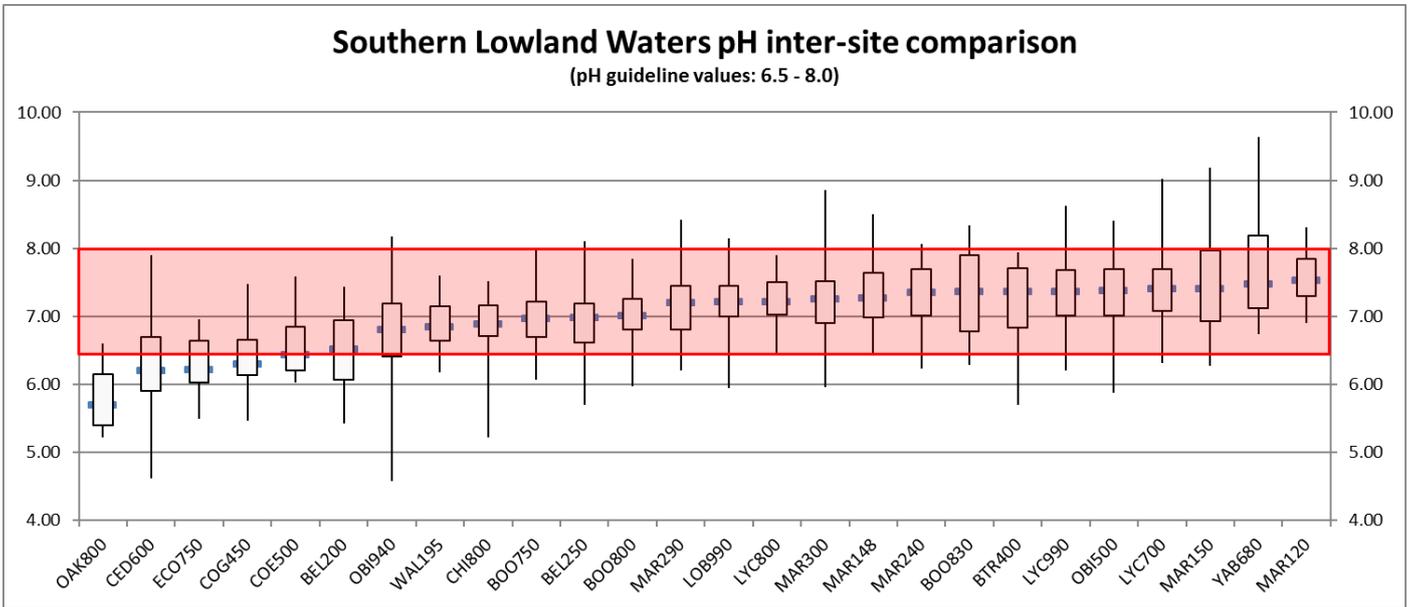
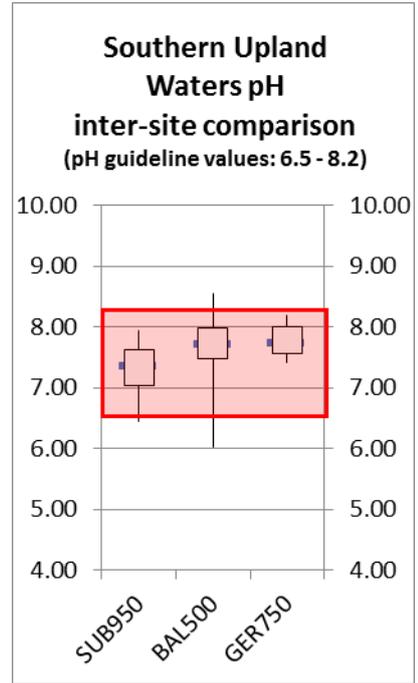
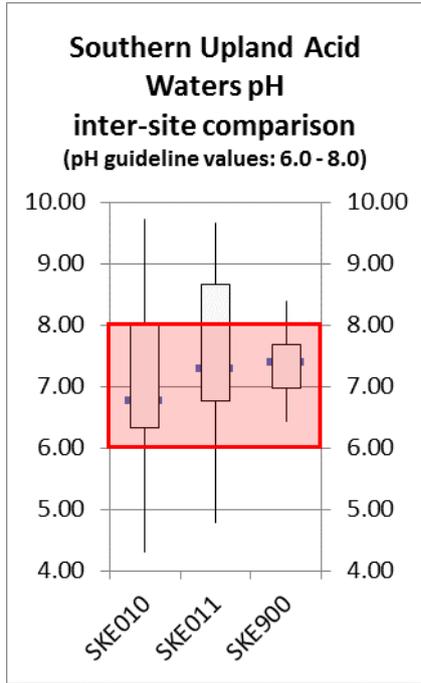
- Skene Creek (SKE900) has higher levels of electrical conductivity compared to the Skene Creek (SKE010 and SKE011) sites at Russell Family Park in Montville. Obi Obi Creek (OBI500) is immediately downstream of SKE900 and has similar electrical conductivity results.
- The site in Little Yabba Creek (LYC800) downstream of Charlie Moreland campground appears to have slightly higher overall levels of electrical conductivity than the upstream site (LYC700) and the lowest Little Yabba Creek site sampled (LYC990). This could be tested with a more detailed statistical analysis of the paired upstream and downstream tests to see if the difference is significant.
- The Chinaman Creek site (CHI800) occasionally exceeds guideline level for electrical conductivity, and also has the highest median electrical conductivity level of the Upper Mary network sites tested.

Kenilworth District Waterwatch Network Electrical Conductivity (salinity) results

- Waterways throughout this network generally show low levels of electrical conductivity. However some sites record relatively high values of electrical conductivity during low flow periods, indicating a contribution from a saline baseflow (Belli and Coonoongibber Creeks).
- Belli Ck crossing 2 (BEL250) shows a marked tendency towards high electrical conductivity during periods of low flow - which is not obvious at the Belli Creek Crossing 1 site (BEL200) immediately upstream.

Long-term inter-site comparison of pH

in the Upper Mary Catchment and Kenilworth District Waterwatch Networks



Long-term inter-site comparison of pH

in the Upper Mary Catchment and Kenilworth District Waterwatch Networks

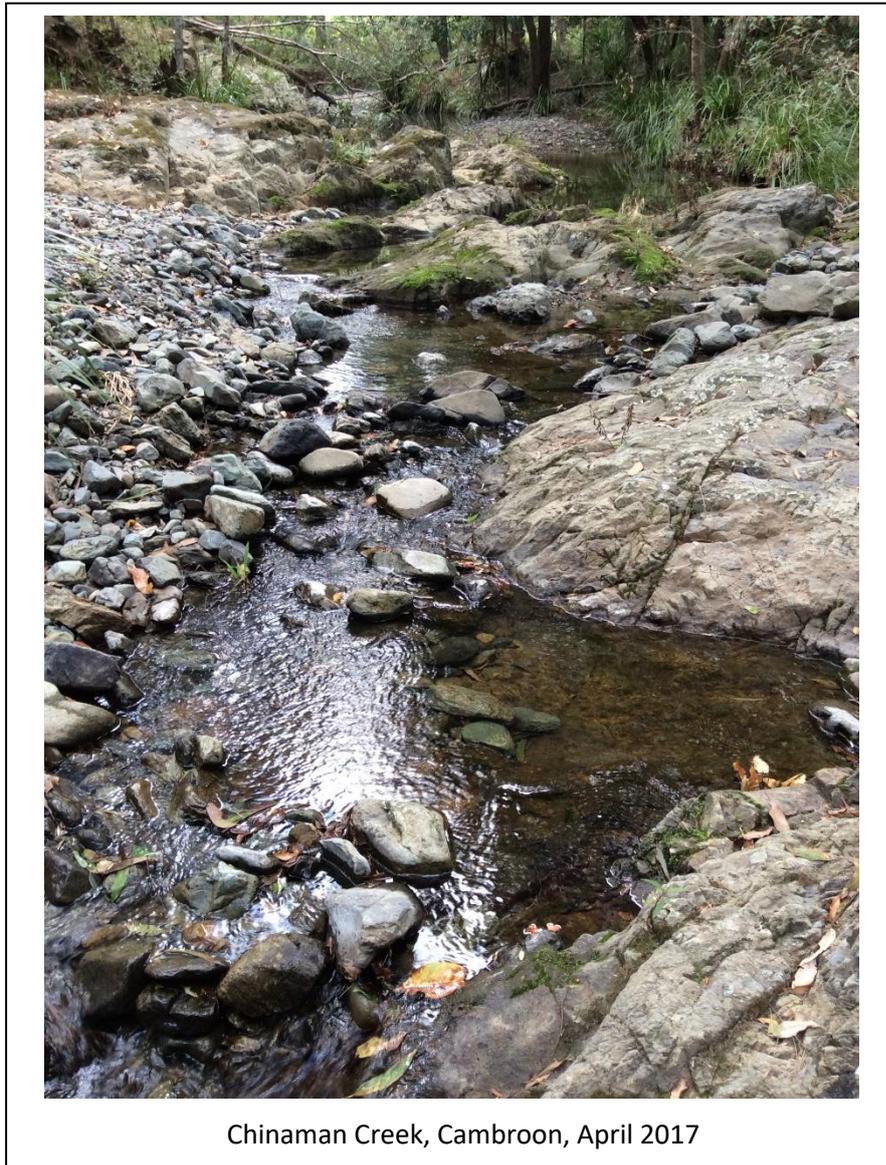
- These graphs illustrates all the long-term data collected from each site, not just the last year's data – the red rectangle represents the pH guideline levels (pH should be between these levels to meet guideline values).

Upper Mary Catchment Waterwatch Network pH results

- The low pH of the Skene Creek sites is likely to be the result of underlying geology which has an acidic background due to its recent volcanic nature. It is consistent with previous Waterwatch data from Fryers Creek on the Maleny plateau. Local pH guidelines have been developed for creeks draining the deep red soils of the Maleny/Mapleton plateau (southern upland acid waters >150m).

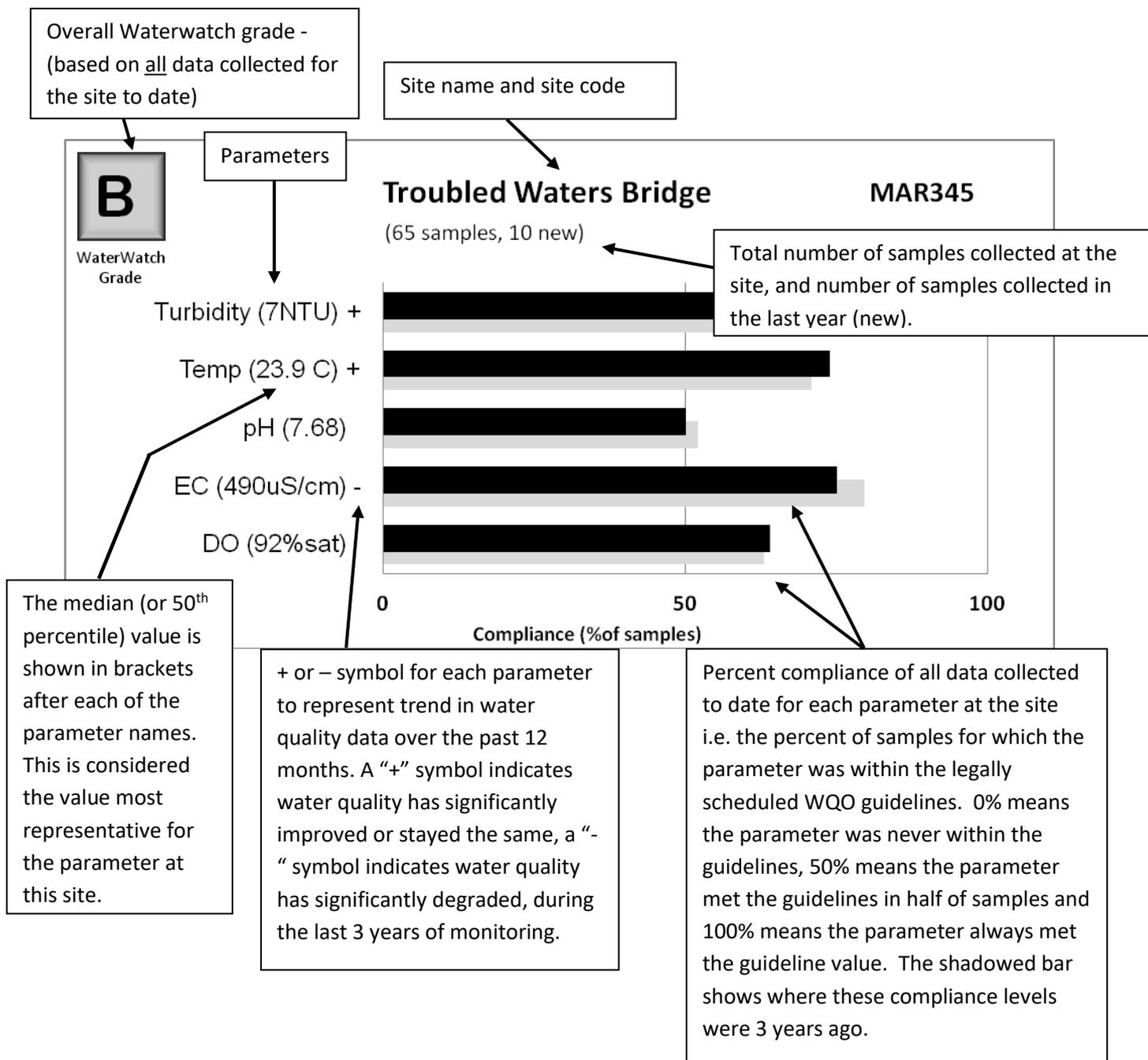
Kenilworth District Waterwatch Network pH results

- The Mary River sites all show generally good compliance with pH guidelines.
- The eastern tributaries which drain the Mapleton plateau (eg. Cedar and Oakey Creeks) have a consistent acidic character, which may be a natural consequence of the source geology.
- High variability in pH can indicate eutrophication causing algae and weed growth (YAB680 and OBI940).



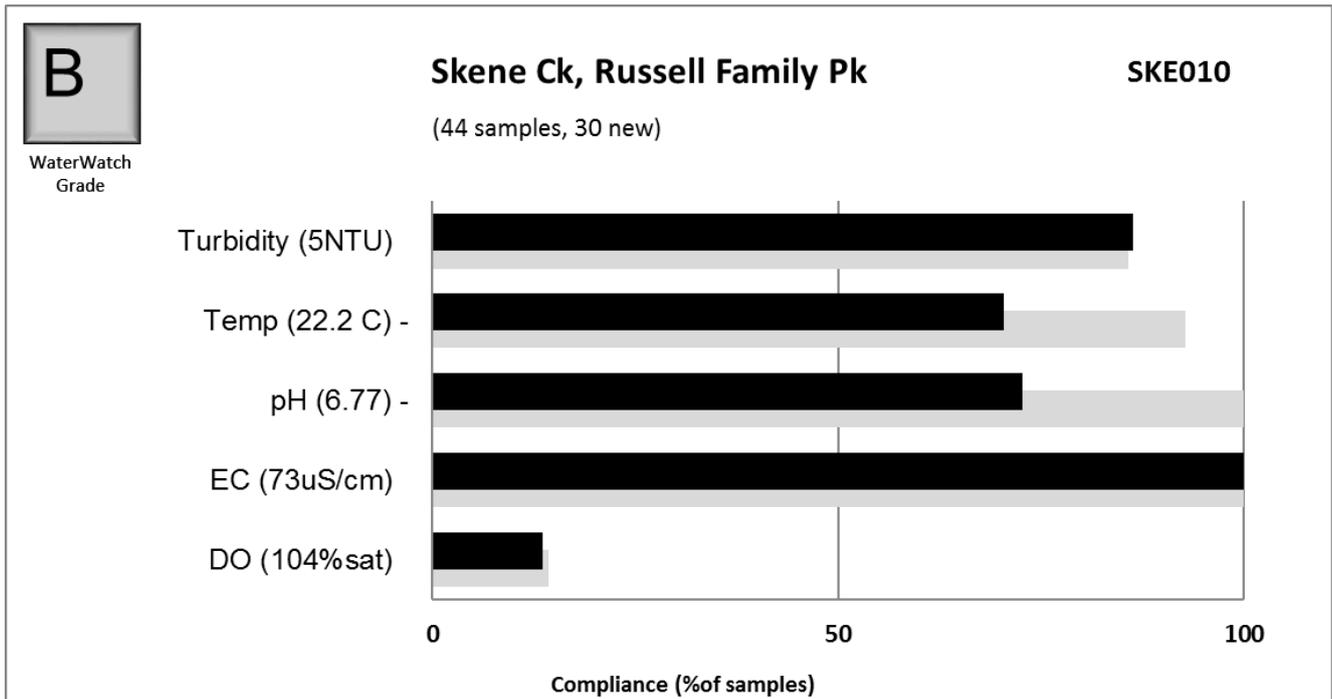
Results - site report cards

The long-term data from each site is analysed and presented as a graphical report card. These graphs present the long-term median value of each parameter and the level of compliance with the relevant guidelines across all the individual samples from that site. The illustration and descriptions below show where this information can be found on the report cards and how to interpret the graphs.

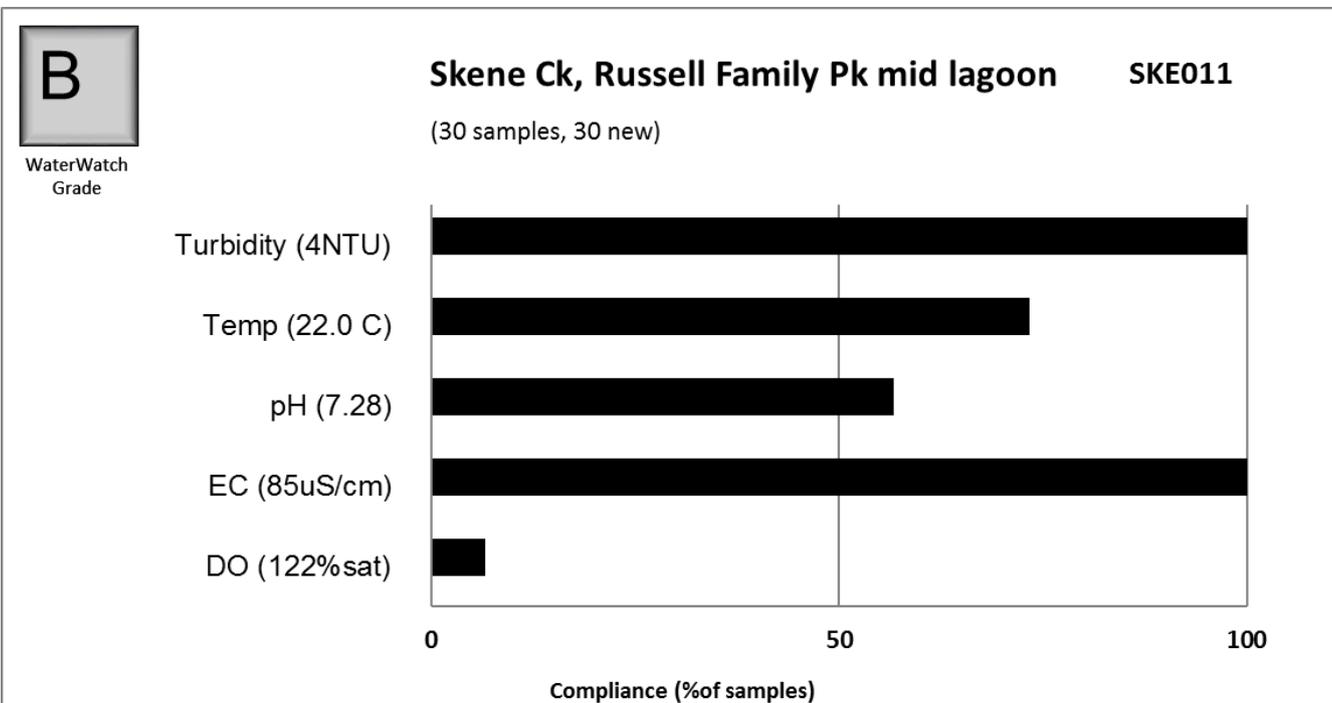


Mapleton Plateau Southern Upland Acid sites (>150m)

Skene Creek



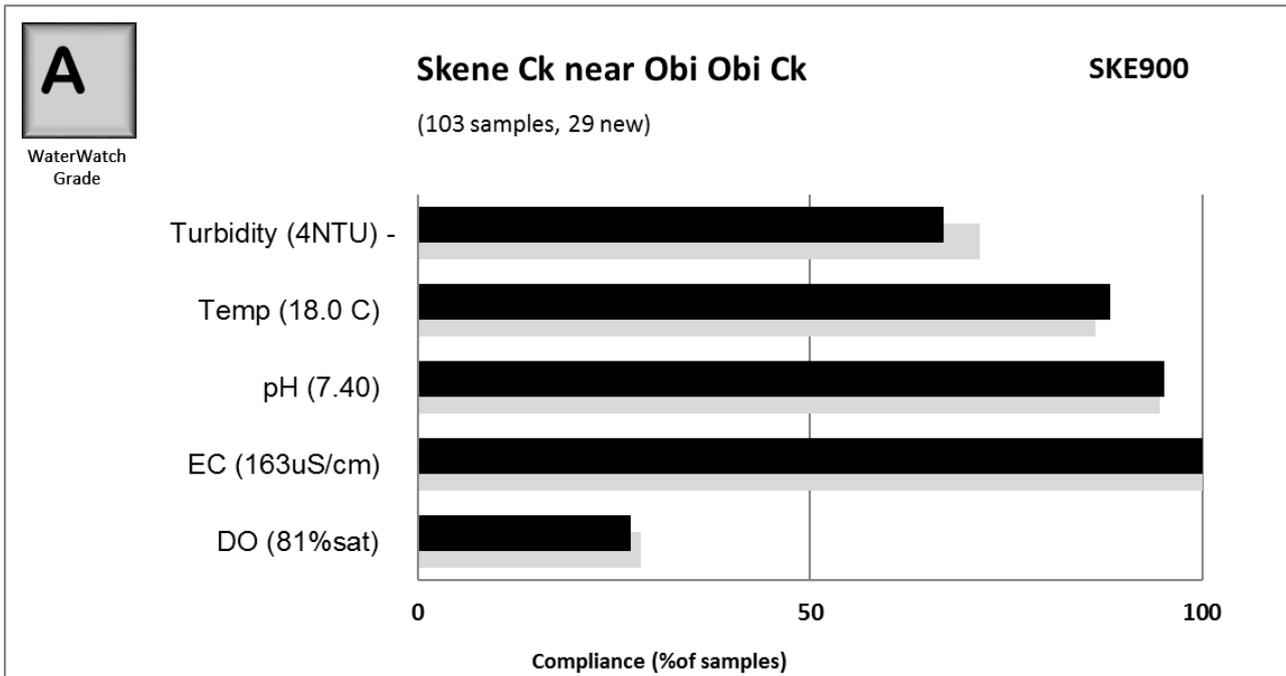
- Good sample size
- Southern Upland Acid Waters
- Maintaining a B grade score
- Excellent compliance for electrical conductivity (salinity) guidelines – very low EC readings recorded
- Very significant decrease in temperature and pH compliance
- On going monitoring of this site is required



- Good sample size
- Southern Upland Acid Waters
- Excellent compliance for electrical conductivity (salinity) and turbidity guidelines – very low readings recorded at this site
- On going monitoring of this site is required

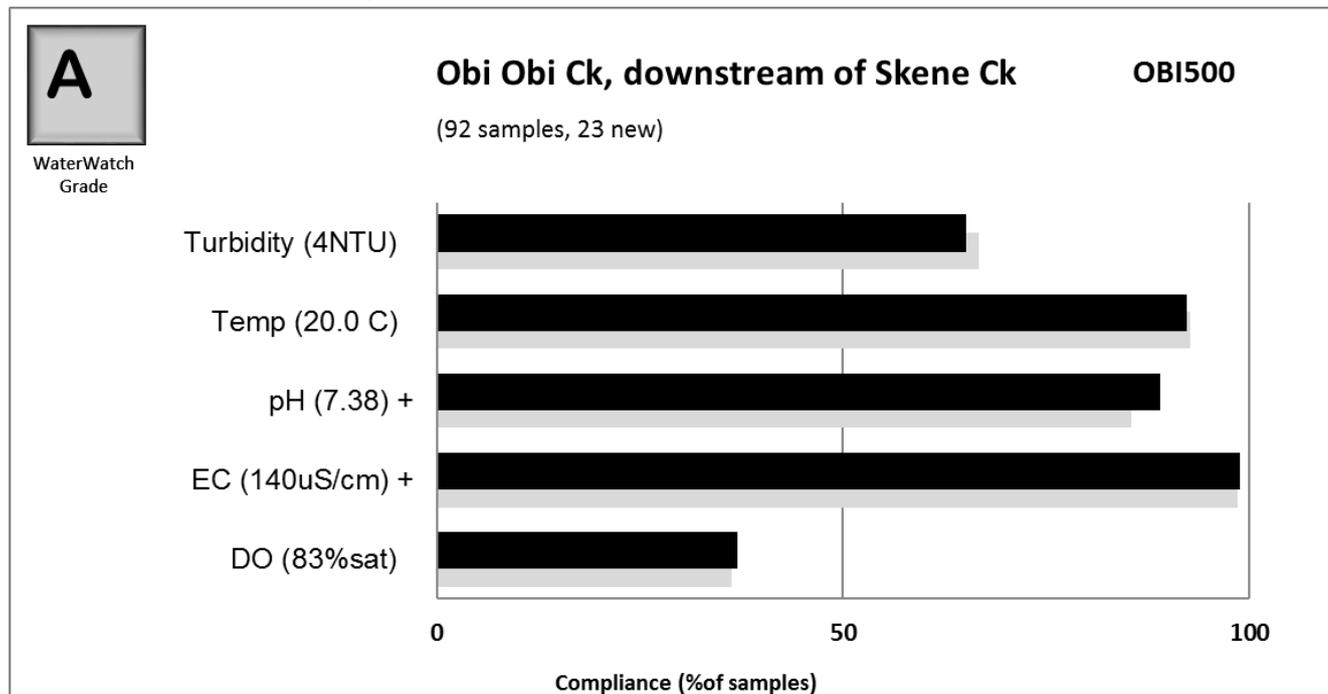
Tributaries of the Mary River (<150 m above sea level)

Skene Creek



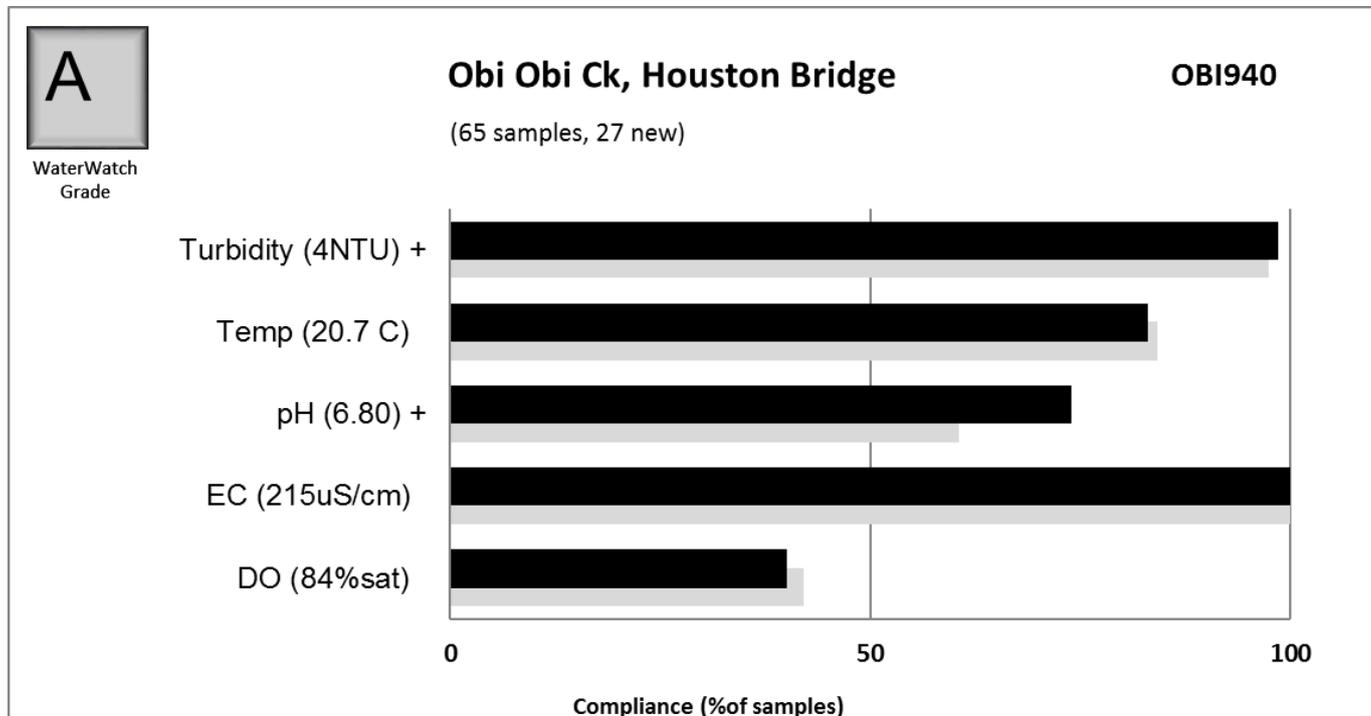
- Excellent sample size (gold star award winner!)
- Lowland Waters (<150m)
- Significant decline in turbidity levels over the past 3 years
- Excellent electrical conductivity (salinity) compliance
- Dissolved oxygen compliance (approximately 40% compliance with guidelines) similar the other Waterwatch sites in the Conondale National Park and Upper Mary River.
- Maintaining an overall grade of A (2010 – 2013 Waterwatch Grade = A)

Obi Obi Creek, Obi Obi Valley



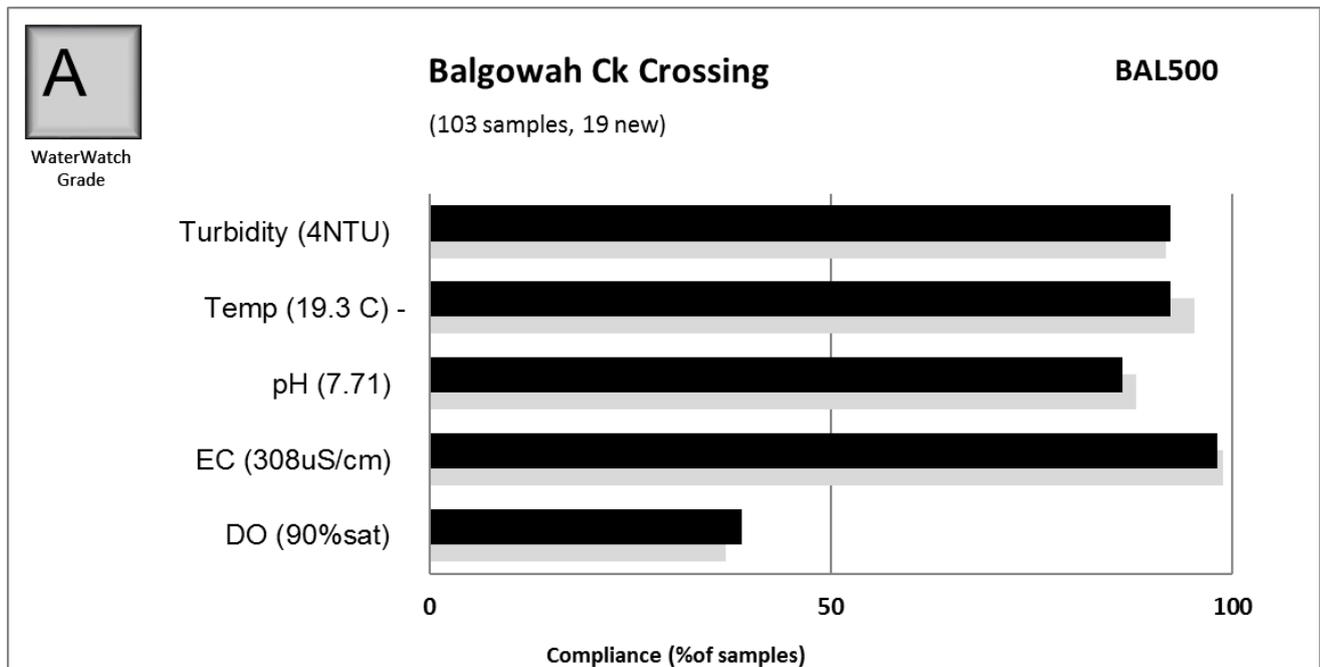
- Great sample size
- Significant improvement in compliance with pH and electrical conductivity (salinity)
- Dissolved oxygen only complies approximately 40% of the time, which is a similar result to the sites sampled in the Conondale National Park. Obi Obi Creek at this site would have more reliable stream flows than those in the Conondale National Park due to consistent water releases from Baroon Pocket Dam.
- Maintaining an overall grade of A (2010 – 2013 Waterwatch Grade = A)

Obi Obi Creek, Kenilworth

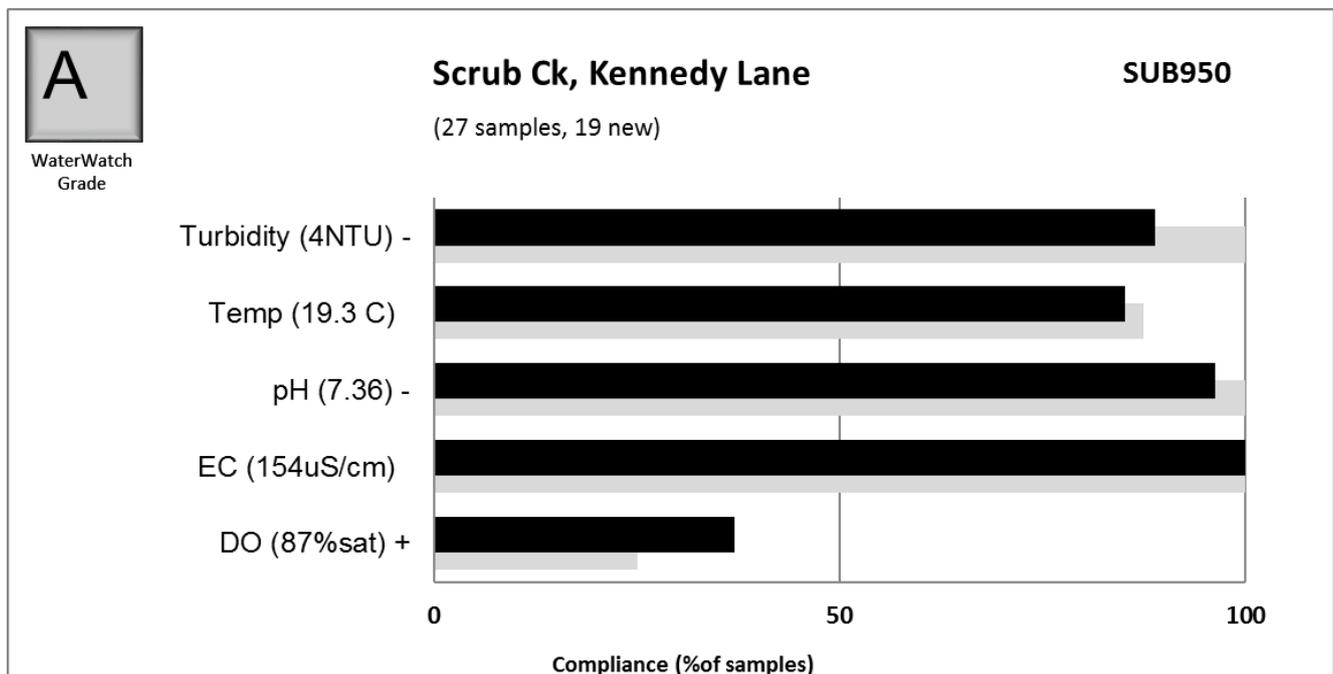


- Great sample size
- Southern Lowland Waters (<150m)
- Excellent electrical conductivity (salinity) and turbidity compliance
- Significant increase in compliance for pH and turbidity over the past 3 years
- Maintained an overall grade of an A (2010 – 2013 Waterwatch Grade = A)

Upland tributaries of the Mary River (>150m)

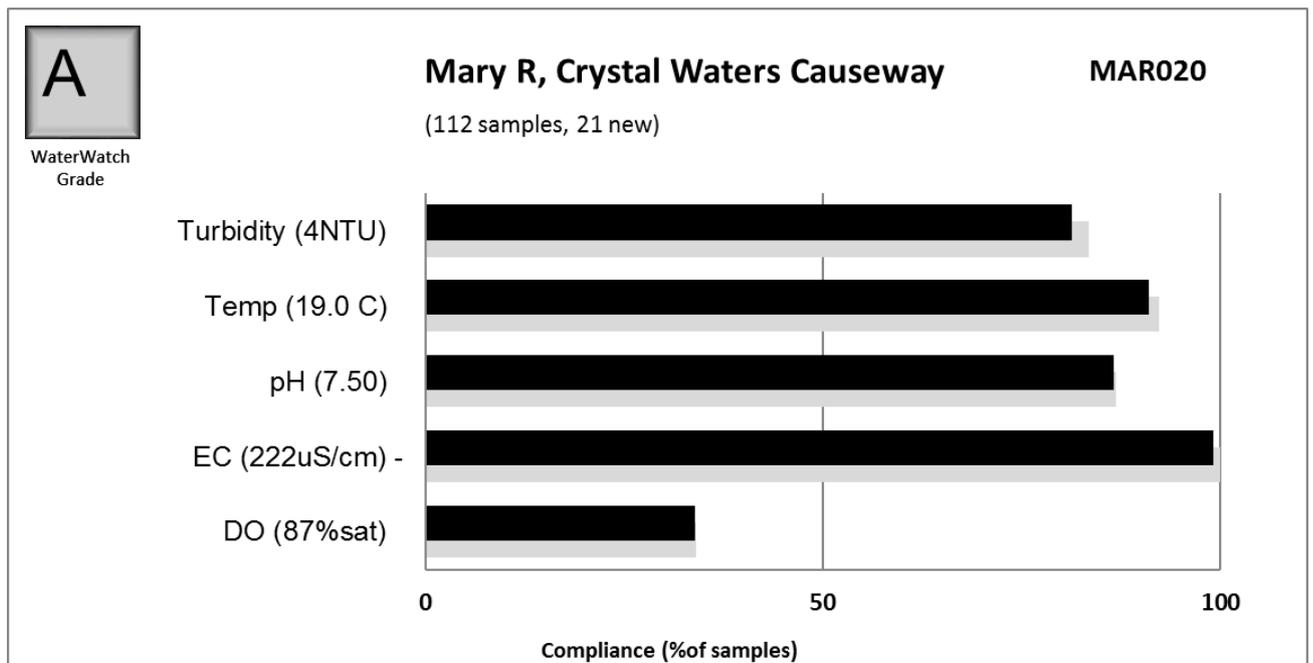


- Excellent sample size (gold star award winner!)
- Southern Upland Waters (>150m)
- Significant decrease in compliance with temperature guidelines over the past 3 years
- Similar dissolved oxygen level of compliance as MAR120 and Conondale National Park streams.
- Maintaining an overall grade of A (2010 Waterwatch Grade = A)



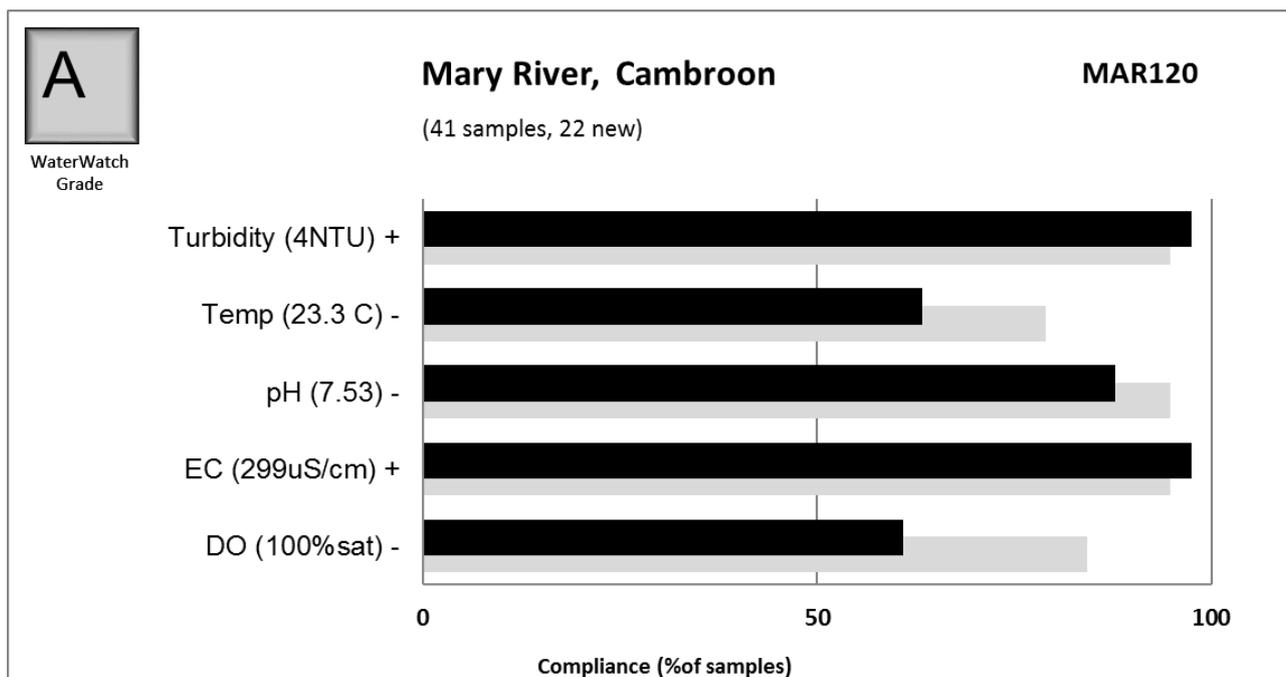
- New site, good sample size
- Significant increase in compliance with dissolved oxygen, although displays similar compliance levels (approximately 40% compliance with guidelines) to Balgowah Creek, Mary River at Crystal Waters and Conondale National Park streams in the district.
- Excellent compliance with electrical conductivity (salinity)
- Significant decrease in turbidity in particular and pH compliance
- On going monitoring of this site is required

Upper Mary River Upland site (>150 m above sea level)

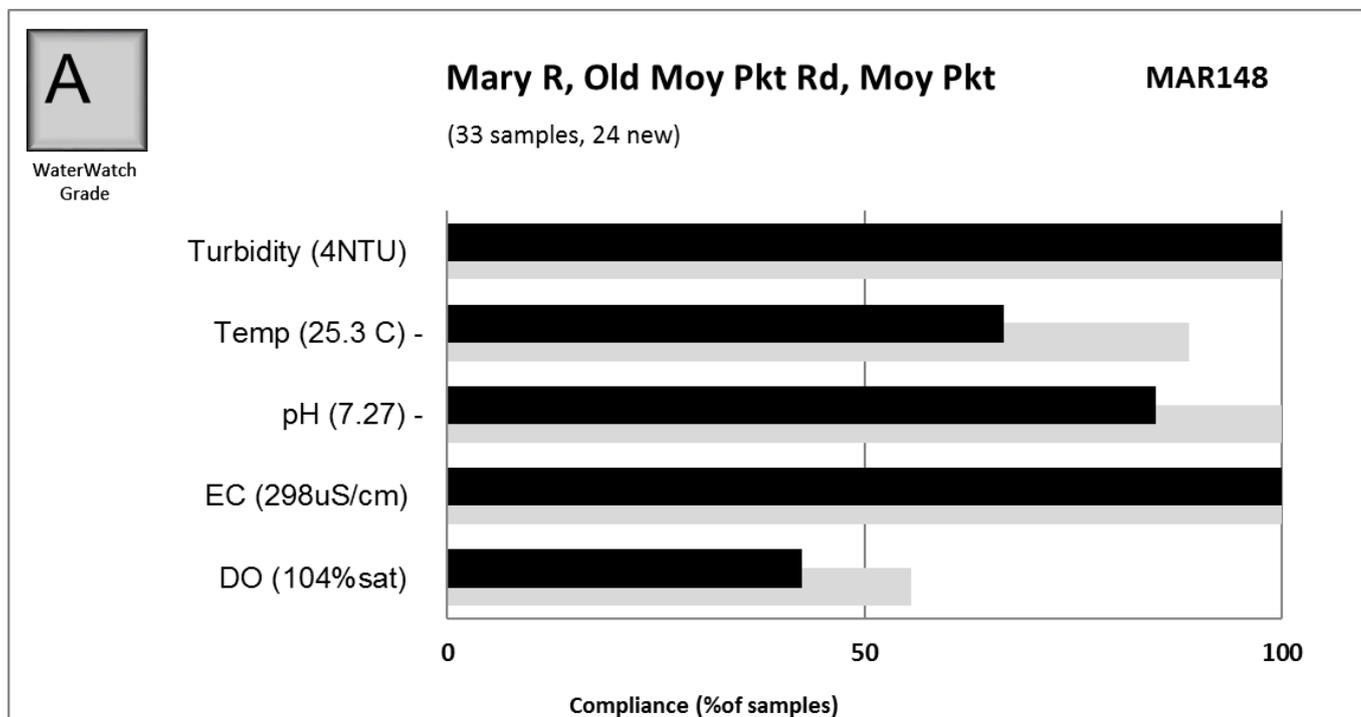


- Excellent sample size (gold star award winner!)
- Southern Upland Waters (>150m)
- Significant decrease in compliance for electrical conductivity (salinity) over the past 3 years
- The dissolved oxygen level compliance is similar that in the Obi Obi Creek and the streams tested in the Conondale National Park. This site has the coolest median stream temperature in the Waterwatch network.
- Maintaining an overall grade of A (2010 – 2013 Waterwatch Grade = A)

Upper Mary River Lowland sites (<150 m above sea level)



- New site, good sample size
- Southern Lowland Waters (<150m)
- Significant increase in compliance with electrical conductivity (salinity) and turbidity
- Significant decrease in compliance for, temperature, pH and dissolved oxygen
- Dissolved oxygen compliance is better at this site than the Conondale National Park site probably due to more consistent stream flows
- Stream temperature is approximately three degrees warmer than the Conondale National Park sites
- On going monitoring of this site is required



- Good sample size
- Southern Lowland Waters (<150m)
- Significant decrease in compliance for temperature and pH
- Excellent turbidity and electrical conductivity compliance over the past three years

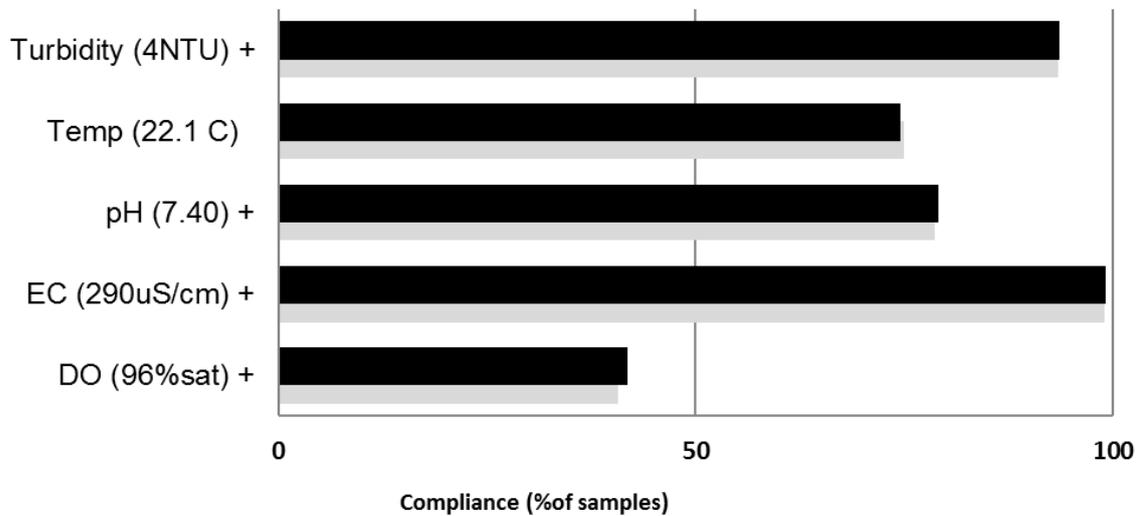


WaterWatch
Grade

Mary River, downstream of Walli Ck

MAR150

(110 samples, 2 new)



- Excellent sample size (gold medal award winner!)
- Southern Lowland Waters (<150m)
- Significant improvement in turbidity, Ph, electrical conductivity (salinity) and dissolved oxygen compliance over the past 3 years
- Maintaining an overall grade of A (2010 Waterwatch Grade = B, 2013 Waterwatch Grade = A)

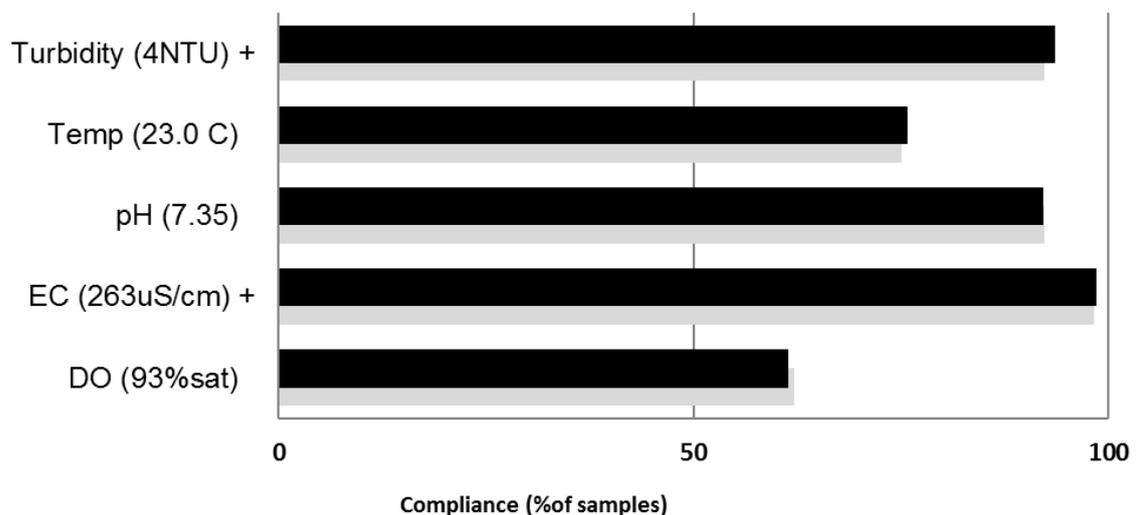


WaterWatch
Grade

Mary River, Pickering Bridge

MAR240

(140 samples, 24 new)



- Excellent sample size (gold medal award winner!)
- Southern Lowland Waters (<150m)
- Excellent electrical conductivity compliance over the past three years
- Significant improvement in compliance for turbidity over the past three years
- Maintaining an overall grade of A (2010 – 2013 Waterwatch Grade = A) over the past 3 years

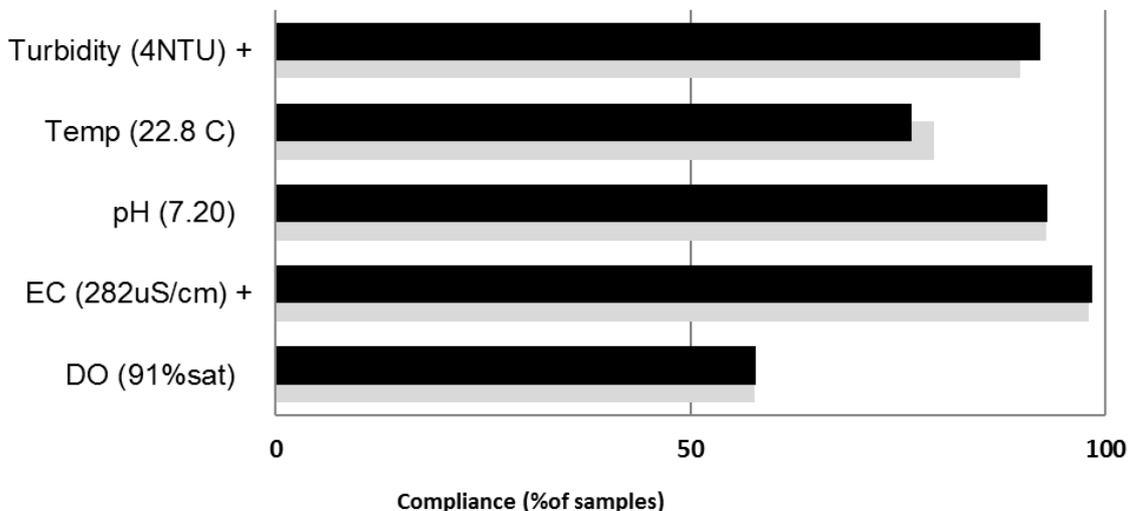


WaterWatch Grade

Mary River, Old Moy Pkt Rd

MAR290

(128 samples, 31 new)



- Excellent sample size (gold medal award winner!)
- Southern Lowland Waters (<150m)
- Excellent electrical conductivity compliance
- Significant increase in compliance for turbidity over the past three years

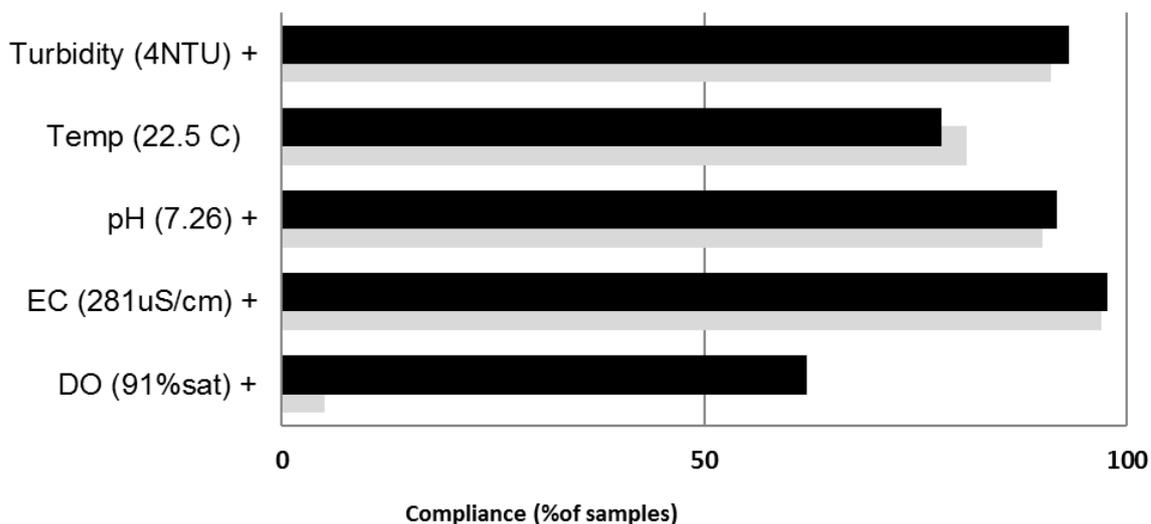


WaterWatch Grade

Mary River, Walker Rd

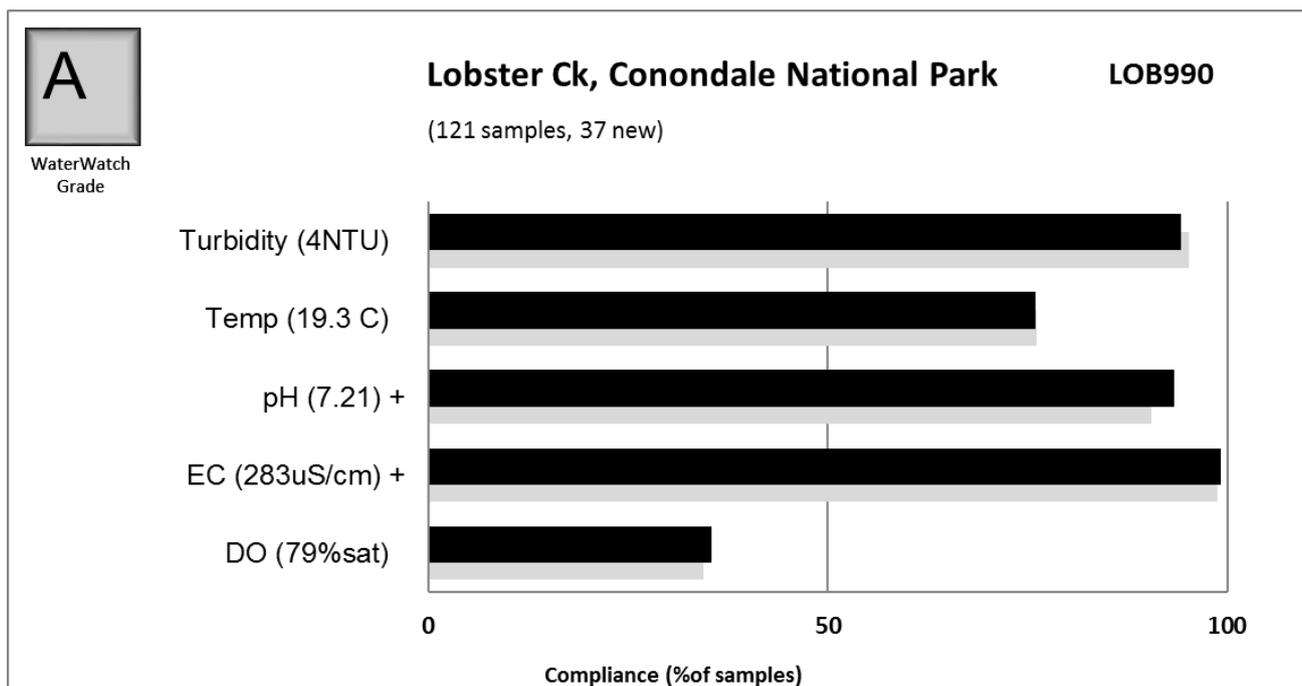
MAR300

(132 samples, 32 new)

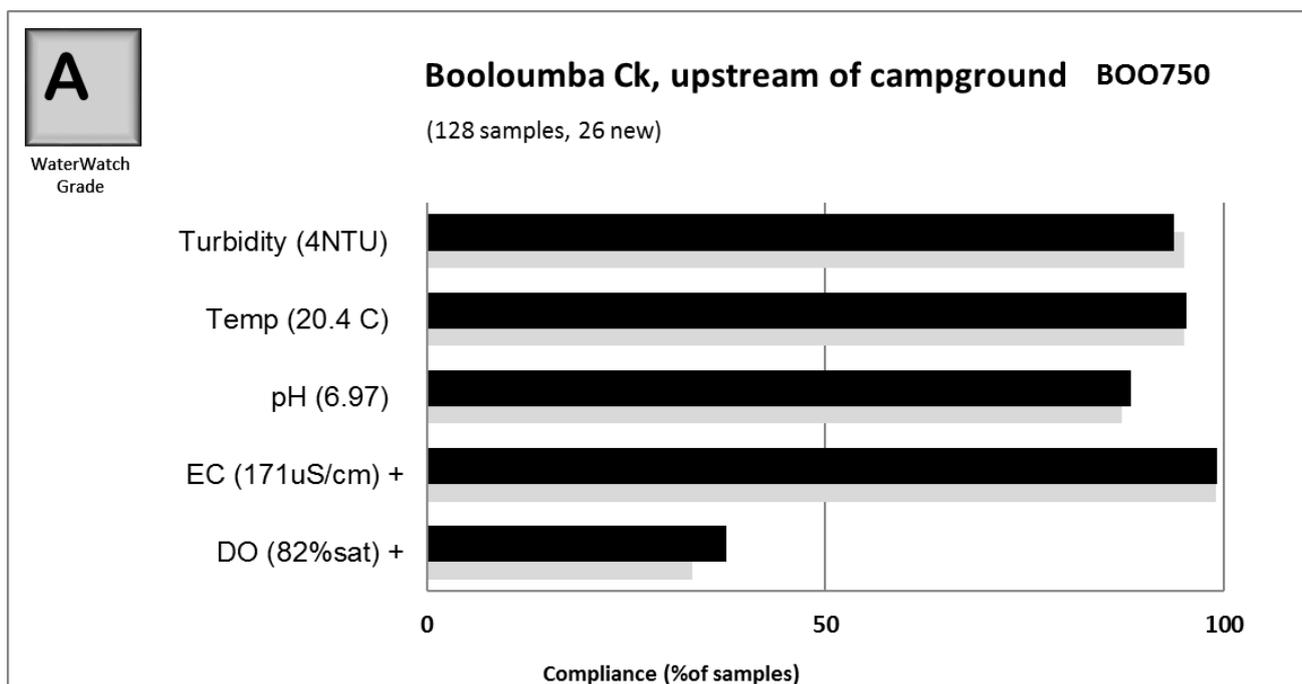


- Maintaining an overall grade of A (2010 – 2013 Waterwatch Grade = A) over the past 3 years
- Excellent sample size (gold medal award winner!)
- Southern Lowland Waters (<150m)
- Excellent electrical conductivity compliance
- Significant improvement in compliance for turbidity, pH and DO over the past three years
- Maintaining an overall grade of A (2010 – 2013 Waterwatch Grade = A) over the past 3 years

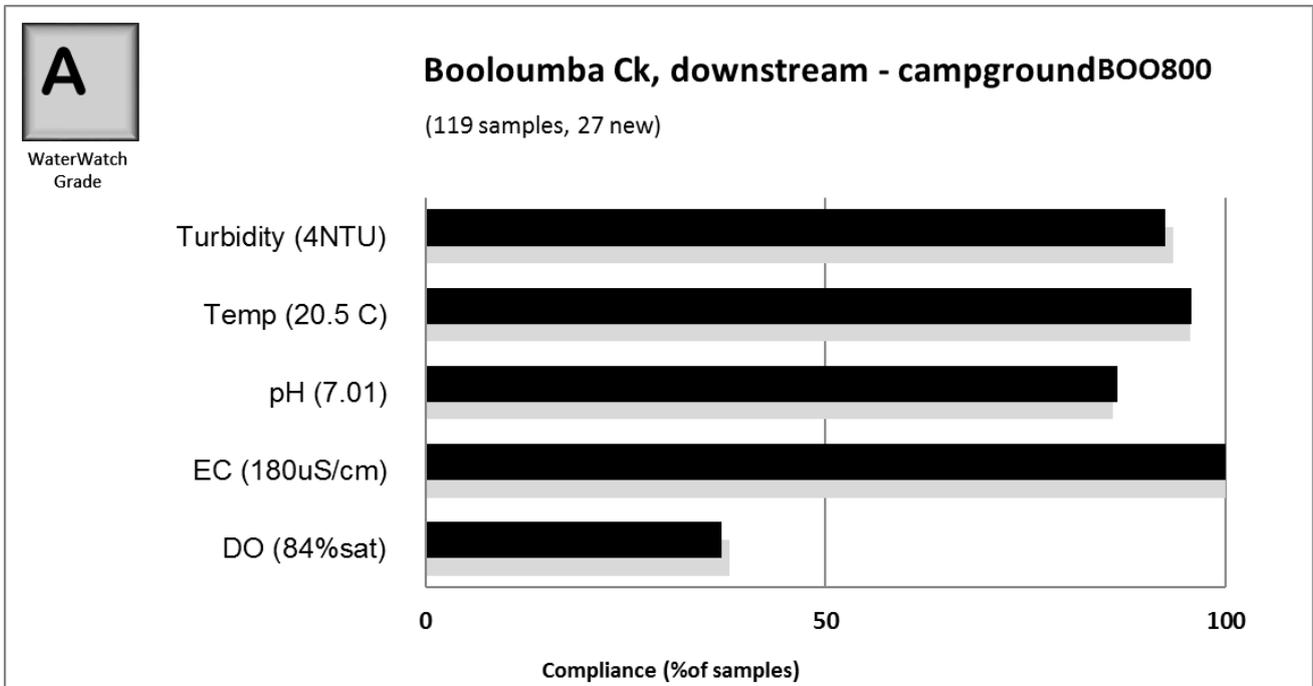
Conondale National Park sites (Lowland <150 metres above sea level)



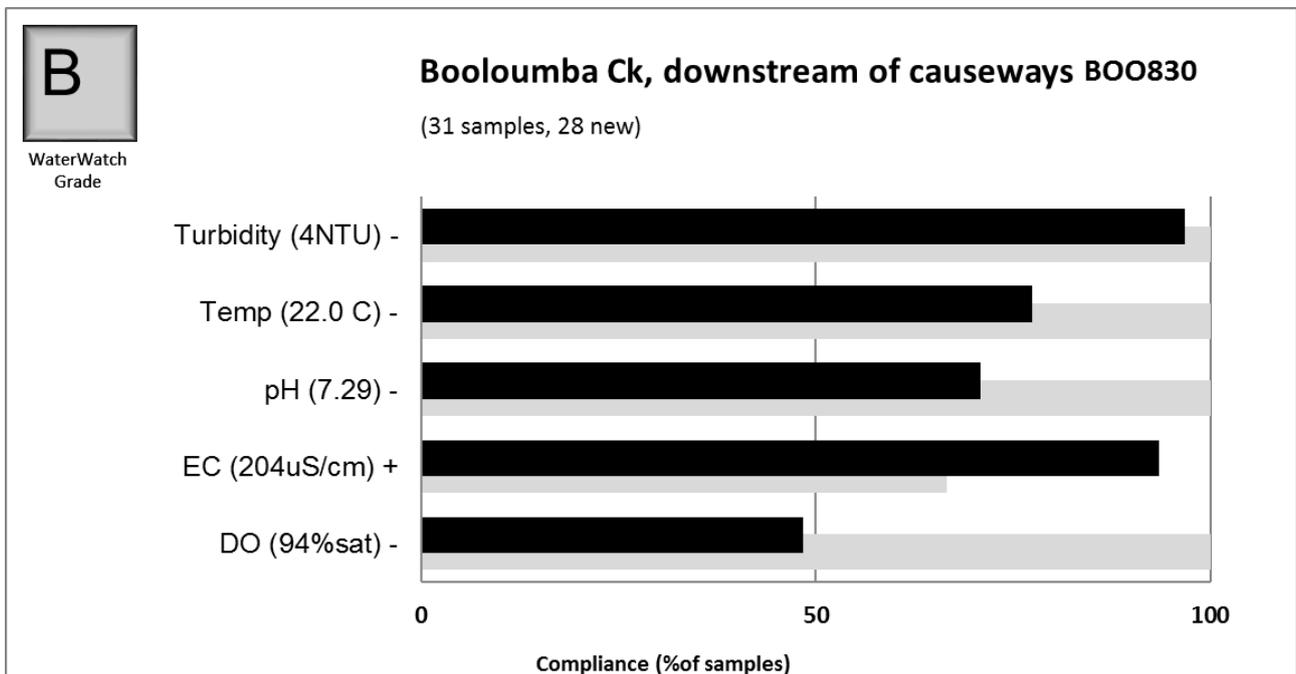
- Excellent sample size (gold star award winner!)
- Southern Lowland Waters (<150m)
- Significant improvement in compliance with pH and EC guidelines over the past 3 years
- Maintaining an overall grade of A (2010 – 2013 Waterwatch Grade = A)



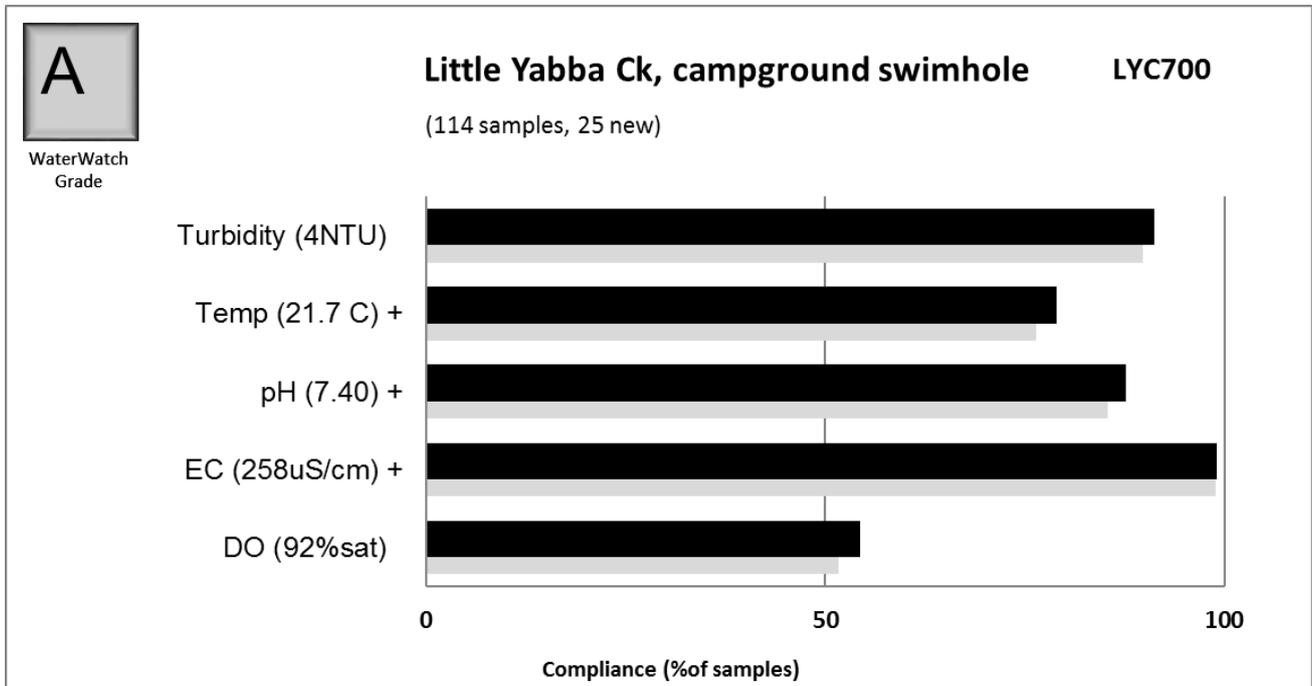
- Excellent sample size (gold star award winner!)
- Significant improvement in compliance with dissolved oxygen and EC guidelines over the past 3 years
- Dissolved oxygen readings seem to only comply with guideline levels approximately 40% of the time, this is likely to be due to the lower than normal summer rain and creekflows during the 2013-2016 reporting period.
- During the last reporting period (2010 – 2013) there was a significant decrease in turbidity. There is no significant change in turbidity during this reporting period
- Maintaining an overall grade of A (2010 – 2013 Waterwatch Grade = A)



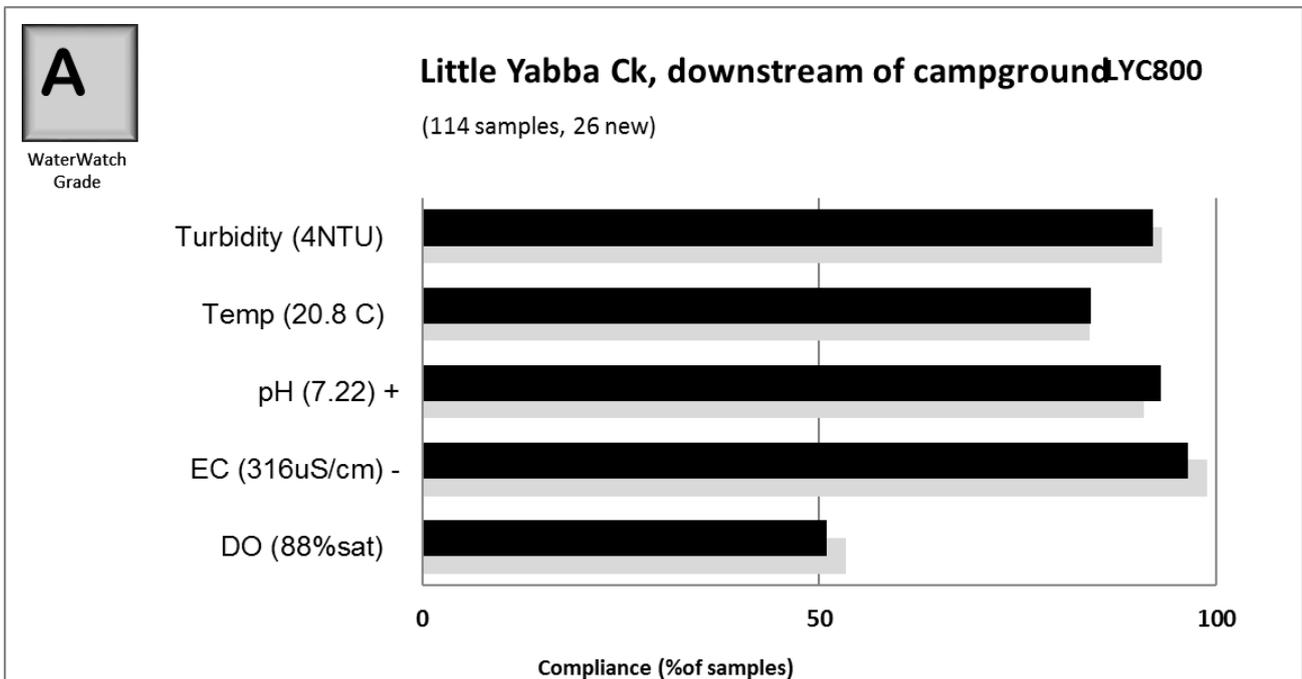
- Excellent sample size (gold star award winner!)
- Southern Lowland Waters (<150m)
- Excellent compliance with electrical conductivity (salinity)
- Like the BOO750 site upstream, the dissolved oxygen readings seem to only comply with guideline levels approximately 40% of the time, this is likely to be due to the lower than normal summer rain and creekflows during the 2013-2016 reporting period
- Maintaining an overall grade of A (2010 Waterwatch Grade = A)



- New site, good sample size
- Significant increase in compliance with electrical conductivity (salinity) compared to the 2013 report
- Like the BOO750 and BOO800 sites upstream, the dissolved oxygen readings comply less than 50% of the time, this is likely to be due to the lower than normal summer rain and creekflows during the 2013-2016 reporting period
- Compliance is similar to the upstream site (BOO800), however temperature is 2 degrees warmer.
- On going monitoring of this site is required



- Excellent sample size (gold star award winner!)
- Southern Lowland Waters (<150m)
- Significant improvement in compliance with electrical conductivity (salinity), temperature and pH guidelines over the past 3 years, however stream temperature is one degree higher than the sample site downstream.
- Dissolved oxygen compliance levels for these Little Yabba Creek sites are better than the Booloumba Creek sites. However stream temperatures are approximately the same as Booloumba Creek.
- Maintaining an overall grade of A (2010 – 2013 Waterwatch Grade = A)



- Excellent sample size (gold star award winner!)
- Southern Lowland Waters (<150m)
- Significant improvement in compliance with pH levels over the past 3 years
- Maintaining an overall grade of A (2010 – 2013 Waterwatch Grade = A)

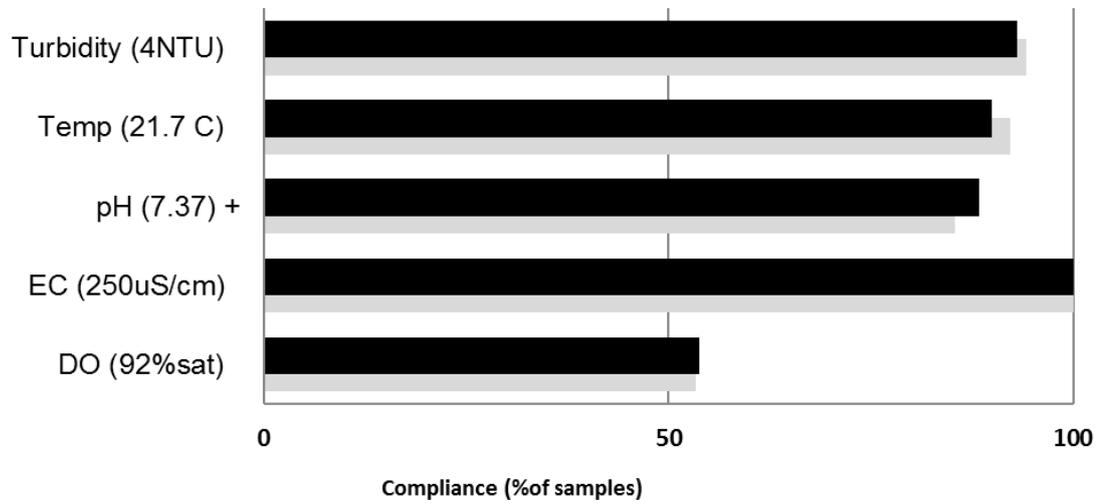


WaterWatch
Grade

Little Yabba Ck, mouth

LYC990

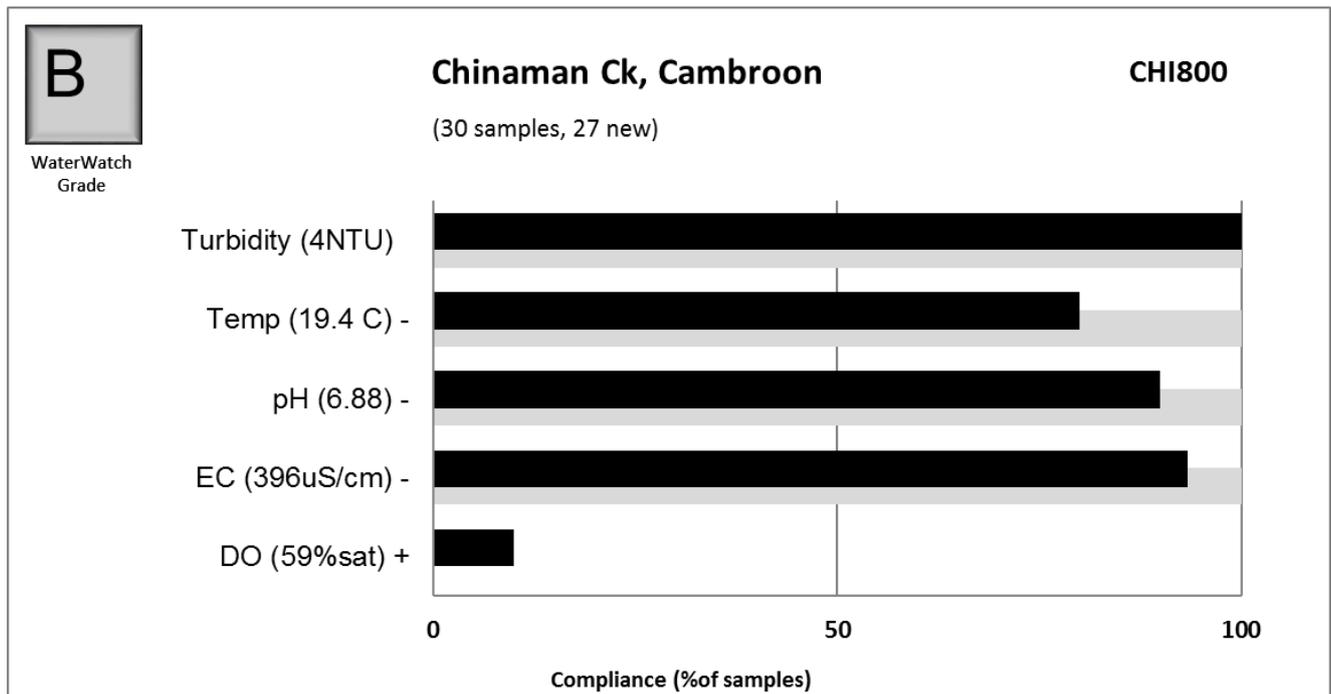
(130 samples, 27 new)



- Excellent sample size (gold star award winner!)
- Southern Lowland Waters (<150m)
- Significant improvement in compliance with pH over the past 3 years
- Excellent compliance with electrical conductivity (salinity)
- Maintaining an overall grade of A (2010 – 2013 Waterwatch Grade = A)

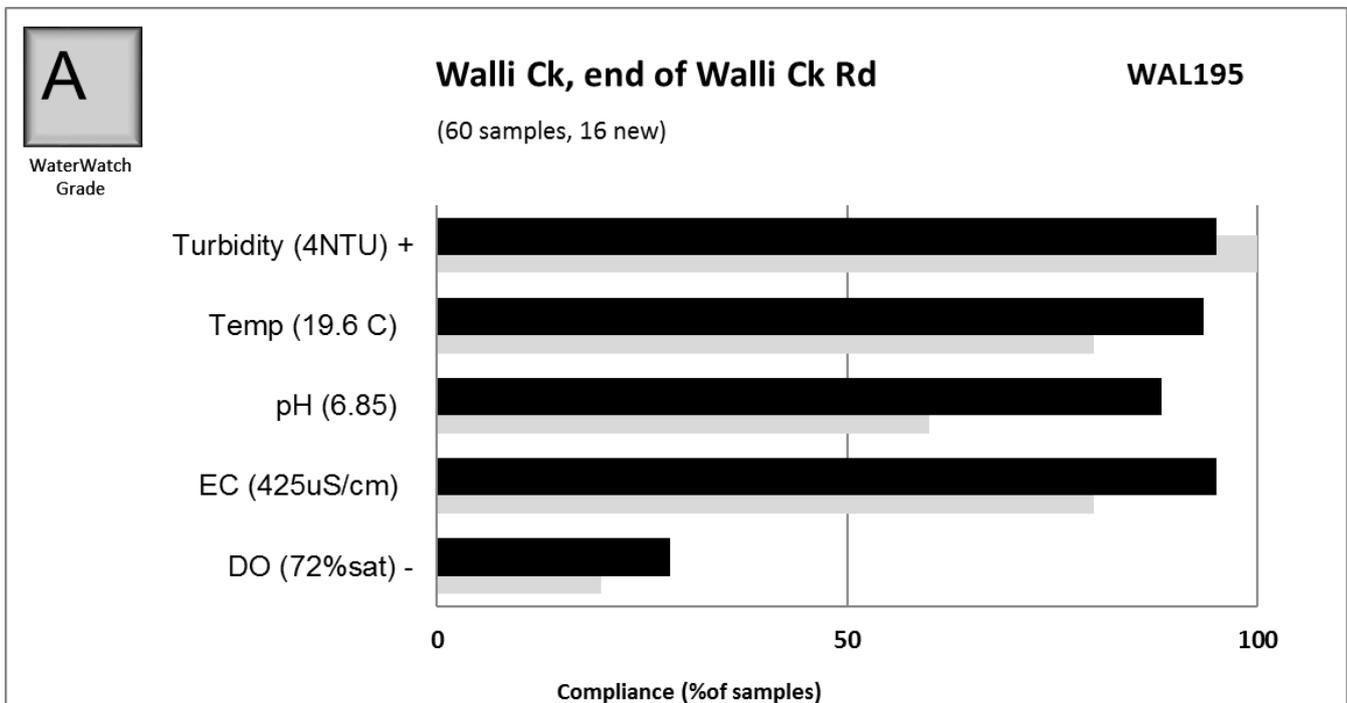
Tributaries of the Mary River

Chinaman Creek, Cambroon



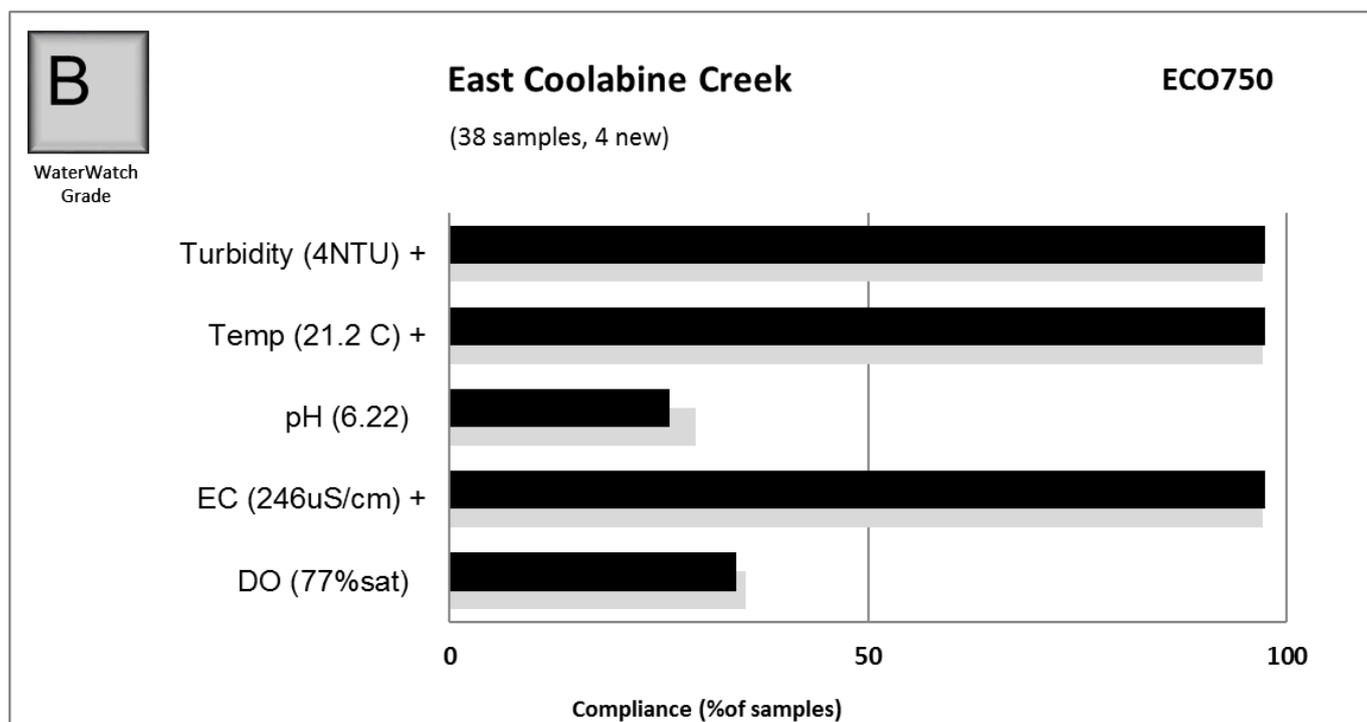
- New site, good sample size
- Southern Lowland Waters (<150m)
- Significant increase in compliance with dissolved oxygen, but % saturation levels are quite low
- Excellent compliance with turbidity
- On going monitoring of this site is required

Walli Creek, Kenilworth



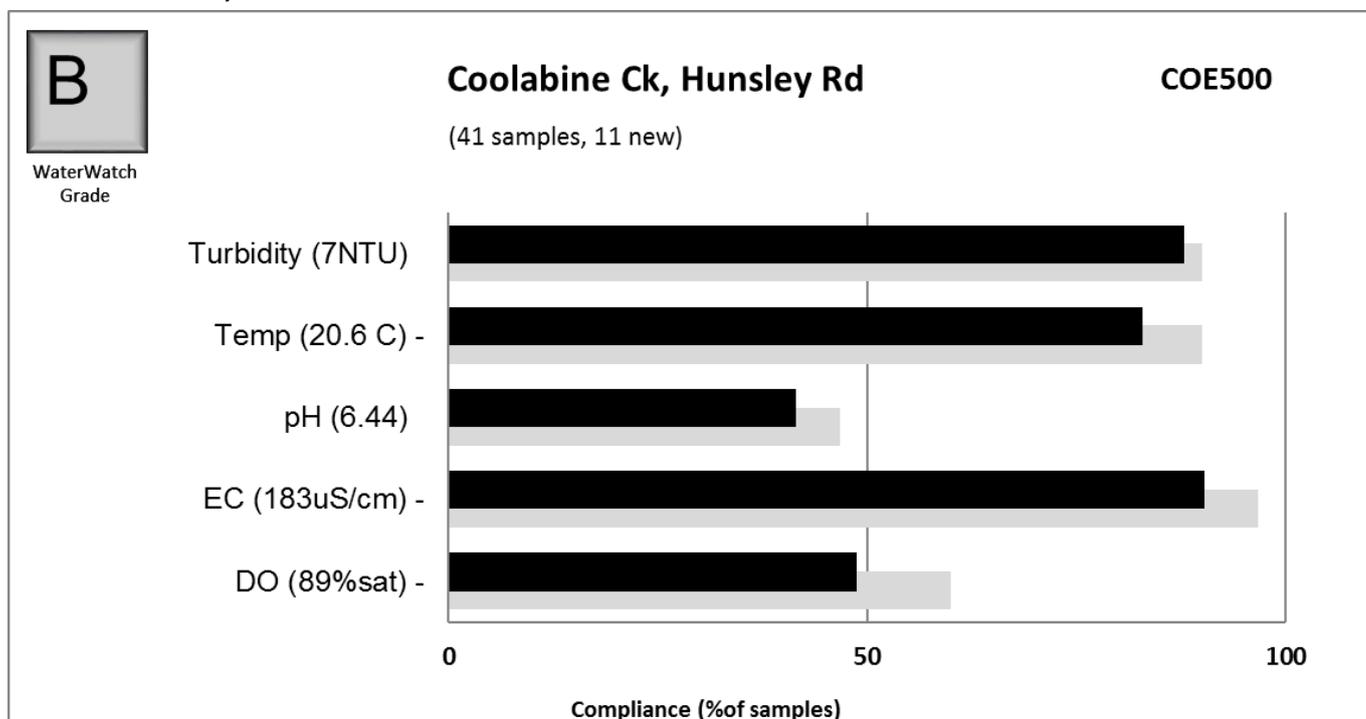
- Great sample size
- Southern Lowland Waters (<150m)
- Significant improvement in turbidity compliance over the past 3 years
- Maintained an overall grade of an A (2010 – 2013 Waterwatch Grade = A)

East Coolabine Creek, Kenilworth



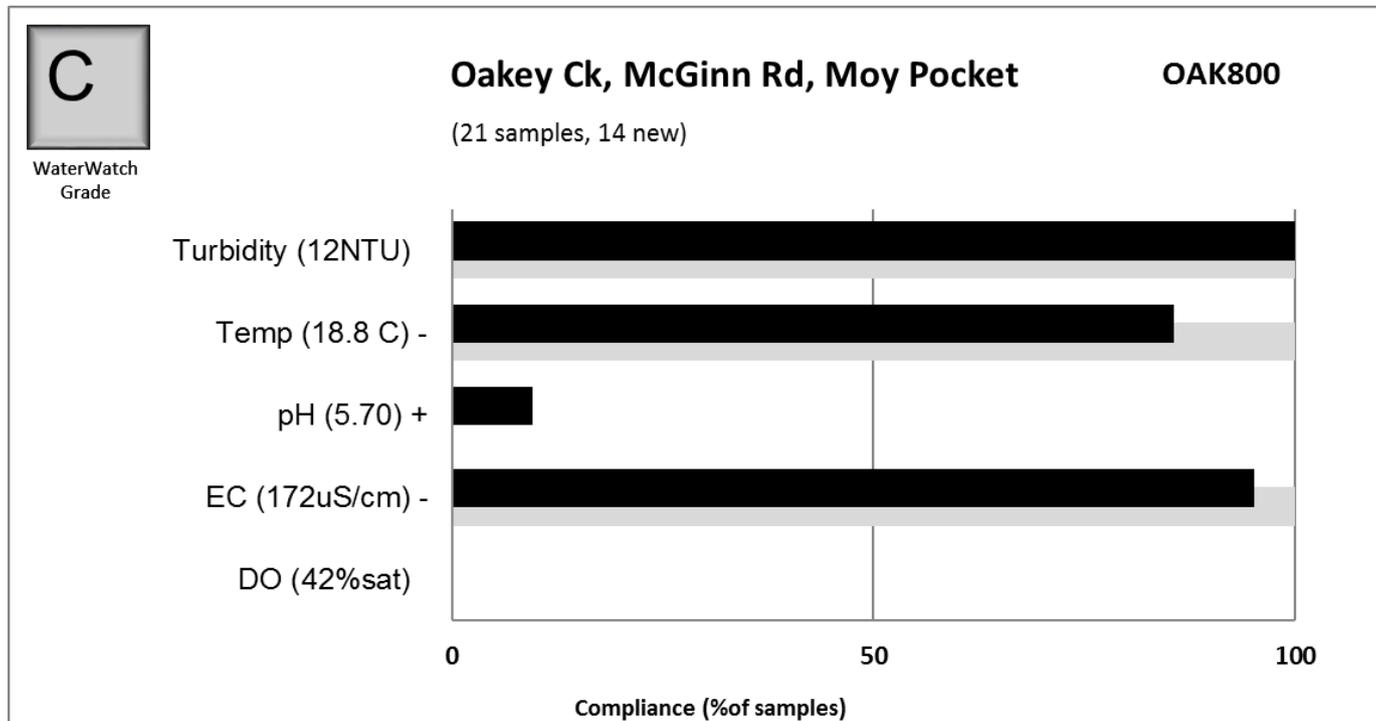
- Good sample size
- Southern Lowland Waters (<150m)
- Significant improvement in water temperature, electrical conductivity (salinity) and turbidity compliance with guidelines over the past 3 years
- Maintaining an overall grade of B (2010 – 2013 Waterwatch Grade = B)

Coolabine Creek, Kenilworth



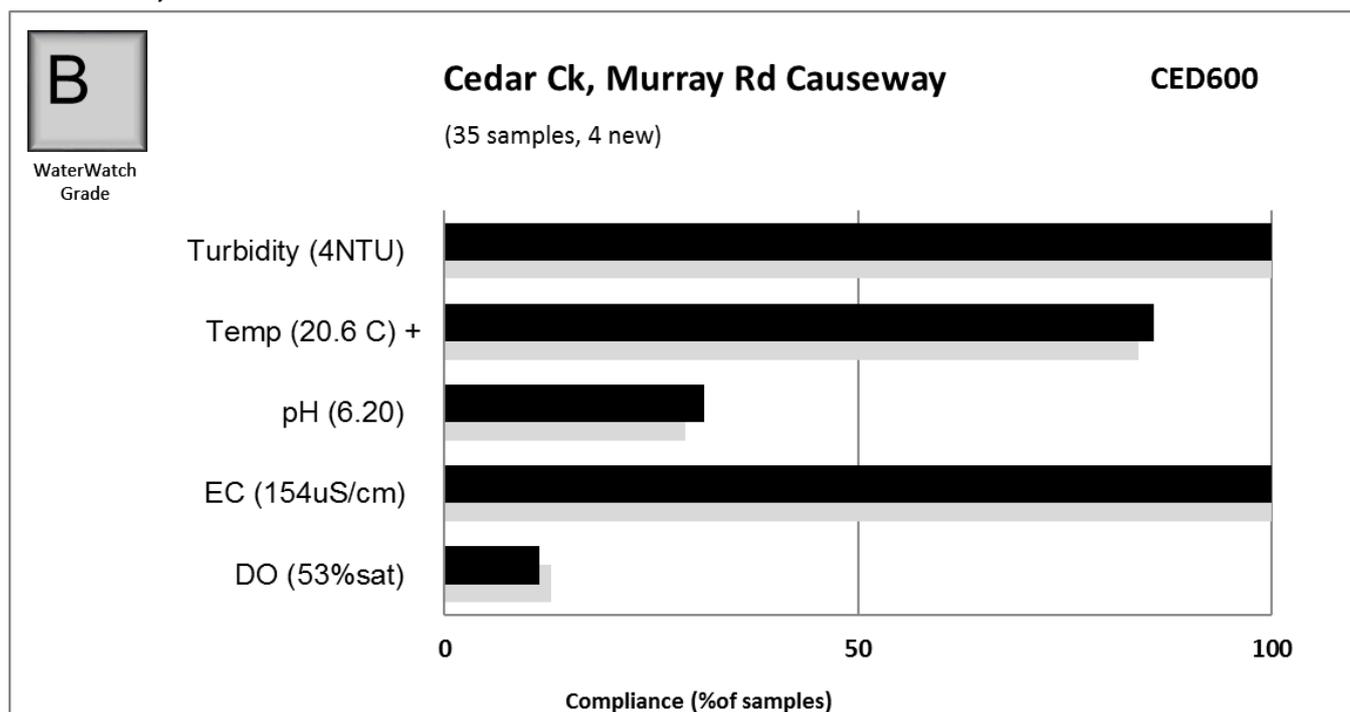
- Good sample size
- Southern Lowland Waters (<150m)
- A significant decline in compliance with temperature, electrical conductivity and dissolved oxygen guidelines over the past three years
- Maintaining a Waterwatch Grade of B (2010 Waterwatch Grade = A, 2013 Waterwatch Grade = B)

Oakey Creek, Moy Pocket



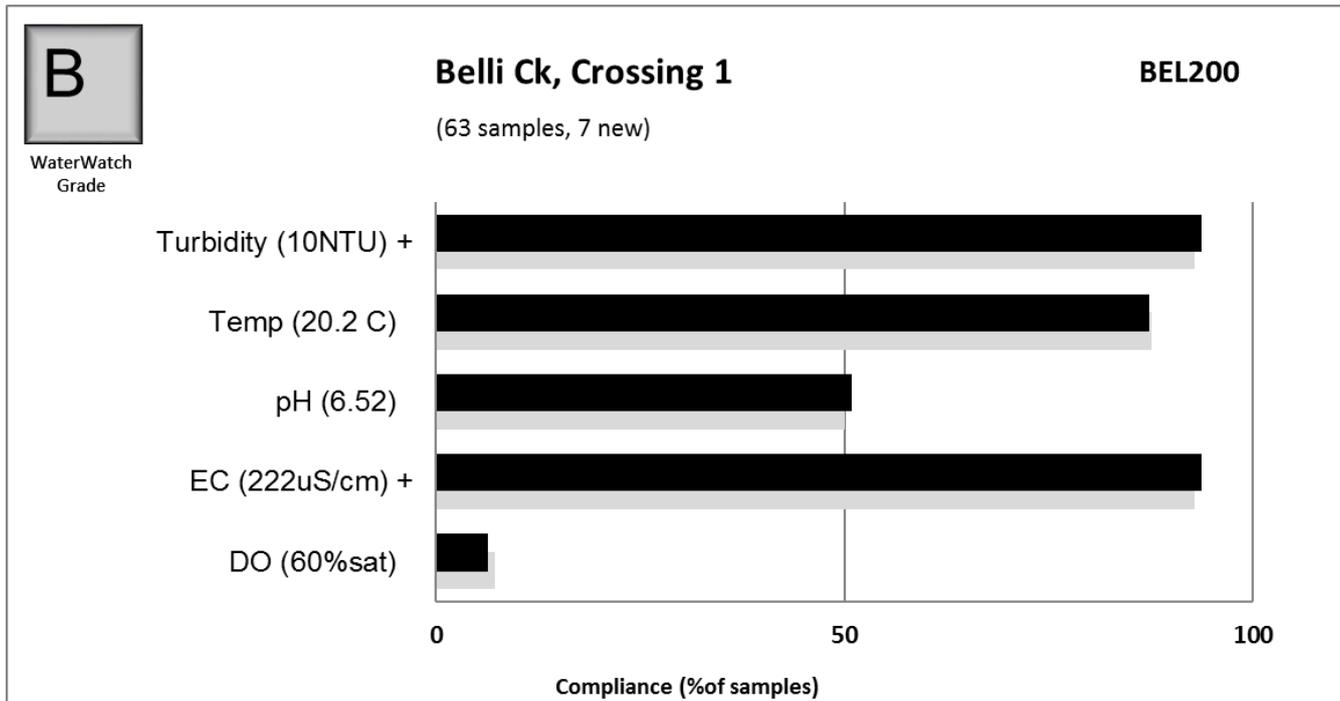
- New site
- Sample insufficient to make definitive comment on trends

Cedar Creek, Belli Park

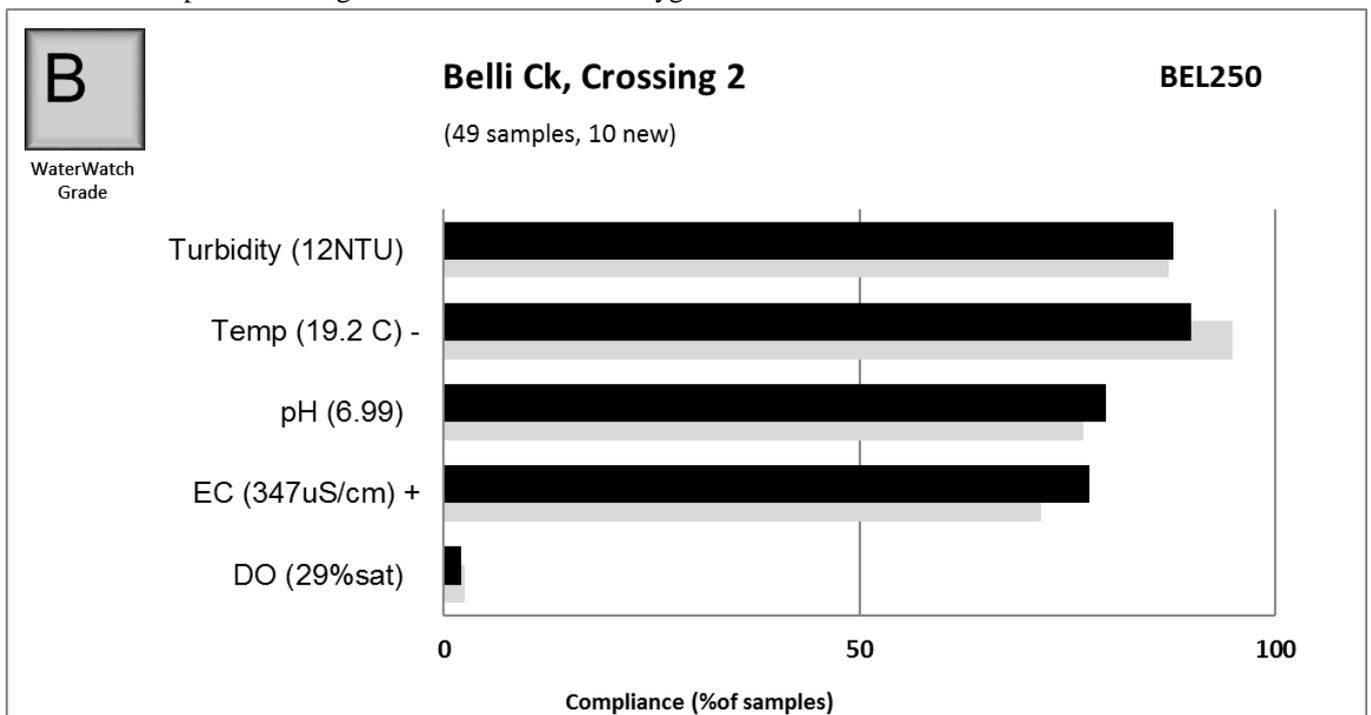


- Good sample size
- Southern Lowland Waters (<150m)
- Very low dissolved oxygen compliance results
- Excellent compliance with electrical conductivity (salinity) levels – very freshwater
- Ambient water quality at this site is quite acidic
- Significant improvement in temperature over the past three years
- Maintaining an overall grade of an B (2010 - 2013 Waterwatch Grade = B)

Belli Creek, Belli Park

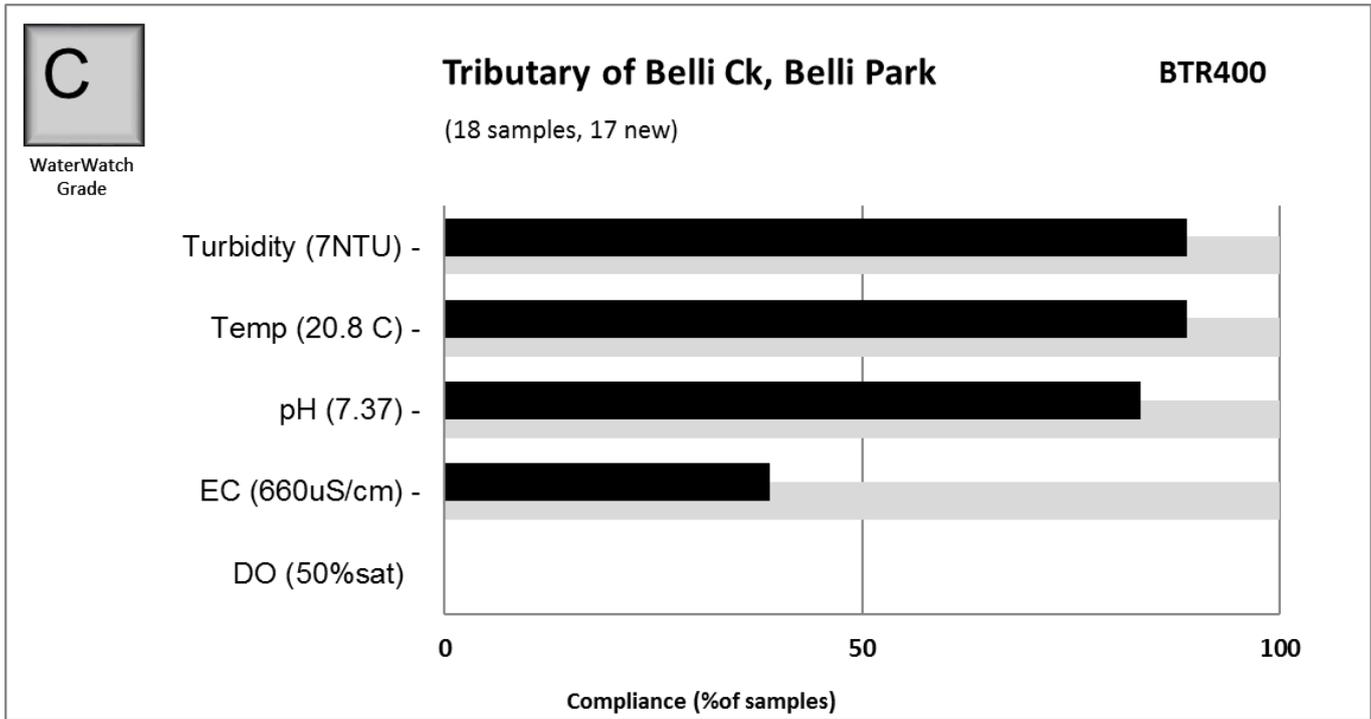


- Great sample size
- Southern Lowland Waters (<150m)
- Significant improvement in compliance for electrical conductivity (salinity) and turbidity over the past 3 years
- Low compliance with guidelines for dissolved oxygen



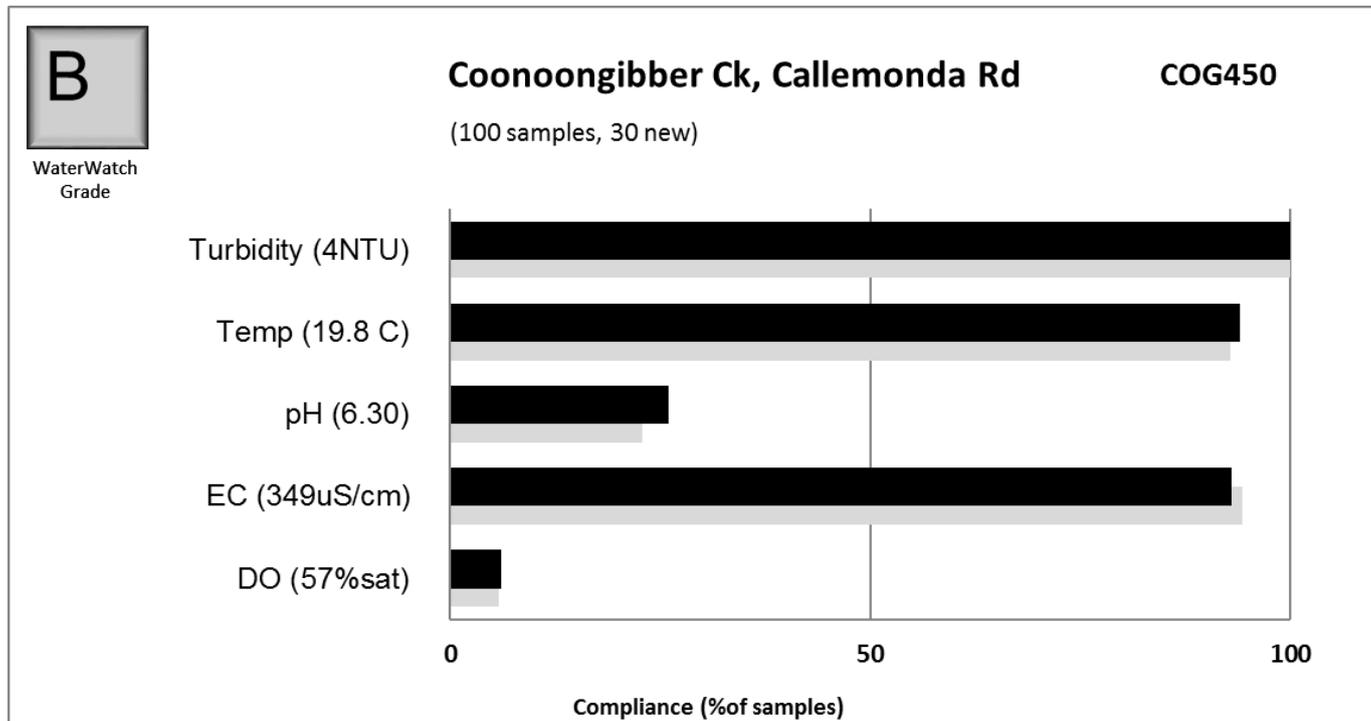
- Maintaining an overall grade of an B (2010 - 2013 Waterwatch Grade = B)
- Good sample size
- Significant improvement in compliance for electrical conductivity (salinity) over the past 3 years
- Significant decline in compliance for temperature over the past 3 years
- Very low compliance with guidelines for dissolved oxygen
- Less compliance with guidelines for electrical conductivity than the upstream Belli Creek site (BEL200), possibly due to a specific saline source between BEL200 and BEL250
- Maintaining an overall grade of an B (2010 - 2013 Waterwatch Grade = B)

Tributary of Belli Creek, Belli Park



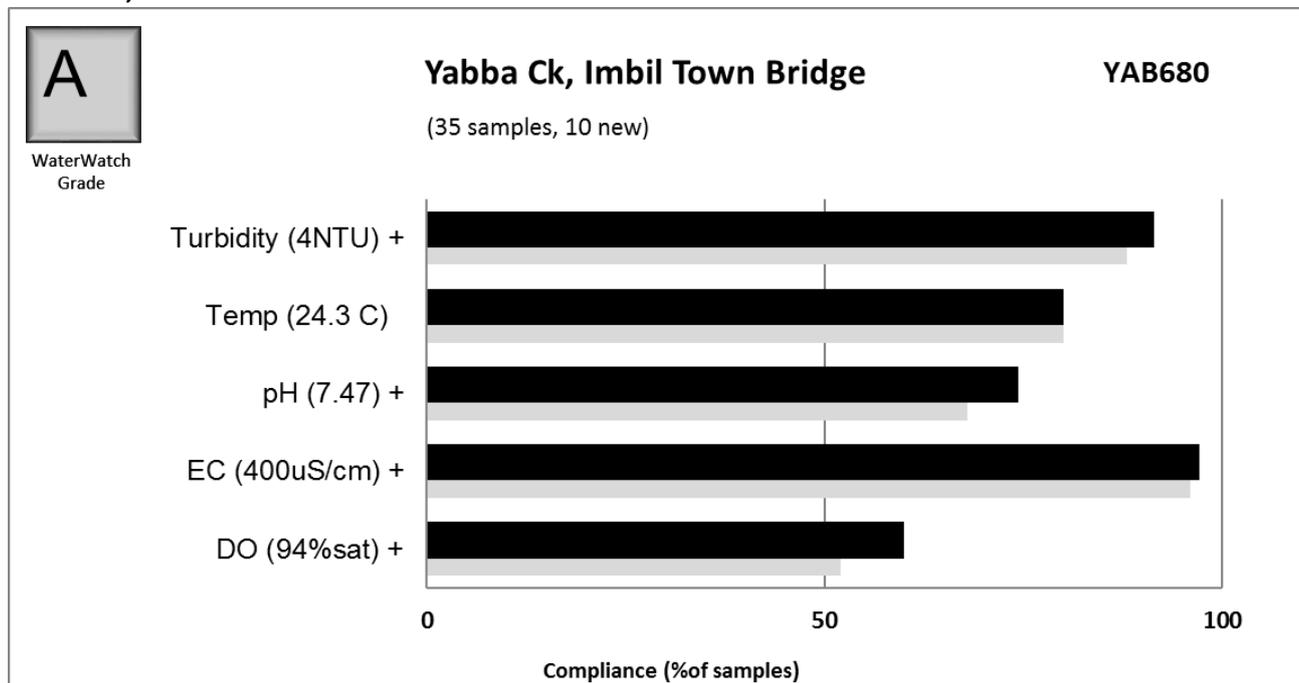
- New site
- Southern Lowland Waters (<150m)
- Sample insufficient to make definitive comment on trends

Coonoongibber Creek, Imbil



- Excellent sample size (gold star award winner!)
- Southern Lowland Waters (<150m)
- Turbidity consistently 100% compliant over the past three years and reflects low sediment loads
- Dissolved oxygen rarely compliant but does not indicate poor stream health
- Maintaining an overall grade of B (2010 – 2013 Waterwatch Grade = B)

Yabba Creek, Imbil



- Good sample size
- Turbidity levels are highly compliant with guideline level
- In the past this site has shown high pH levels (alkaline) because of profuse growth of aquatic plants and algae. However, pH compliance has improved significantly over the last 3 years
- Analysis shows DO levels have been highly variable at this site with 60% compliance and 94% median values
- Maintaining an overall grade of B (2010 – 2013 Waterwatch grade = B) over the past 3 years

Data Analysis

The MRCCC Waterwatch Report Card assessment is based on all data collected for each site. Using the Waterwatch data, we have developed a report card grade from an A to F for each of the Waterwatch sites. The report card grade is derived from the physical and chemical parameters monitored by the Waterwatch volunteers and is not a grade that represents the holistic health of the site or stream. To obtain a comprehensive overall rating of health we would need to collect data on other processes such as macroinvertebrates, nutrients, fish species, riparian zone health, etc. This is a future goal of the MRCCC. However the MRCCC Waterwatch Report Card Grade provides us with an excellent general rating of the physical/chemical water quality of our sites.

The Report Card grade for each site is determined by comparing the Waterwatch data results to the QLD Water Quality Objectives (WQO's) developed by the Environmental Protection Agency. For the parameters pH, DO, EC and turbidity, the number of times the parameters complied with the WQO's was calculated. This was then converted to a percentage to give a "percent compliance" figure for each parameter at each site. For example if 100 pH samples were taken, and 85 of them were within the accepted limits of the WQO guidelines, the site would score 85 percent compliance for pH. For temperature, percent compliance was calculated by comparing the results with the 90th and 10th percentile data from reference sites at Obi Obi Creek and Home Park, taking into account the season (i.e. higher expected temperatures in summer than in winter) and location in the catchment

A weighted average of percent compliance of the 5 measured parameters was then taken. DO was only given a half weighting due to the variable nature of spot DO measurements. Turbidity was also given a half weighting, as it is more informative if regular records are collected throughout high flow events. This average was then classed as an A, B, C or F based on the following:

A – Greater than 80 percent compliance. The water quality at this site is within the accepted WQO guidelines more than 80% of the time, and is considered to have **excellent water quality** compared to a reference site in excellent condition.

B – Between 66 and 80 percent compliance. The water quality at this site is within the accepted WQO guidelines more than two thirds of the time, and is considered to have **good water quality** compared to a reference site in excellent condition.

C – Between 50 and 66 percent compliance. The water quality at this site was within accepted WQO guidelines more than half of the time, and is considered to have **average water quality** compared to a reference site in excellent condition.

F – Less than 50 percent compliance. The water quality at this site was *outside* the accepted WQO guidelines more than half of the time, and is considered to have **poor water quality** compared to a reference site in excellent condition.