

Gympie Region Waterwatch Report 2013 – 2016



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MRCCC Catchment Officers
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This report prepared with the assistance of the Gympie Regional Council Environment Levy

Introduction

Welcome to the 2016 edition of the Gympie Region water quality report card.

A new innovation for this edition is the combining of all the Waterwatch Networks in the Gympie Region into one single report. This provides a concise appraisal of the water quality of the Gympie Region in one single report, instead of two separate reports. Also included in this edition is some water quality data that is collected by members of the Kenilworth District Waterwatch Network. By including this information in the Gympie Region report a thorough snapshot of the region can be provided.

Four Waterwatch Networks water quality data is represented in this report, namely:

1. Imbil to Amamoor (Mary Valley) Waterwatch Network
2. Gympie to Curra (Gympie District) Waterwatch Network
3. Eastern Catchments (Tinana sub-catchment) Waterwatch Network
4. Widgee – Wide Bay Creeks Waterwatch Network

Some of the original volunteers of the Gympie-Amamoor Waterwatch network have been monitoring for over 10 years, which earns them a gold medal for Waterwatching! 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 late in 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 March 2015 Cyclone Marcia came through following an unusual path along the Great Dividing Range (from a trajectory of Yeppoon to Monto to Upper Kandanga) 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.

It is difficult to report any noticeably consistent trends over the past three years – at some sites the report card score has gone down e.g B to C, while at other sites the grade has gone up e.g. C to B. In the previous report (2012/13) there had appeared to be a general improvement to the water quality of the waterways within the Gympie Region. Native in-stream aquatic plants and riparian vegetation are recovering from the devastating floods of 2013. Waterwatch volunteers are encouraged to continue collecting data and comment on any interesting fauna and flora observations.

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 since the last report in 2013.



Bongmullerer Creek, Woolooga, December 2015

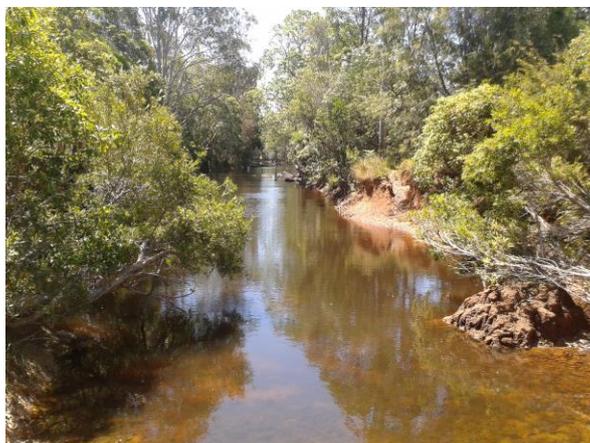
Waterwatch sites monitored in the Imbil – Amamoor (Mary Valley), Gympie – Curra, Wide Bay – Widgee Creeks & Eastern Mary Catchments Waterwatch Networks

Imbil to Amamoor (Mary Valley) Waterwatch Network		
Site Code	Creek Name	Location
AMA050	Amamoor Creek	South Branch, Amamoor
AMA100	Amamoor Creek	Bluebell Area, Amamoor
AMA800	Amamoor Creek	Town Bridge, Amamoor
ARA500	Araucaria Creek	HQP Imbil
CAS500	Caseys Gully	HQP Imbil
DER400	Derrier Creek	Cutters Camp, HQP Imbil
KAD499	Kandanga Creek	Upper Kandanga
KAD760	Kandanga Creek	Town bridge, Kandanga
KAD850	Kandanga Creek	Bunya Bridge, Kandanga
YAB600	Yabba Creek	Stirlings crossing, Imbil
YAB680	Yabba Creek	Town Bridge, Imbil
MAR240	Mary River	Pickering bridge, Moy Pocket
MAR290	Mary River	Old Moy Pocket Road, Moy Pocket
MAR300	Mary River	Walker Road, Moy Pocket

Gympie to Curra (Gympie District) Waterwatch Network		
Site Code	Creek Name	Location
SIX950	Six Mile	Rest area, Bruce Highway, Monkland
TRA500	Traveston Creek	Old Traveston Rd, Traveston
SRB750	Scrubby Creek	Benian Rd, The Palms
RLC300	Reedy Lagoon	Scotchy Pocket
RLC100	Reedy Lagoon catchment	Scotchy Pocket
GLA450	Glastonbury Creek	Geiger Road, Upper Glastonbury
ELC850	Eel Creek	Long Road, Pie Creek
DEE500	Deep Creek	Richardson Rd, Gympie
DEE650	Deep Creek	Junction of Tannery Ck, Gympie
DEE920	Deep Creek	Bruce Highway, Gympie
DEE950	Deep Creek	Confluence with Mary River, Gympie
MAR435	Mary River	Gilldora
MAR499	Mary River	Gympie weir
MAR565	Mary River	Reibels Crossing, Scotchy Pocket

Widgee Wide Bay Catchments Waterwatch Network		
Site Code	Creek Name	Location
FAT990	Fat Hen Creek	Oakview
GAP800	Gap Creek	Oakview
GLA450	Glastonbury Creek	Upper Glastonbury
WIB290	Wide Bay Creek	Kilkivan
WIB400	Wide Bay Creek	Oakview
WIB950	Wide Bay Creek	Sexton
WID095	Widgee Creek	Upper Widgee
WON195	Wonga Creek	Lower Wonga
WON200	Wonga Creek	Lower Wonga

Eastern Mary River Catchments Waterwatch Network		
Site Code	Creek Name	Location
BIG300	Big Sandy Creek	Toolara Forest
COO200	Coondoo Creek	Toolara Forest, Haylocks Road
COO350	Coondoo Creek	Toolara Forest, Hundreds Road
COO450	Coondoo Creek	Toolara Forest, Gillies Road
COO830	Coondoo Creek	Toolara Forest, Tin Can Bay Rd
SDY200	Sandy Creek	Toolara Forest, WP260
SDY550	Sandy Creek	Toolara Forest, WP256
YDS500	Yards Creek	Toolara Forest, WP272
ROS400	Ross Creek	Upstream of Hines Creek Goomboorian
ROS450	Ross Creek	Downstream of Hines Creek Goomboorian
SNY020	Sandy Creek	Sandy Creek Road, Downsfield
TAG500	Tagigan Creek	Tagigan Road Goomboorian
TIN220	Tinana Creek	Tagigan Road Goomboorian
TIN235	Tinana Creek	Tagigan Road Goomboorian
TIN265	Tinana Creek	Anderleigh Road Kia Ora
TIN380	Tinana Creek	Toolara Forest, WP240
ULI200	Ulirrah Creek	Toolara Forest, WP212 no report card
HIN400	Hines Creek	Goomboorian



Natural lagoons on Six Mile Creek, Traveston,
December 2015

Volunteers

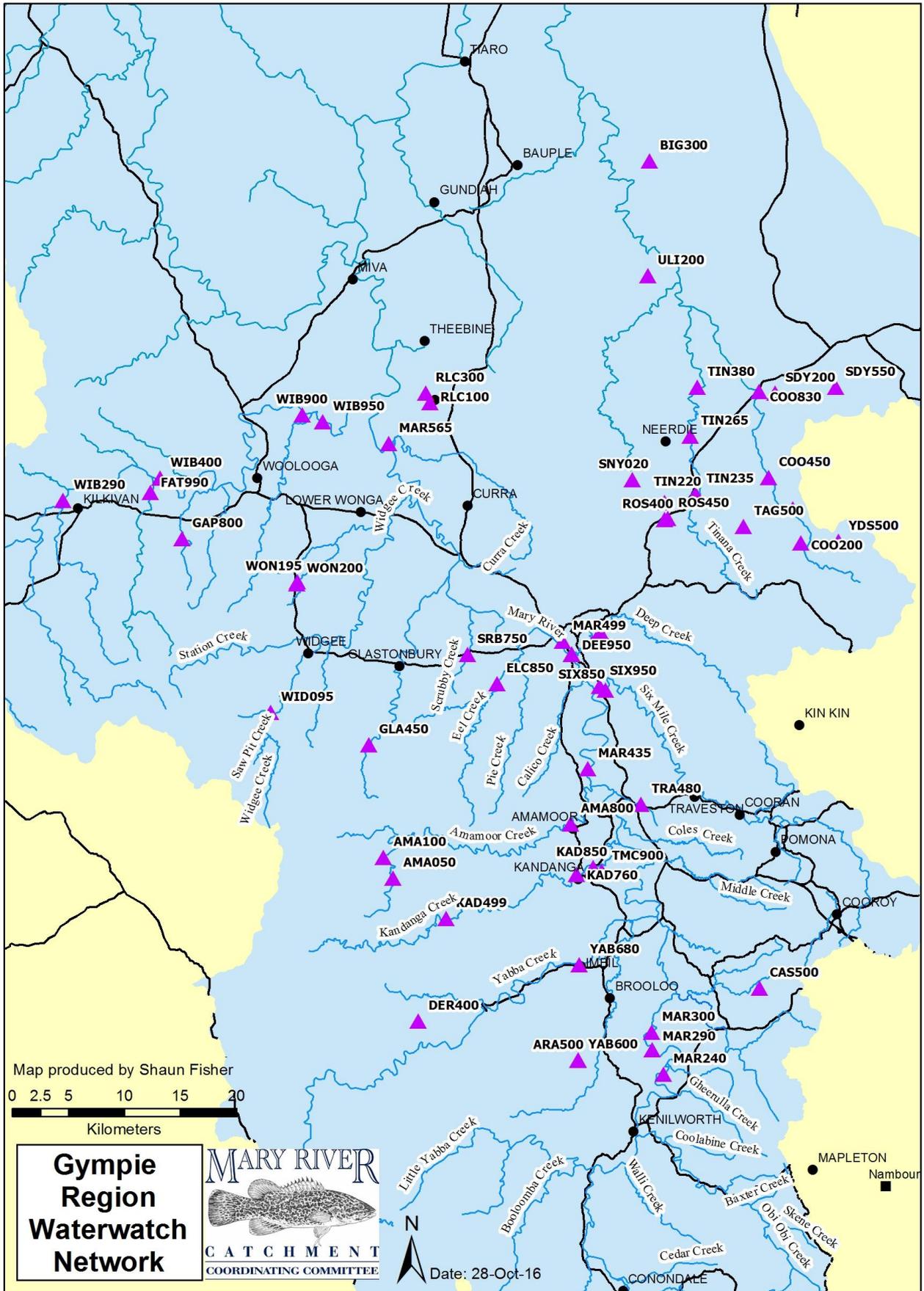
The MRCCC extends our thanks to the dedicated Waterwatch volunteers past and present for their continued effort, assistance and involvement in the Waterwatch network during 2013-16. Contributors to this monitoring program are: Kevin and Robin Jackson, Howard Kirby, Col and Cath Robinson, Craig and Lesley Hanson, Bob and Lorraine Hood, Bob Fredman, Noo Dye, Will Kingham, Jason Buckley, Dan O'Reagan, HQP Imbil and Toolara staff, Les & Inge Giegler, David Wilson, Brian Thomas, Errol Janke, Yvonne, John & Gillian Crossley, Stephen Horseman, Mick Bambling, Anette Bambling, Keith and Christine Bagnall, Rob and Cathy Kerle.

Thanks to the Ross Creek Store, Amamoor Store, Bos Rural, Sauers Rural Supplies and Widgee Store for being a pick up point for the kit. New Volunteers who joined the program over this time are: Phil Herrington, Kylie Carr, Charlie McIntosh, Alan and Tracey Petersen, Joolie Gibbs, Becky Watson, Annette Bourke, Wendy McPherson, Bruce McCulloch, Tanzi Smith, Renee Brown and James Warner.

Thank you to the following retired Waterwatch volunteers: Kent Hutton, Lorne and Ross Maitland, Shane Litherland, Graeme Draper, Jeff Clifton, Bart Schneemann, Bec Owen, Karen Flynn, Mara Vucak, Dave and Janet Golding, Narelle Hall, David and Rosemary Burnett.



Waterwatch sites monitored in the Imbil – Amamoor (Mary Valley), Gympie – Curra, Wide Bay – Widgee Creeks & Eastern Mary Catchments Waterwatch Networks



Monitoring Methods

Sites monitored by the networks 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 within the Mary River 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 Queensland Water Quality Guidelines

Report Card grades are based on Waterwatch data compliance with Aquatic Ecosystems guideline values outlined in the Qld Water Quality Guidelines.

(Environmental Protection Agency, 2006 and Department of Environment and Resource Management 2009): Different guidelines are applicable to different sub-catchments of the Mary Catchment.

In the Gympie Region Waterwatch report 3 different guidelines have been used to suit the variety of different sites:

1. Mary Catchment north eastern lowland and southern lowland freshwater guidelines
2. Mary Catchment lowland freshwater guidelines with Western Mary electrical conductivity guidelines
3. Mary Catchment tannin stained freshwater guidelines (Eastern Mary Catchments)

Water Quality Guidelines	
<p>Mary Catchment north eastern and southern lowland freshwater guidelines</p> <p>Lowland freshwaters (<150m) in the main trunk of the Mary River and all Eastern tributaries which drain into the Mary River downstream of Six Mile Creek and upstream of Deep Creek, except for Eastern Sandplain Tannin Stained Waters</p>	<p>Electrical Conductivity 0 – 580 µS/cm</p> <p>pH 6.5 – 8.0</p> <p>Dissolved Oxygen 85 – 110 % saturation</p> <p>Turbidity 0 – 50 NTU</p> <p>Summer Temperature 18 – 30 °C</p> <p>Winter Temperature 13 – 24 °C</p>
<p>Mary Catchment lowland freshwater with Western Mary electrical conductivity</p> <p>Lowland freshwaters (<150m) in all western tributaries which drain into the Mary River downstream of Six Mile Creek. As well as Gutchy Creek and its tributaries</p>	<p>Electrical Conductivity 0 – 1200 µS/cm</p> <p>pH 6.5 – 8.0</p> <p>Dissolved Oxygen 85 – 110 % saturation</p> <p>Turbidity 0 – 50 NTU</p> <p>Summer Temperature 22 – 30 °C</p> <p>Winter Temperature 16 – 24 °C</p>
<p>Mary Catchment tannin stained freshwater guidelines (Eastern Mary Catchments)</p> <p>Tannin stained waters of the eastern tributaries of Tinana Creek</p> <p>*from footnotes in Mary WQO document for water bodies in the natural state</p>	<p>Electrical Conductivity 0 – 580 µS/cm</p> <p>pH 3.6 – 6.0*</p> <p>Dissolved Oxygen 85 – 110 % saturation</p> <p>Turbidity 0 – 50 NTU</p> <p>Summer Temperature 22 – 30 °C</p> <p>Winter Temperature 16 – 24 °C</p>

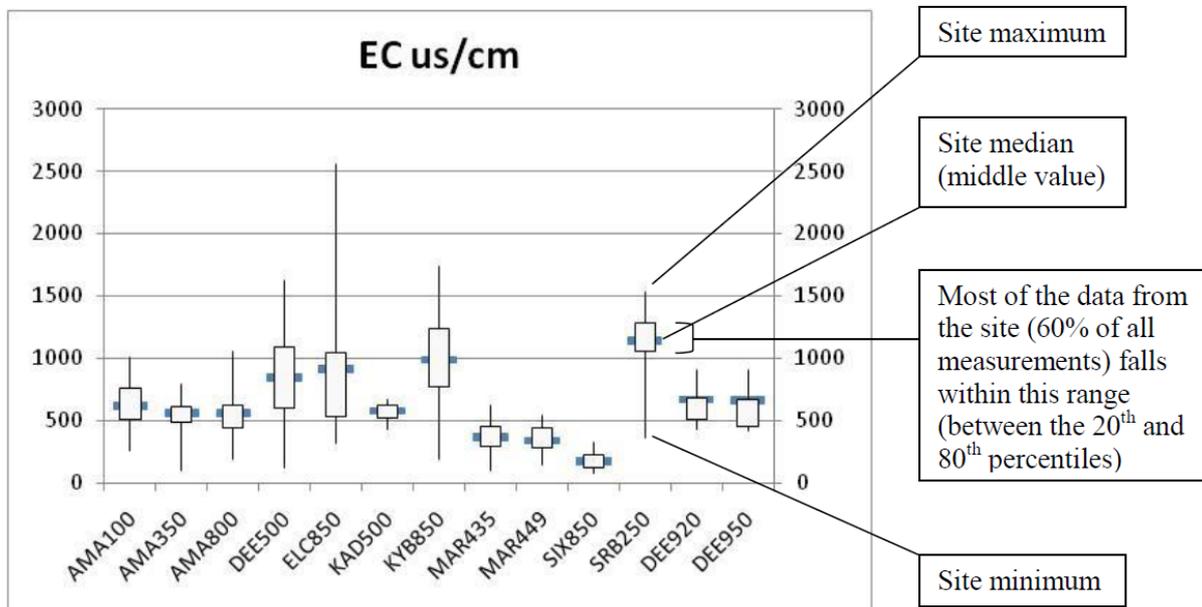
Results- inter-site comparisons

Within each waterwatch network, the spread of pH, EC 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.

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



**Long-term inter-site comparison of dissolved oxygen levels (all data collected)
in the Imbil to Amamoor (Mary Valley), Gympie to Curra, Widgee Wide Bay and Eastern Catchments
Waterwatch Networks**

- This graph illustrates all the long-term data collected from each site, not just the last three year's data – the red rectangle represents the dissolved oxygen guideline level of 85% to 110% saturation (dissolved oxygen should be between these levels to meet guideline values).
- Dissolved oxygen levels can change remarkably over the course of a day. In disturbed waterways with high nutrient and light levels, dissolved oxygen levels can vary over a wide range eg. 30% to 150%. In undisturbed waterways the oxygen levels are generally maintained within a smaller range eg. 90% to 100%.

Imbil to Amamoor (Mary Valley) and Gympie to Curra Waterwatch Network Dissolved Oxygen results

- The more ephemeral creeks, with high carbon inputs from leaf litter (eg. Six Mile, Tagigan and Coonoon Gibber Creeks etc.) have generally lower oxygen levels, accompanied by much more variability in dissolved oxygen level.
- Waterways with a more consistent flow regime generally show higher overall oxygen levels (eg. Yabba, Amamoor and the main trunk of the Mary).
- 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 MAR435).

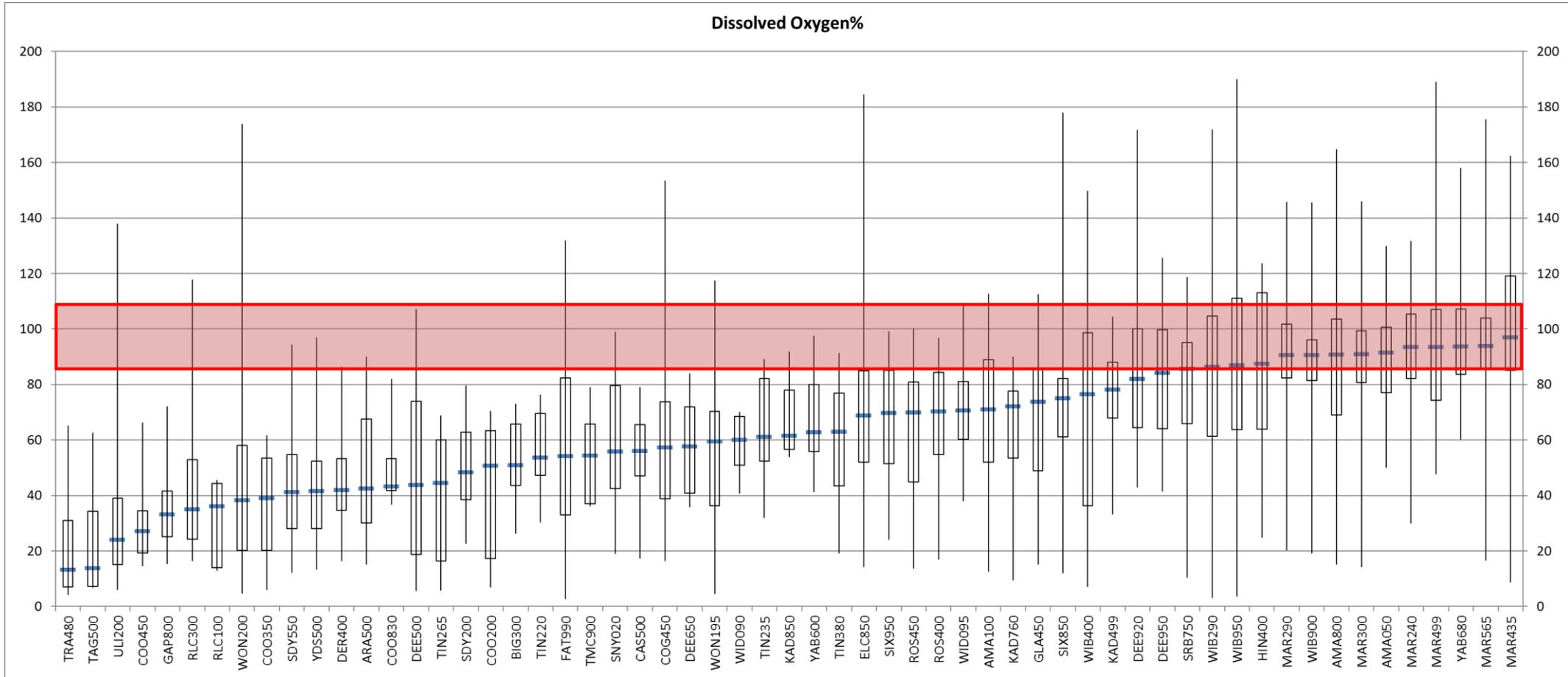
Widgee Wide Bay Waterwatch Network Dissolved Oxygen results (incl Scotchy Pocket and Glastonbury Creek)

- Generally all creeks within the Widgee Wide Bay network display large variation in dissolved oxygen levels due to significant periods of dry weather during the monitoring period with low overall compliance of all streams
- The Wide Bay Creek sites (WIB290 and WIB950) recorded relatively good compliance levels. These sample sites have large pools above the sampling site which may help to mitigate fluctuations in dissolved oxygen.
- The Scrubby Creek site (SRB750) has also recorded relatively good compliance.

Eastern Catchments (incl tannin stained waters east of Tinana Creek) Waterwatch Network Dissolved Oxygen results

- These tannin stained acidic water monitoring sites exhibit lower maximum dissolved oxygen levels than the other freshwater sites in the Gympie Region. It is assumed these sites have a naturally lower dissolved oxygen regime than sites located to the west. More data will help to identify the dissolved oxygen regime of these streams.
- 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 less disturbed waterways such as the above sites, the oxygen levels are generally maintained within a smaller range (eg. 60% to 80% for tannin stained waters).
- The more ephemeral creeks, with high carbon inputs from leaf litter have generally lower oxygen levels, accompanied by much more variability in oxygen level.

**Long-term inter-site comparison of dissolved oxygen levels (all data collected)
in the Imbil to Amamoor (Mary Valley), Gympie to Curra, Widgee Wide Bay and Eastern Catchments
Waterwatch Networks**



Long-term inter-site comparison of Electrical Conductivity (salinity) in the Imbil to Amamoor (Mary Valley), Gympie to Curra, Widgee Wide Bay and Eastern Catchments Waterwatch Networks

- This graph illustrates all the long-term data collected from each site, not just the last three year's data. The solid red line represents the lowland freshwater electrical conductivity guideline level of 580 us/cm – EC should be below this level to meet guideline values. The dotted line shows the Western Mary guideline value of 1200 us/cm (outlined in the Qld Water Quality Guidelines).
- These graphs reflect 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.

Imbil to Amamoor and Gympie to Curra Electrical Conductivity Results

- The Mary River, Yabba, Coonoon Gibber and Six Mile Creek sites have consistently complied with EC guidelines.
- Deep Creek consistently displays higher than guideline levels which has occurred since monitoring commenced in 2002.
- The tributaries within the Imbil HQP area display significantly high EC levels (Casey's Gully maximum EC reached 2970 us/cm).
- The Amamoor and Kandanga Creek sites median values are at or above the guideline level with the Three Mile Creek site (TMC900) median value approximately 1250us/cm.

Widgee Wide Bay Network Electrical Conductivity Results (including Scotchy Pocket and Glastonbury Creek)

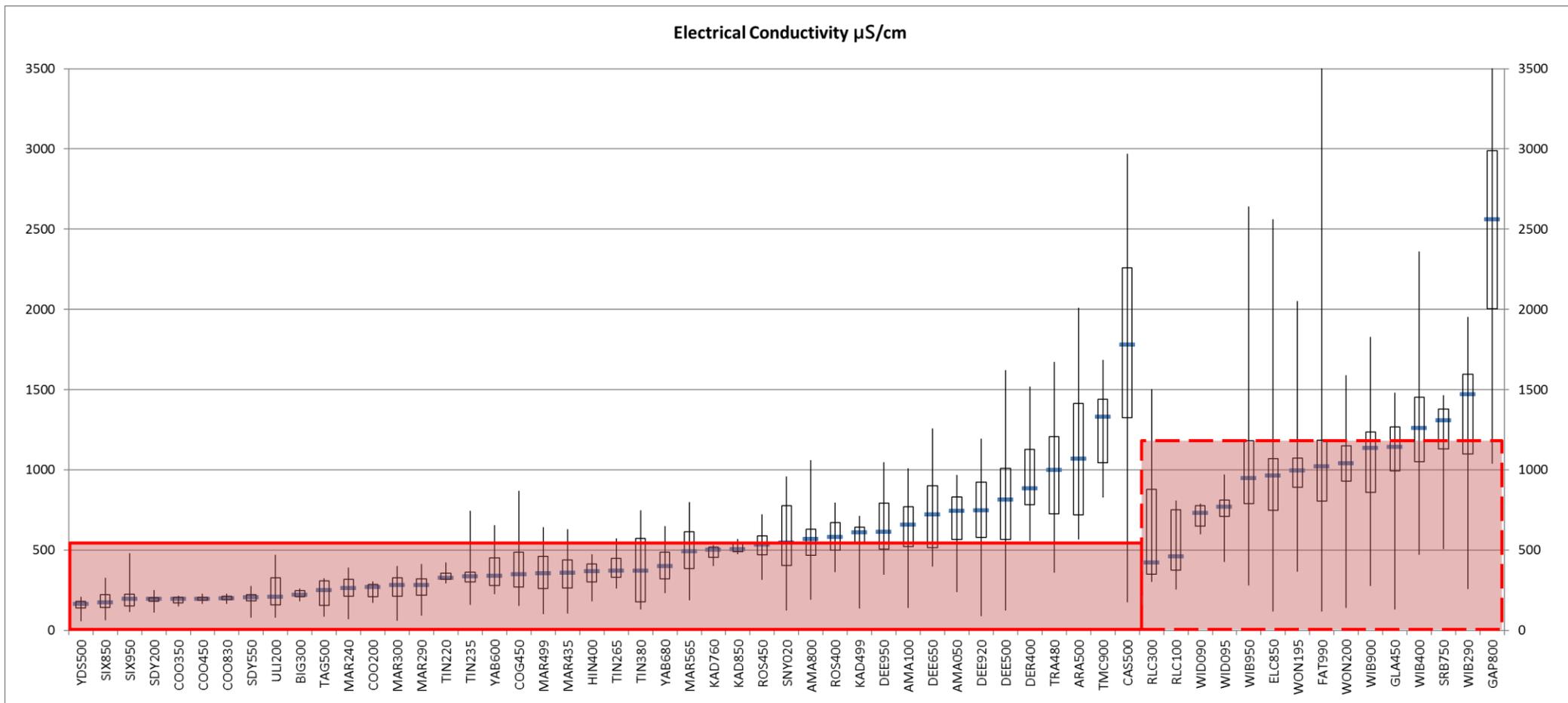
- These streams have a higher EC guideline compared to the other streams in the Gympie region.
- The Upper Widgee Creek sites (WID090 and WID095) display very minimal variation with good overall compliance.
- Overall EC levels in this network are higher than the levels observed in all the other Waterwatch networks of the Mary River catchment. However compliance is good for most sites with median levels falling at the maximum guideline level, except Wide Bay Creek, Kilkivan weir (WIB290) which exceeds the guideline level.
- Gap Creek (GAP800) is still a statistically different outlier in the Waterwatch network for electrical conductivity after many years of data collection.

Eastern catchments (incl tannin stained waters east of Tinana Creek) Electrical Conductivity Results

- These graphs reflect 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.
- These monitoring sites are significantly compliant with the EC guidelines.
- YDS500, SDY200, COO350, COO450, COO830, SDY550, BIG300 and COO200 sites are all located in the HQP Toolara State Forest.
- The TIN235 and TIN380 sites exhibit similar maximum EC values.
- These streams have the lowest EC results when compared to all the other streams in the Mary River catchment.

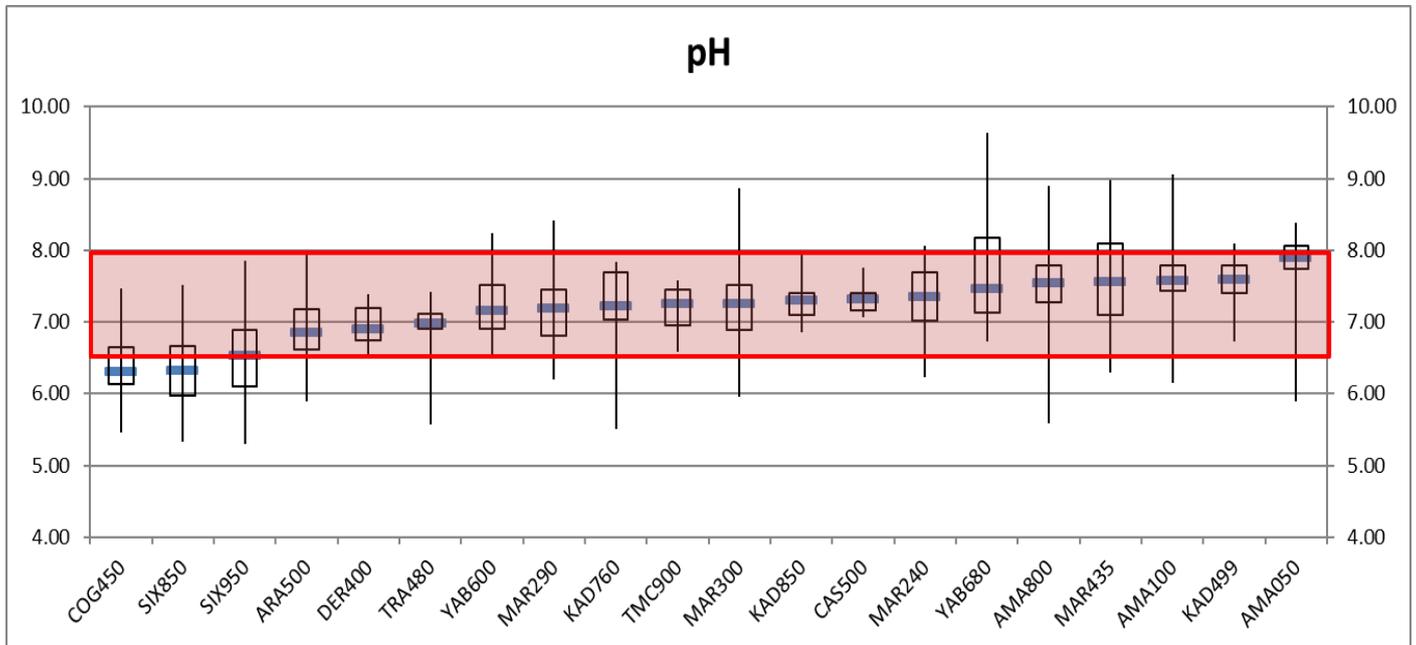
This area experiences high rainfall (up to 1800mm) being the closest streams to the coast.

**Long-term inter-site comparison of Electrical Conductivity (salinity)
in the Imbil to Amamoor (Mary Valley), Gympie to Curra, Widege Wide Bay and Eastern Catchments
Waterwatch Networks**



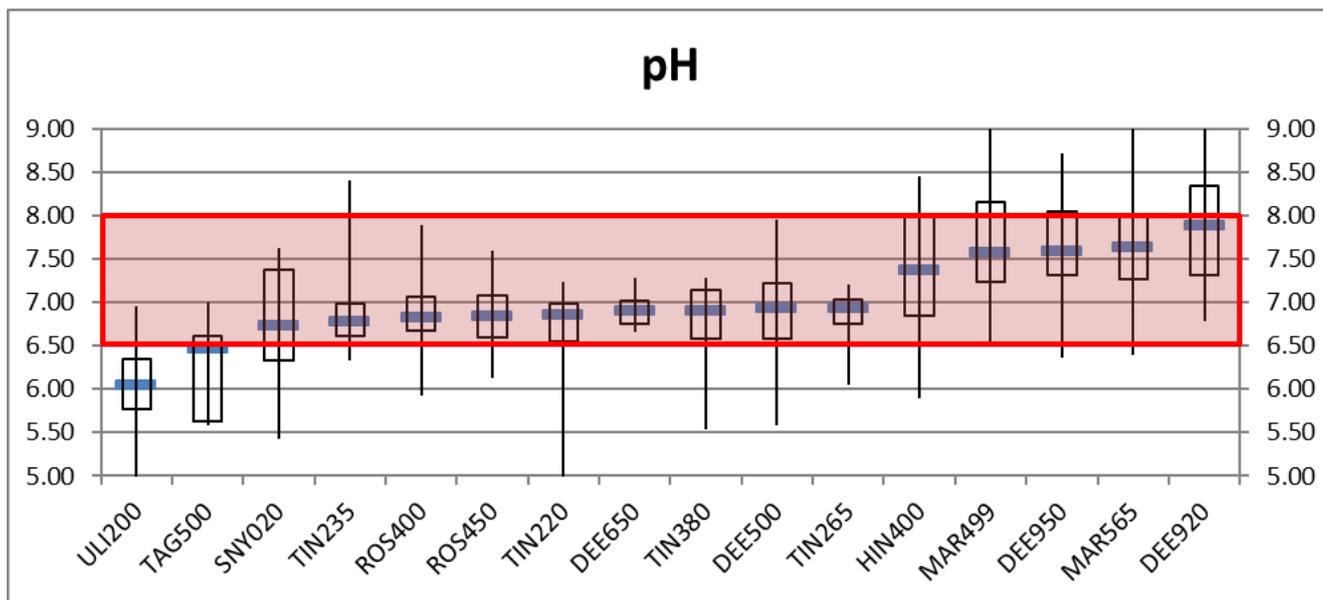
**Long-term inter-site comparison of pH
in the Imbil to Amamoor (Mary Valley), Gympie to Curra, Widgee Wide Bay and Eastern Catchments
Waterwatch Networks**

Imbil to Amamoor Network pH Results



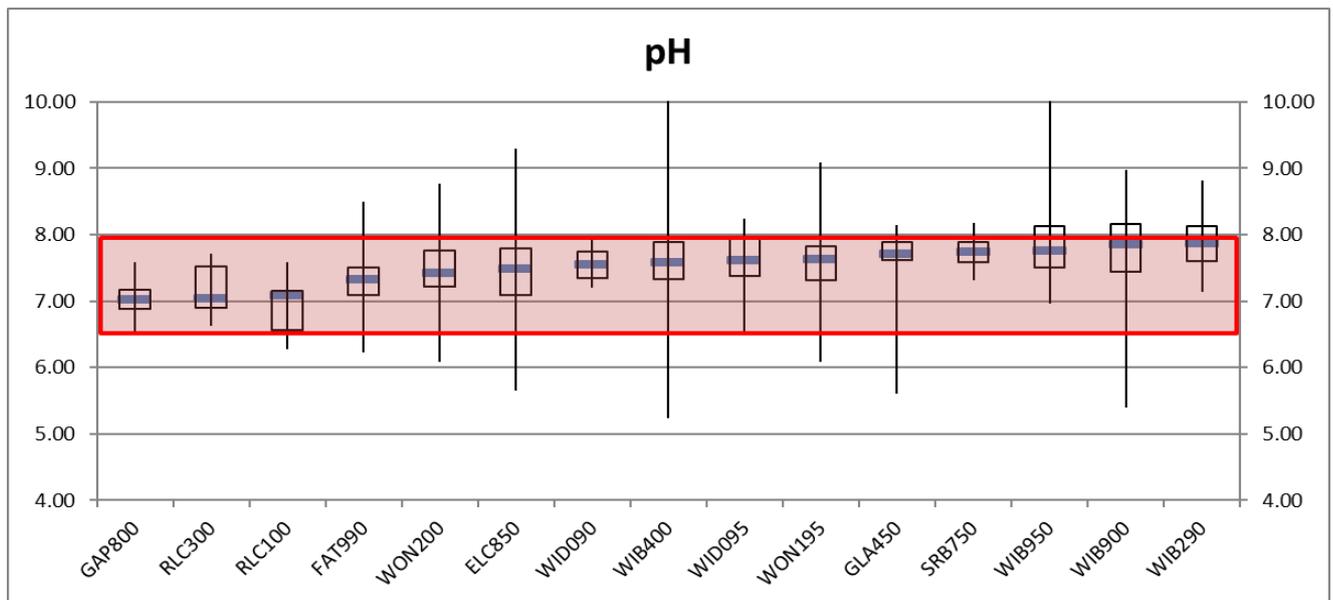
- This graph illustrates all the long-term data collected from each site, not just the last three year's data – the red rectangle represents the pH guideline level of 6.5 to 8 (pH should be between these levels to meet guideline values).
- Generally all sites in the Mary Valley show good compliance with pH guidelines.
- Six Mile Creek consistently shows low pH (acidic) levels, which is consistent with the nature of the sub-catchment. There is now a case for developing a set of local water quality guidelines for the Six Mile Creek catchment.
- High variability in pH can indicate eutrophication causing algae and weed growth eg. AMA800.

Gympie to Curra Network pH Results



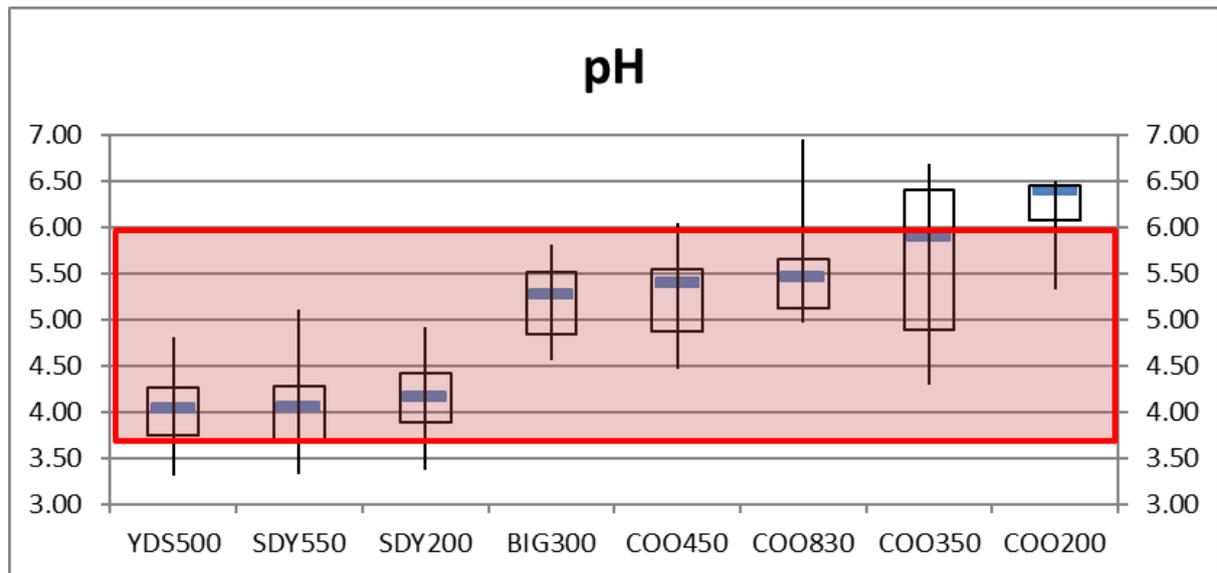
- This graph illustrates all the long-term data collected from each site, not just the last three year's data – the red rectangle represents the pH guideline level of 6.5 to 8 (pH should be between these levels to meet guideline values).
- Generally all sites in the Gympie District show good compliance with pH guidelines.
- Ulirrah Creek consistently shows low pH (acidic) levels, which is consistent with the nature of the sub-catchment.
- High variability in pH can indicate eutrophication causing algae and weed growth eg. the Deep Creek sites.
- The Mary River and Deep Creek sites are more alkaline compared to the other sites.

Widgee Wide Bay Network pH Results (including Scotchy Pocket and Glastonbury Creek)



- This graph illustrates all the long-term data collected from each site, not just the last three year's data – the red rectangle represents the pH guideline level of 6.5 to 8 (pH should be between these levels to meet guideline values).
- Generally all sites in the Widgee Wide Bay network show good compliance with pH guidelines.
- All sites apart from Gap Creek and the Reedy Lagoons have pH measurements greater than 7, indicating alkalinity.
- Gap Creek (GAP800) is consistently different from the other sample sites with consistently neutral pH.
- Wide Bay Creek (WIB400, WIB900 and WIB950) has recorded extreme variations in pH levels over the monitoring period with high variability in pH possibly indicating eutrophication causing algae and weed growth.

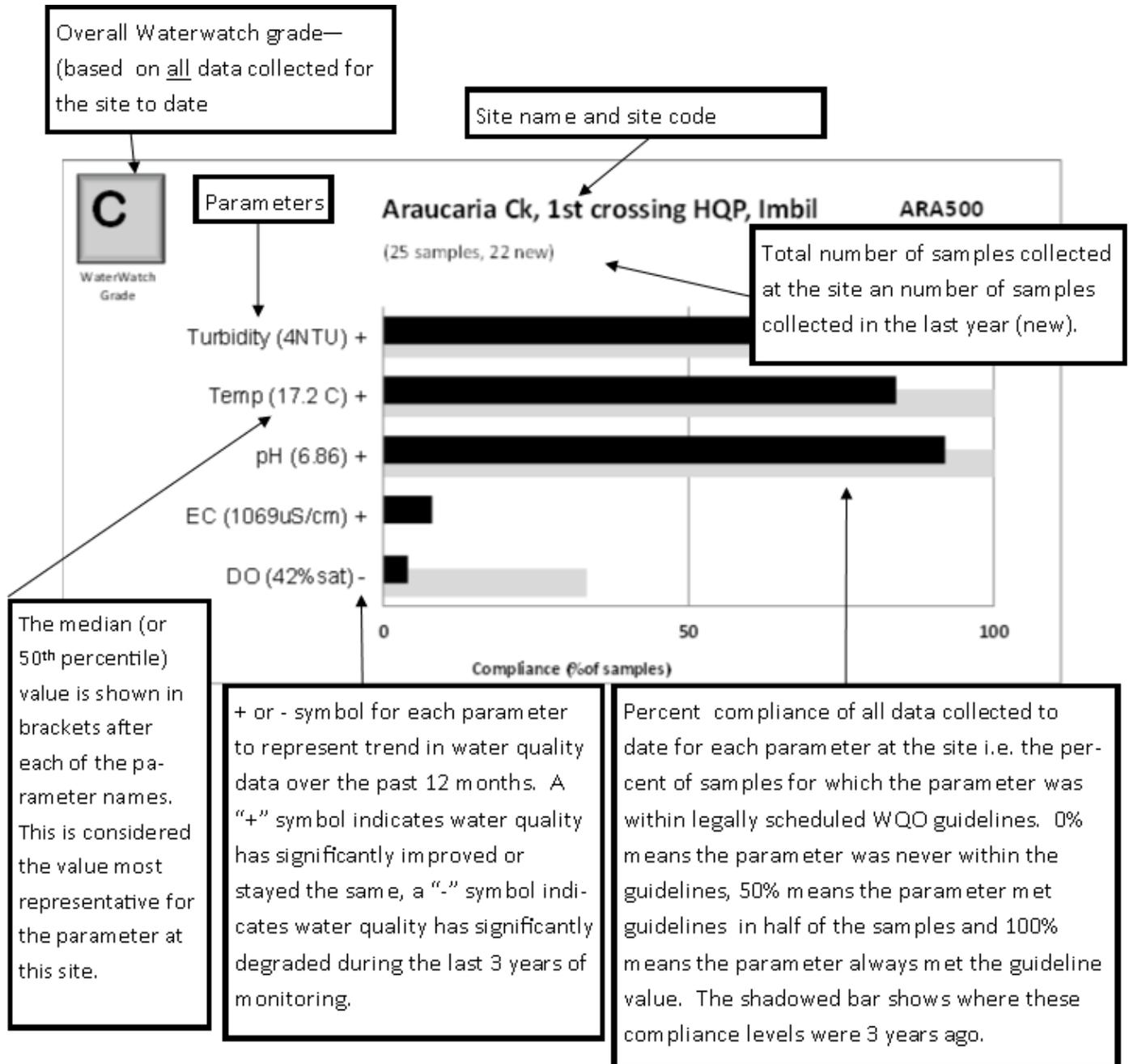
Eastern tannin stained , catchments east of Tinana Creek Electrical Conductivity Results

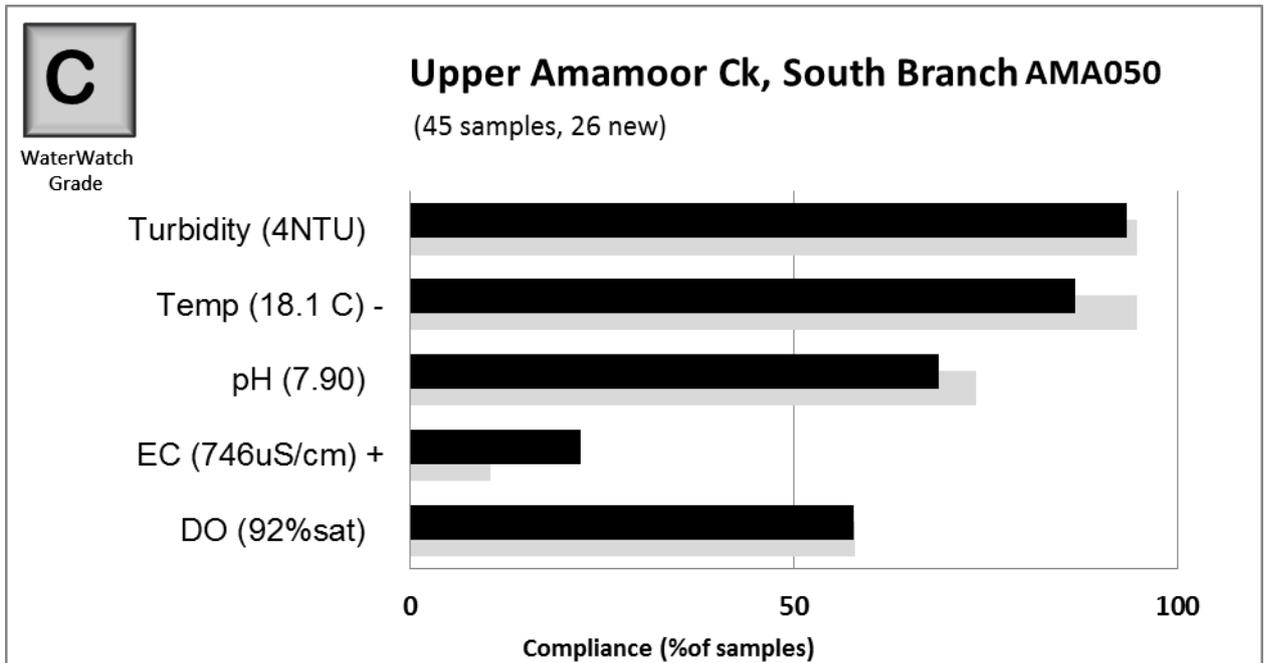


- This graph illustrates all the long-term data collected from each site, not just the last three year's data – the red rectangle represents the pH guideline level of 3.6 to 6 (pH should be between these levels to meet guideline values).
- These streams in the eastern section of the Mary River catchment have their own pH guideline due to their inherently acidic nature.
- All sites apart from the upper Coondoo Creek comply with these tannin stained, acidic water quality guidelines.
- The Yards and Sandy Creek sites are distinctly more acidic than the pH recorded at the other sites.
- More pH data from these sites is required to fully understand the complexities of these streams, in particular the Upper Coondoo Creek system.
- These sites are all located in the HQP Toolara State Forest.

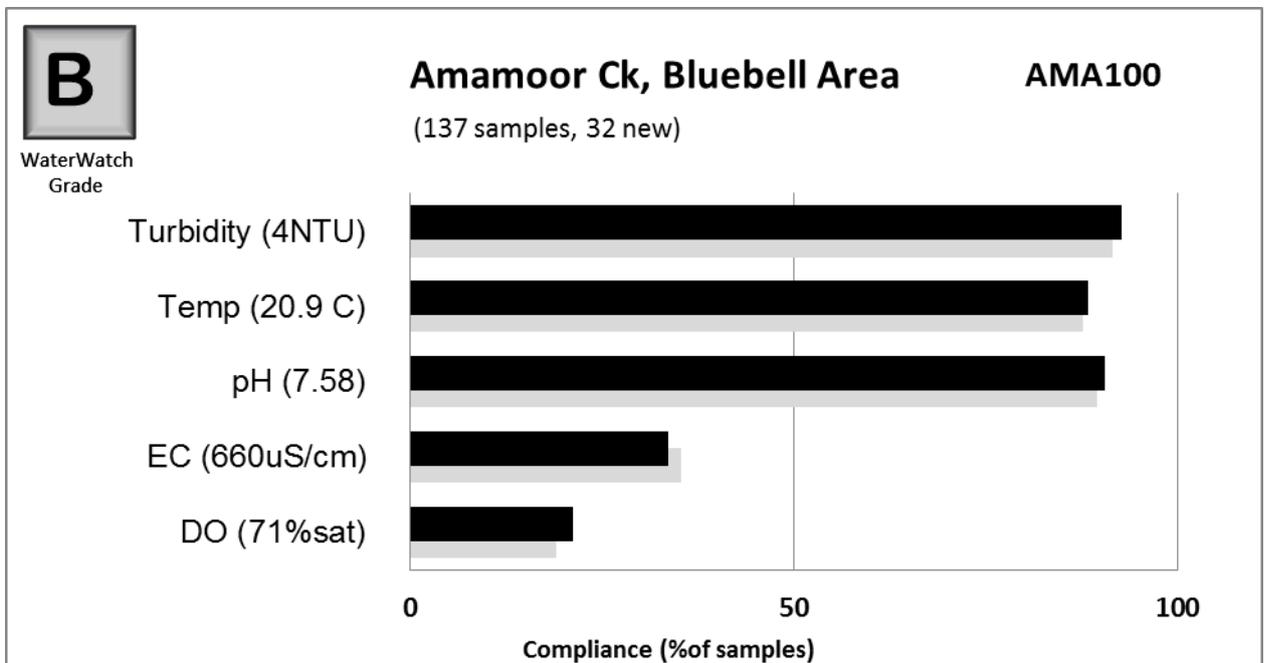
Results – site report cards

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.

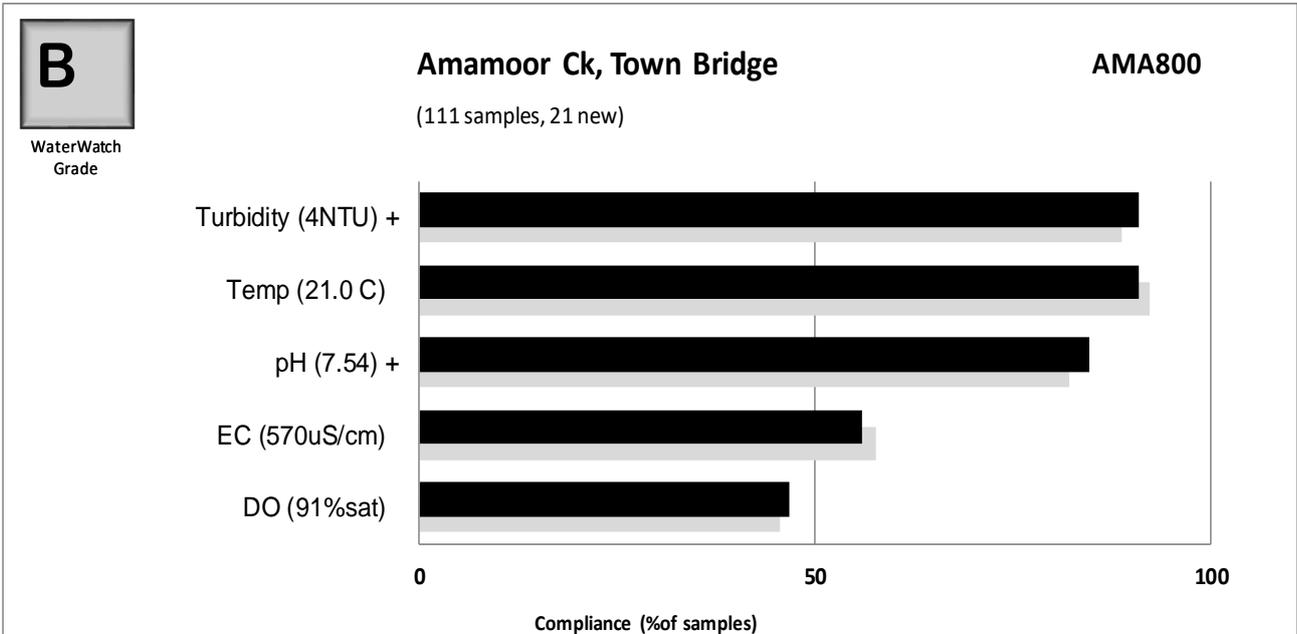




- Good sample size.
- A decline in compliance for temperature over the last three years which is contrary to the previous report where a temperature improvement was observed.
- Turbidity has remained very low, with good compliance.
- Electrical conductivity (salinity) levels rarely comply with guidelines - which is consistent with the nature of the sub-catchment. However, EC has significantly improved over the past three years.
- Maintaining an overall grade of C (2013 Waterwatch Grade = C) over the past 3 years.

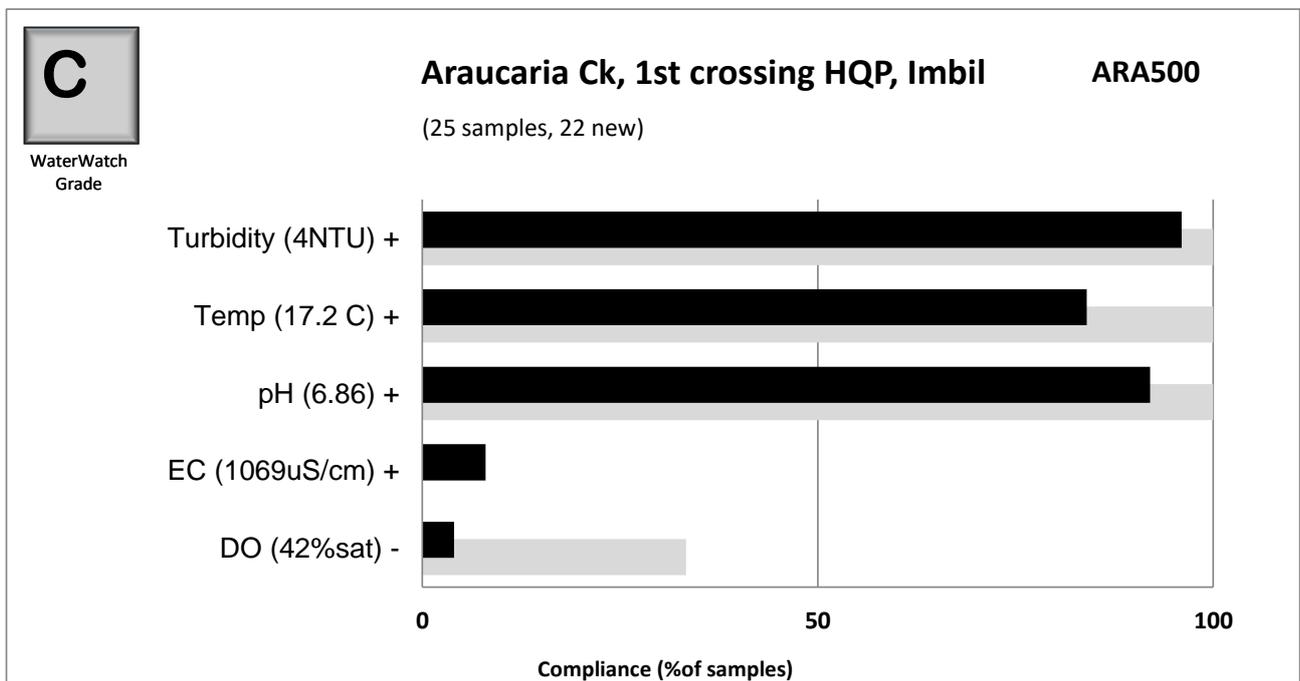


- Excellent sample size.
- Dissolved oxygen levels are gradually improving. Over the past three years dissolved oxygen is now more compliant than 2011/12 report and the 2013 report.
- Electrical conductivity (salinity) levels rarely comply with guidelines (see above comment).
- Very good turbidity results, reflected in low sediment loads of the sub-catchment.
- Maintaining an overall grade of B (2013 Waterwatch Grade = B) over the past 3 years.



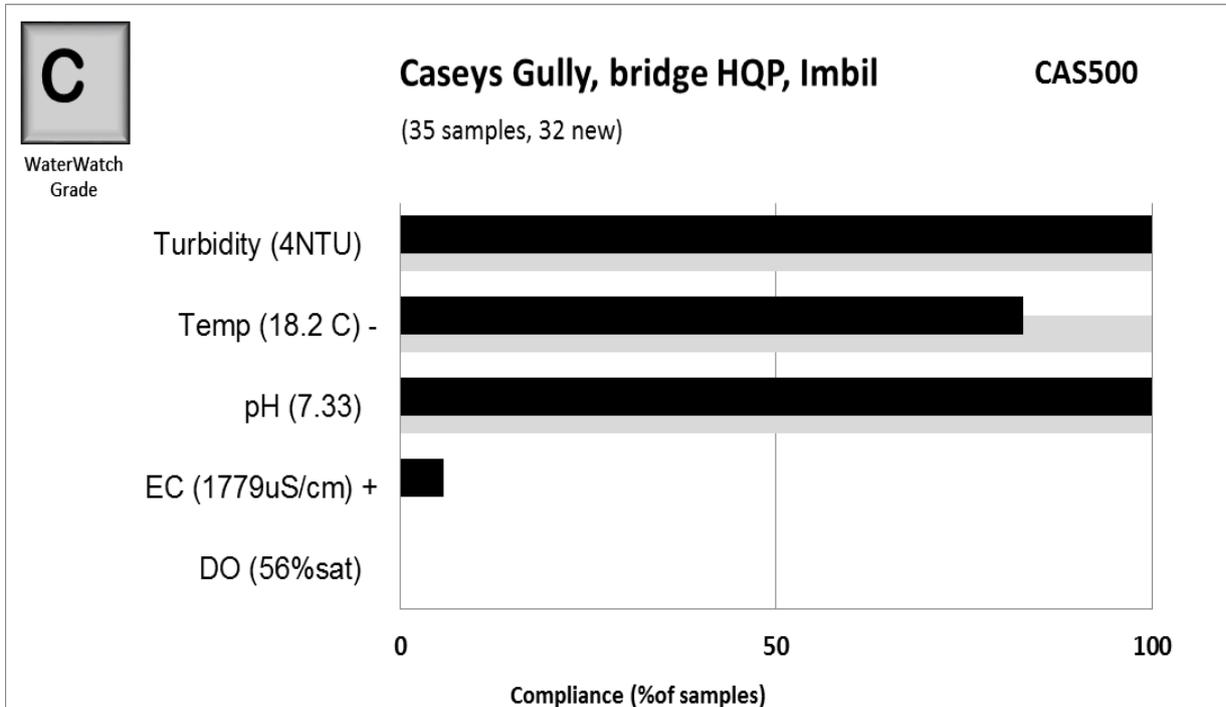
- Excellent sample size.
- This site has seen an improvement in compliance with pH and turbidity in the last 3 years.
- Better electrical conductivity (salinity) and dissolved oxygen compliance than Amamoor Creek, Bluebell – most likely due to more reliable creek flows because the site is located lower in the sub-catchment.
- Maintaining an overall grade of B (2013 Waterwatch Grade = B) over the past 3 years.

Araucaria Creek



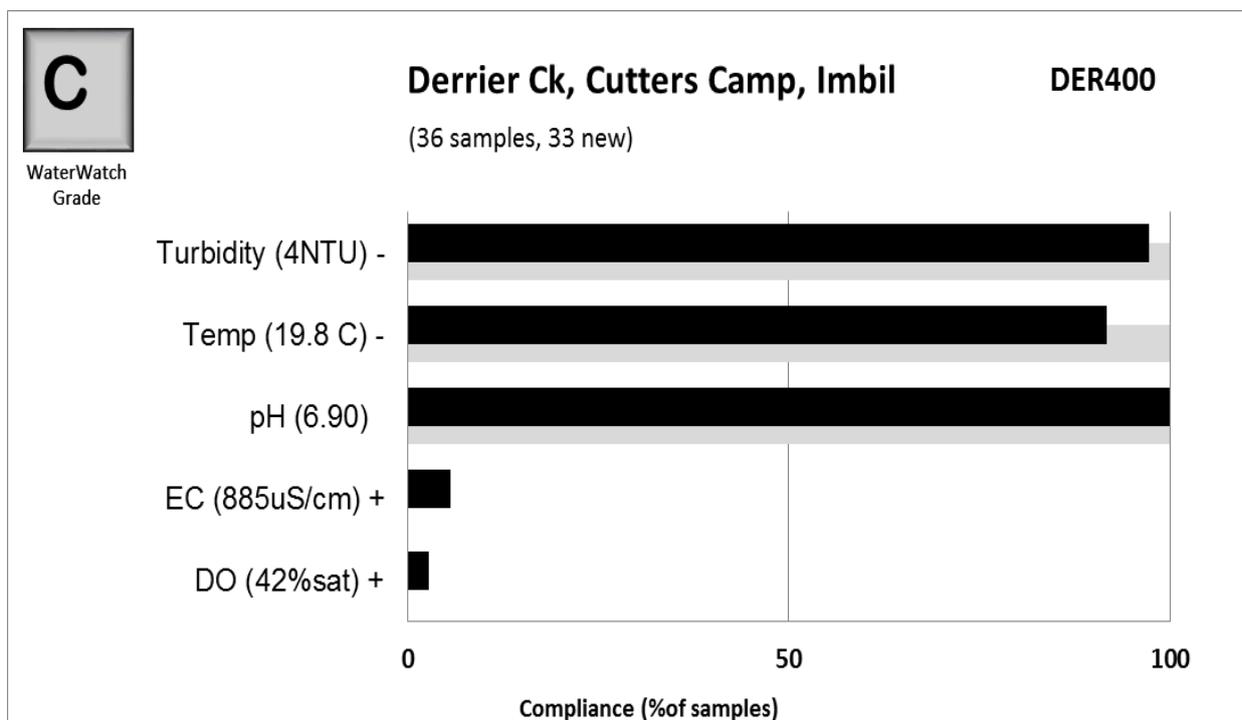
- New site, good sample size to make comments on trends.
- Consistently higher electrical conductivity (salinity) levels than other sub-catchments in the district – higher EC levels than Amamoor Creek, with very low compliance with guideline level.
- This site has highly variable dissolved oxygen levels resulting in a low compliance level overall.

Casey's Creek



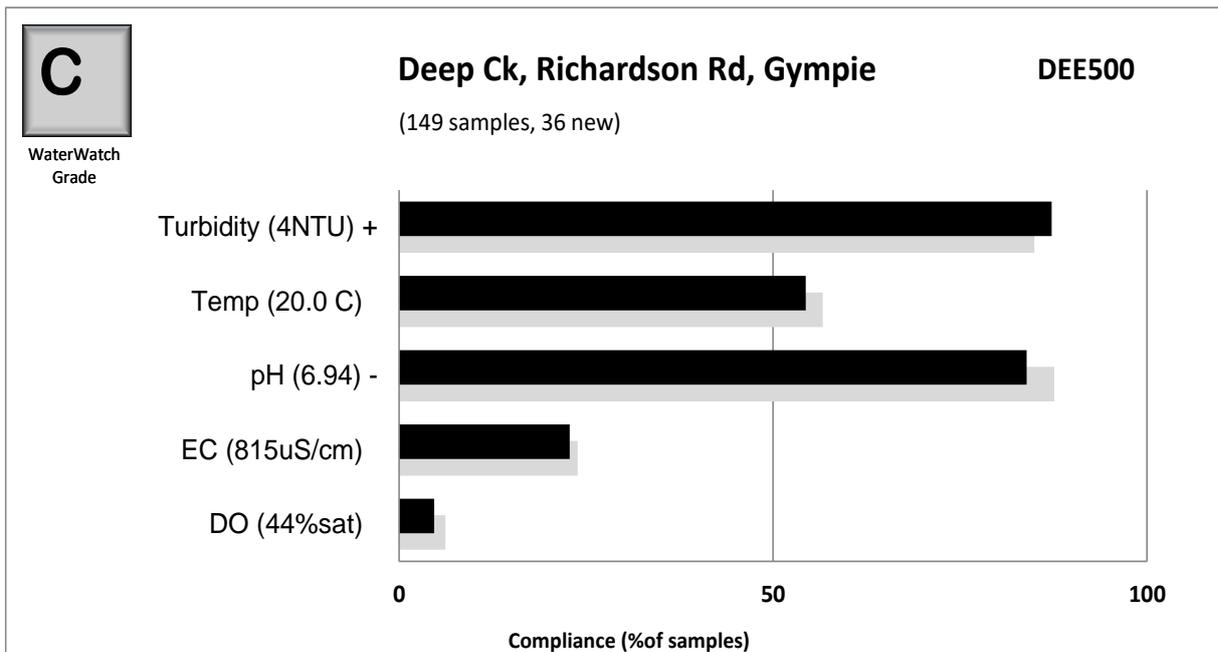
- Good sample size.
- A decline in compliance for temperature over the last three years.
- Excellent compliance with turbidity and pH.

Derrier Creek

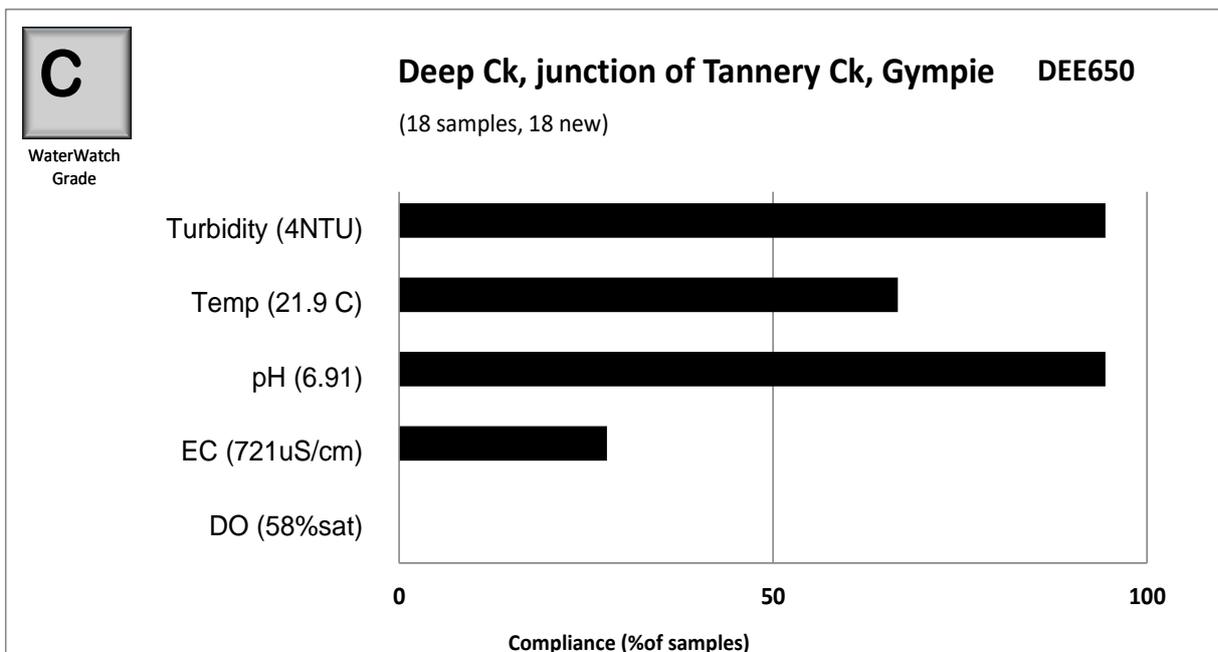


- Good sample size.
- A significant decline in compliance for temperature and turbidity over the last three years.
- Excellent compliance with pH.

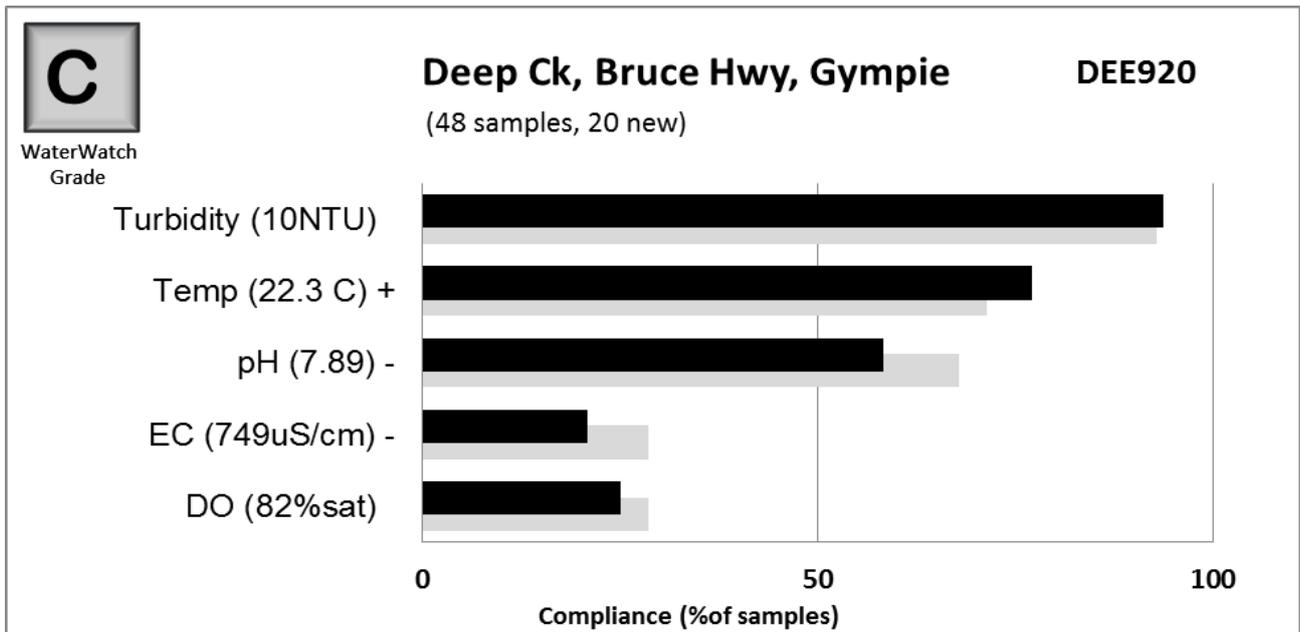
Deep Creek



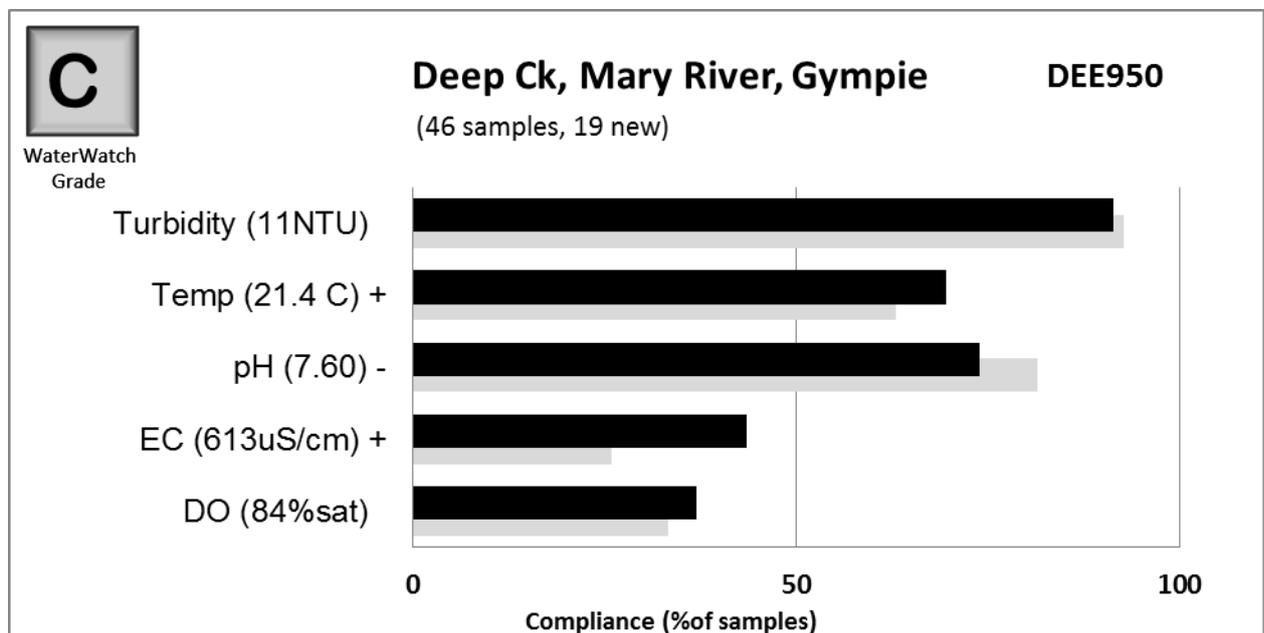
- Excellent sample size.
- Good compliance for turbidity and temperature (an improvement in turbidity since the last report).
- Gradual decline in pH compliance compared to 2011/12 report and the 2013 report (site is becoming slightly acidic).
- Consistently higher electrical conductivity (salinity) levels than other sub-catchments – higher EC levels than Amamoor Creek.
- Maintaining an overall grade of C (2013 Waterwatch Grade = C) over the past 3 years.



- New site, sample size large enough for interpretation.
- Results similar to the DEE500 site, located up stream.
- Median temperature is lower compared to the DEE500 site.

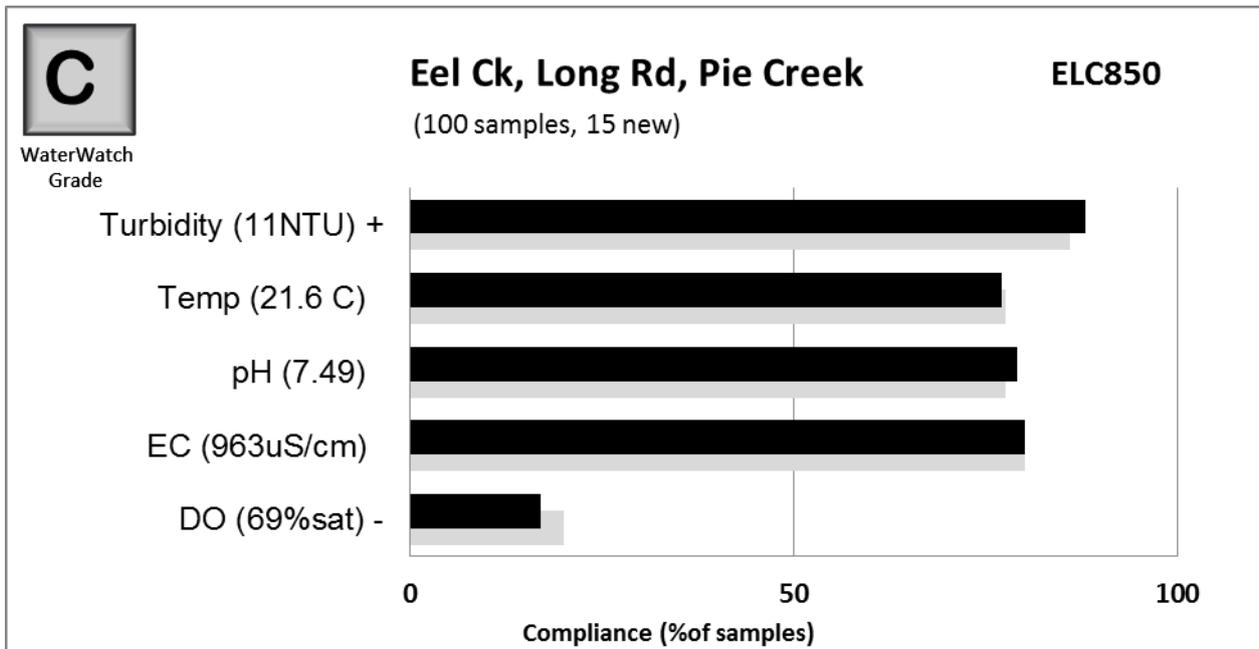


- Good sample size for interpretation.
- Continued low compliance with guidelines for dissolved oxygen, however better compliance than DEE500 site.
- Decline in EC over the past three years – similar to the DEE500 site.
- Significant rise in pH over the past three years (2013 median = 7.7pH).
- Maintaining an overall grade of C (2013 Waterwatch Grade = C) over the past 3 years.



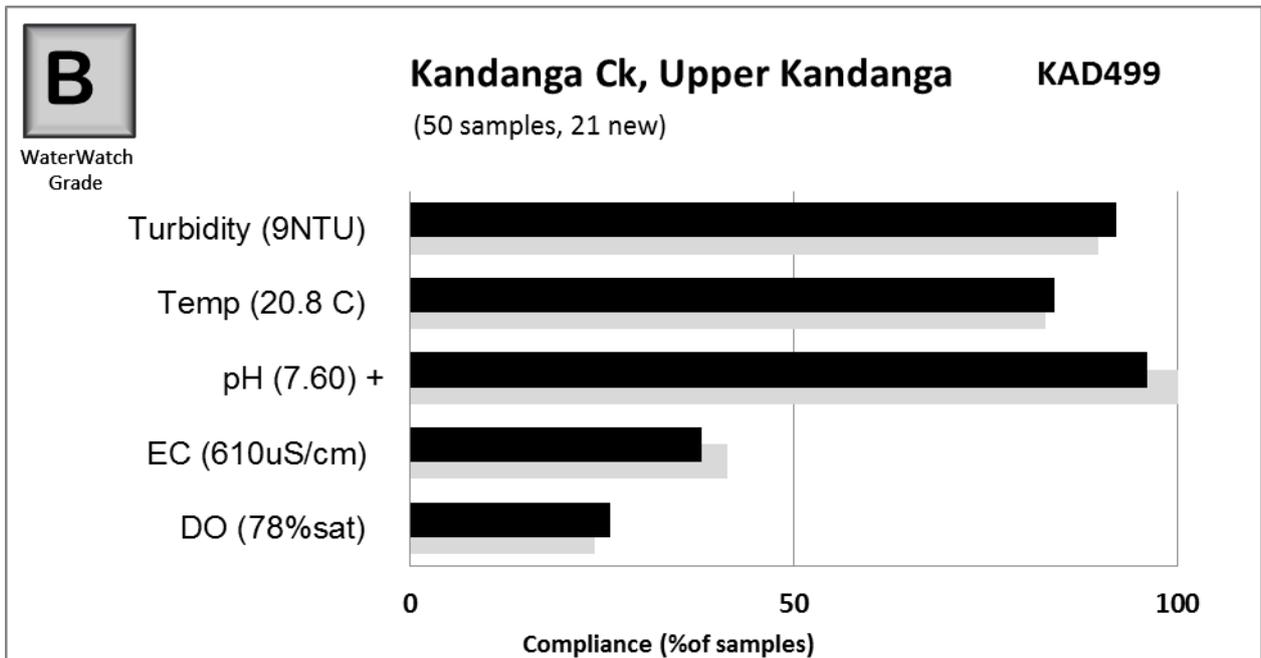
- Good sample size to make comments on trends.
- Electrical conductivity (salinity) levels have shown an improvement in compliance over the past three years. Possibly due to backup effect of the Mary River, which has a lower EC than Deep Creek.
- Maintaining an overall grade of C (2013 Waterwatch Grade = C) over the past 3 years.

Eel Creek

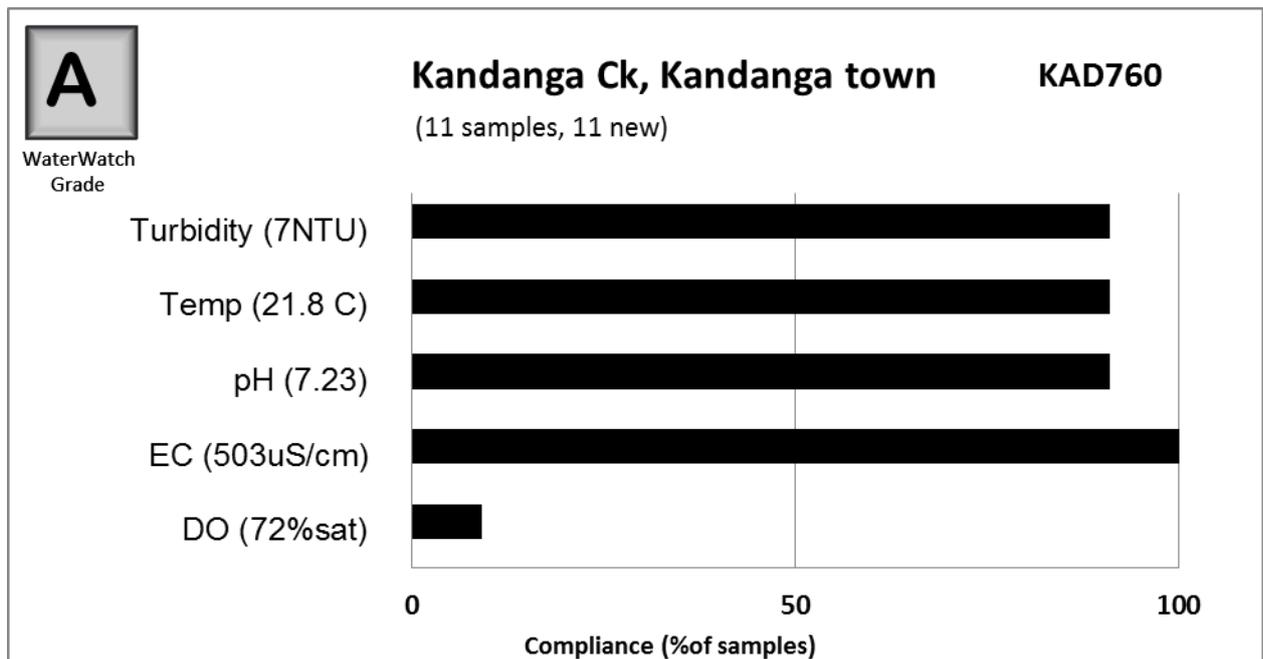


- Good sample size, gold medal award winner!
- Consistently higher electrical conductivity (salinity) levels than Amamoor and Deep Creeks.
- Turbidity compliance has improved over the last three years.
- Dissolved oxygen compliance has declined over the last three years.
- Maintaining an overall grade of C (2013 Waterwatch Grade = C) over the past 3 years.

Kandanga Creek



- Good sample size.
- This year's data indicates an improvement in pH compliance over the past 3 years.
- Maintaining an overall grade of B (2013 Waterwatch Grade = B) over the past 3 years.



- New site.
- Sample size is not yet sufficient to make definitive comments on trends.

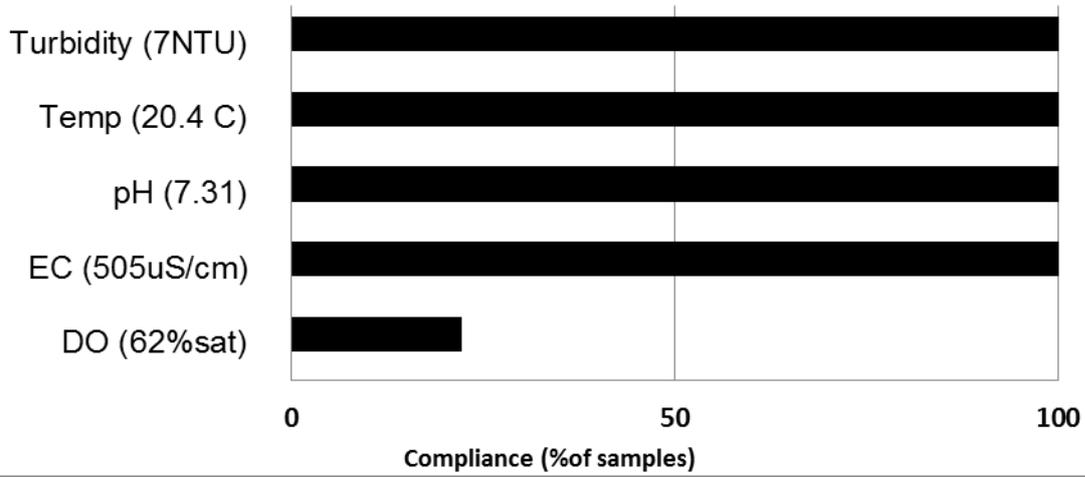


WaterWatch
Grade

Kandanga Ck, Mary Valley Rd

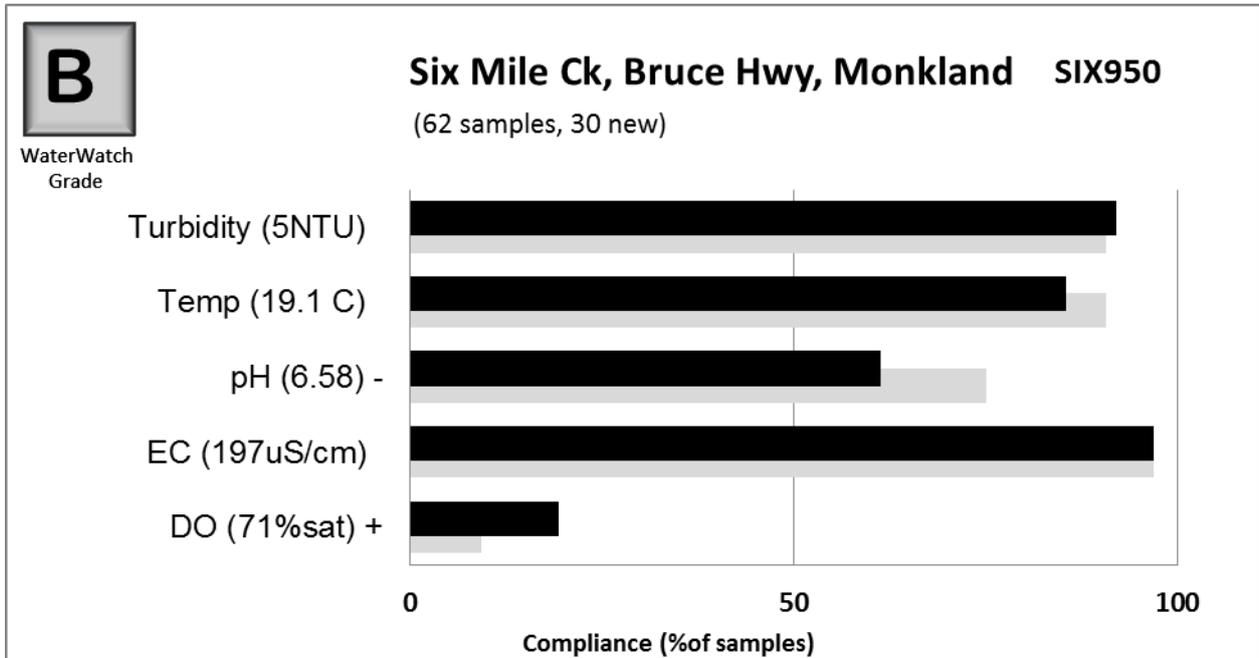
KAD850

(9 samples, 9 new)



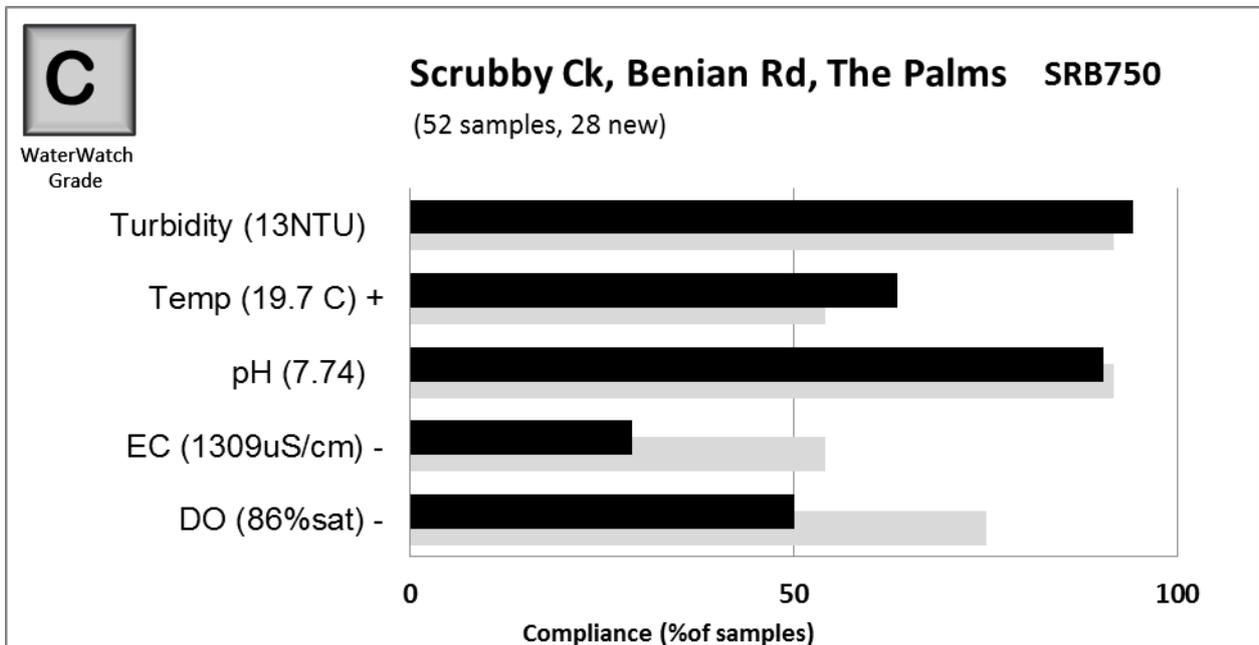
- New site.
- Sample size is not yet sufficient to make definitive comments on trends.

Six Mile Creek



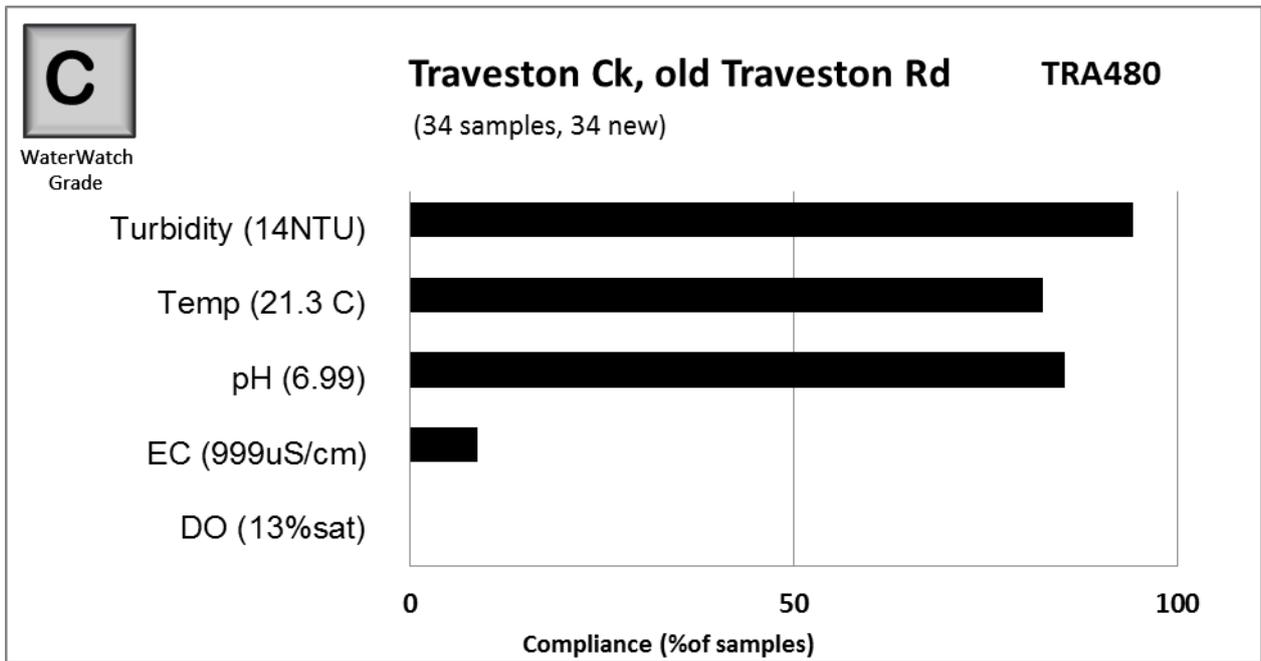
- Good sample size.
- pH compliance has dropped over the last three years - Six Mile Creek is a naturally acidic sub-catchment.
- Improved compliance over the last three years for dissolved oxygen.
- Low overall dissolved oxygen compliance, however results are consistently just below the 85% saturation guideline. This dissolved oxygen level does not appear to be detrimental to aquatic life eg.fish. However on going monitoring will help to inform this assumption.

Scrubby Creek

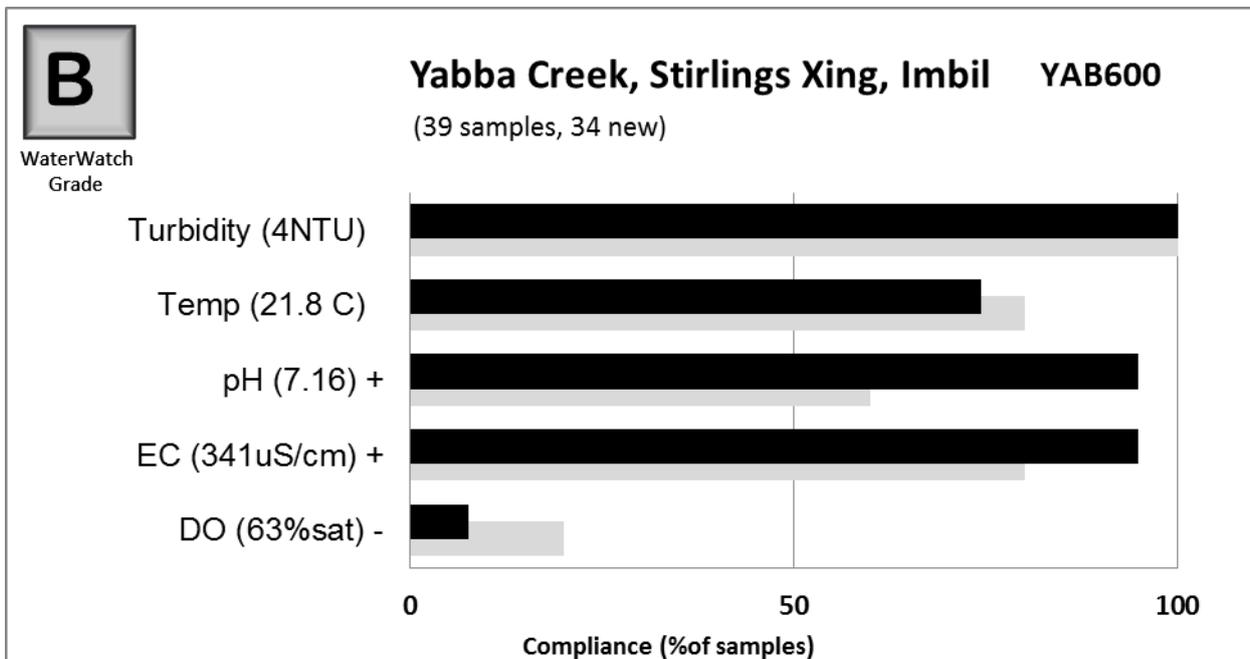


- Good sample size.
- A very high EC level is consistently recorded at this site. The North-western Mary Catchment EC guidelines (<1200 us/cm) has been applied at this site.
- EC compliance has significantly declined over the last three years – possibly due to lower than average rainfall and stream flow.
- Dissolved oxygen compliance has significantly declined in the last three years.

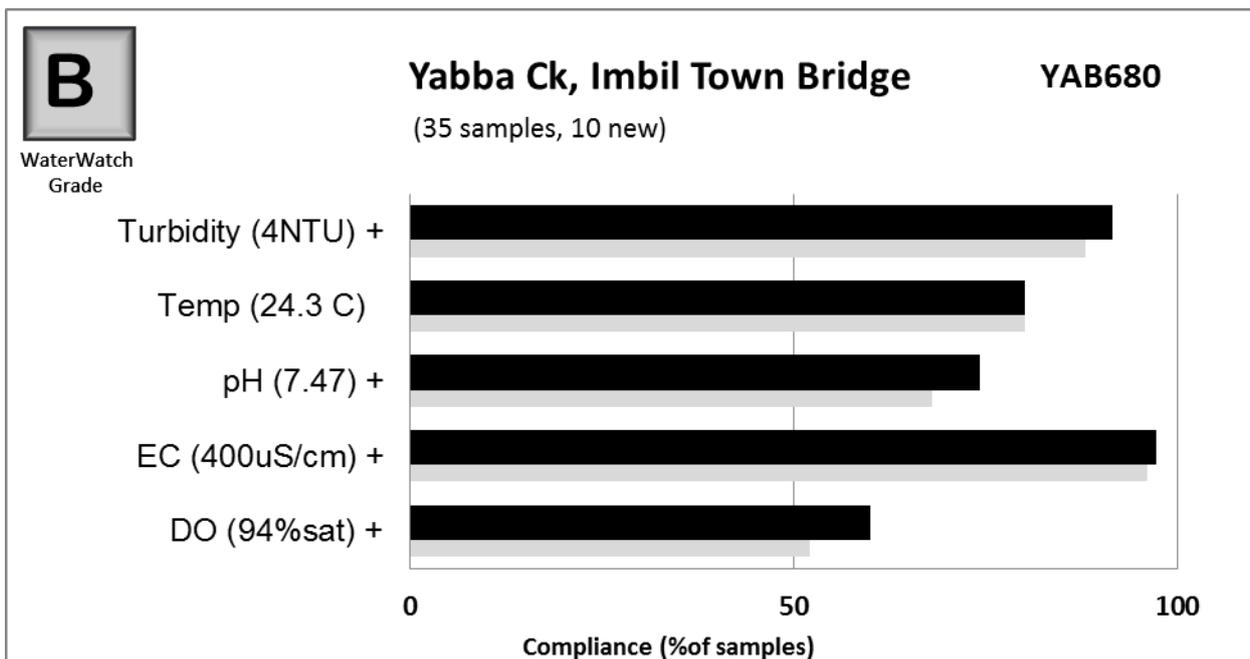
Traveston Creek



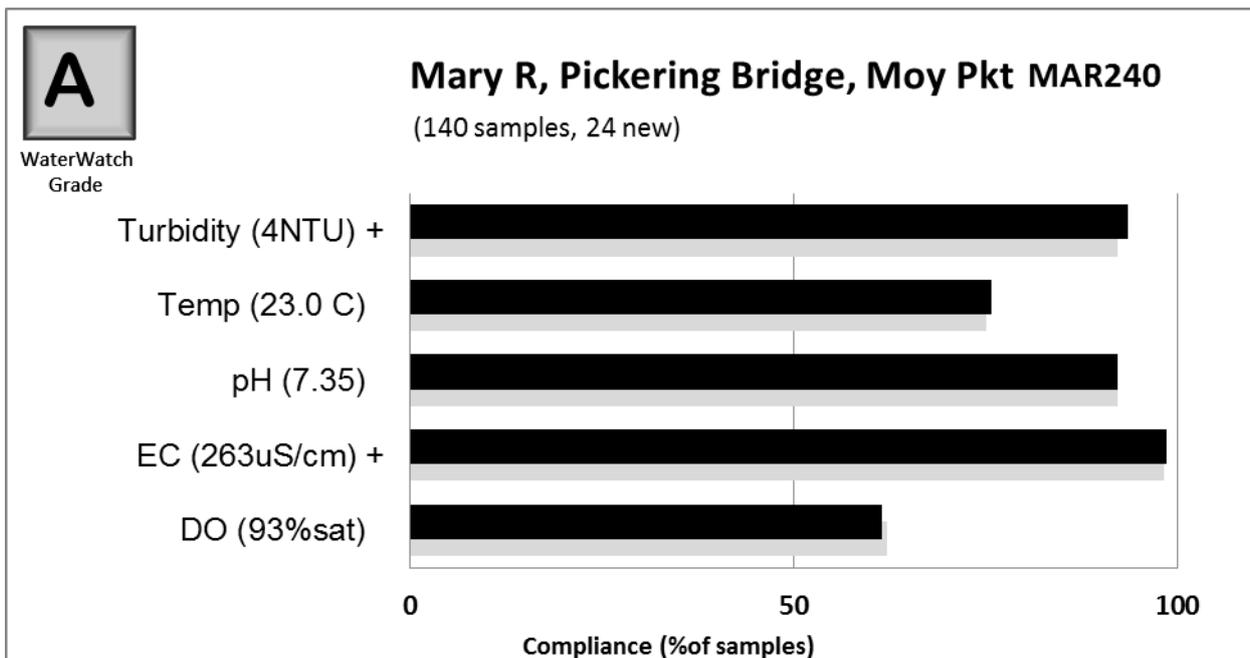
- Good sample size.
- Site consistently not complying with dissolved oxygen guidelines. Generally Traveston Creek has low to nil flows coupled with high leaf litter inputs from the shaded riparian zone.
- Very low EC guideline compliance, with relatively high EC results for this district.



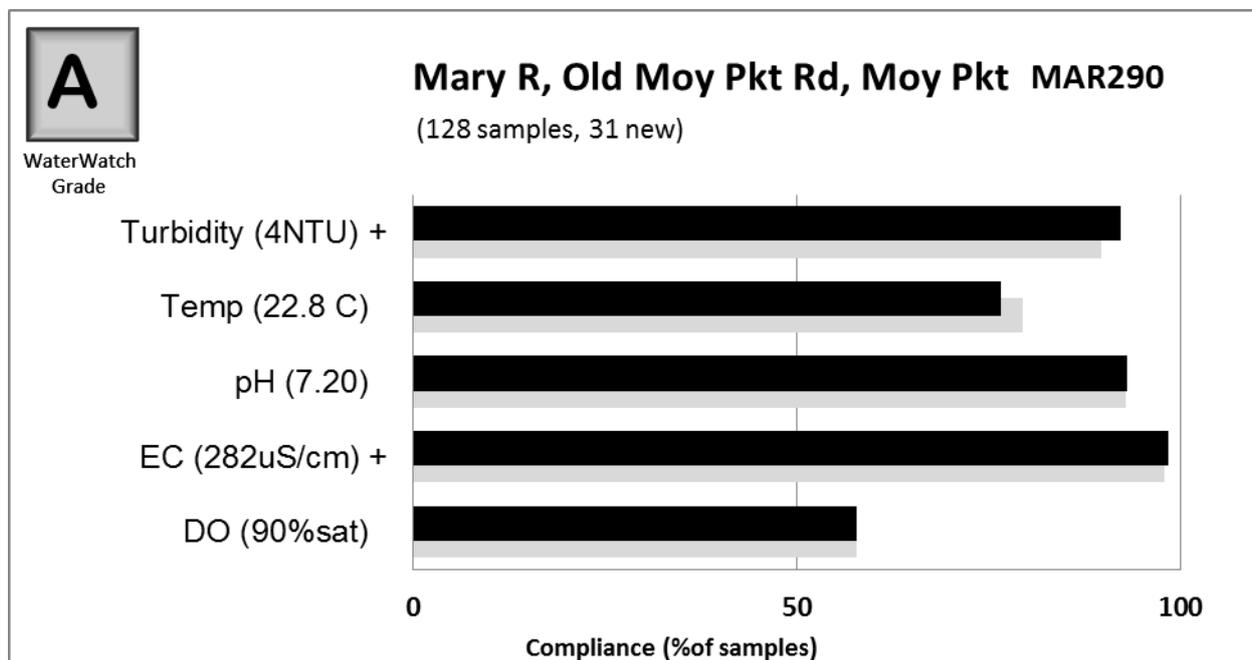
- New site, good sample size.
- Low dissolved oxygen compliance, however results are consistently just below the 85% saturation guideline. This dissolved oxygen level does not appear to be detrimental to aquatic life eg.fish. However on going monitoring will help to inform this assumption.



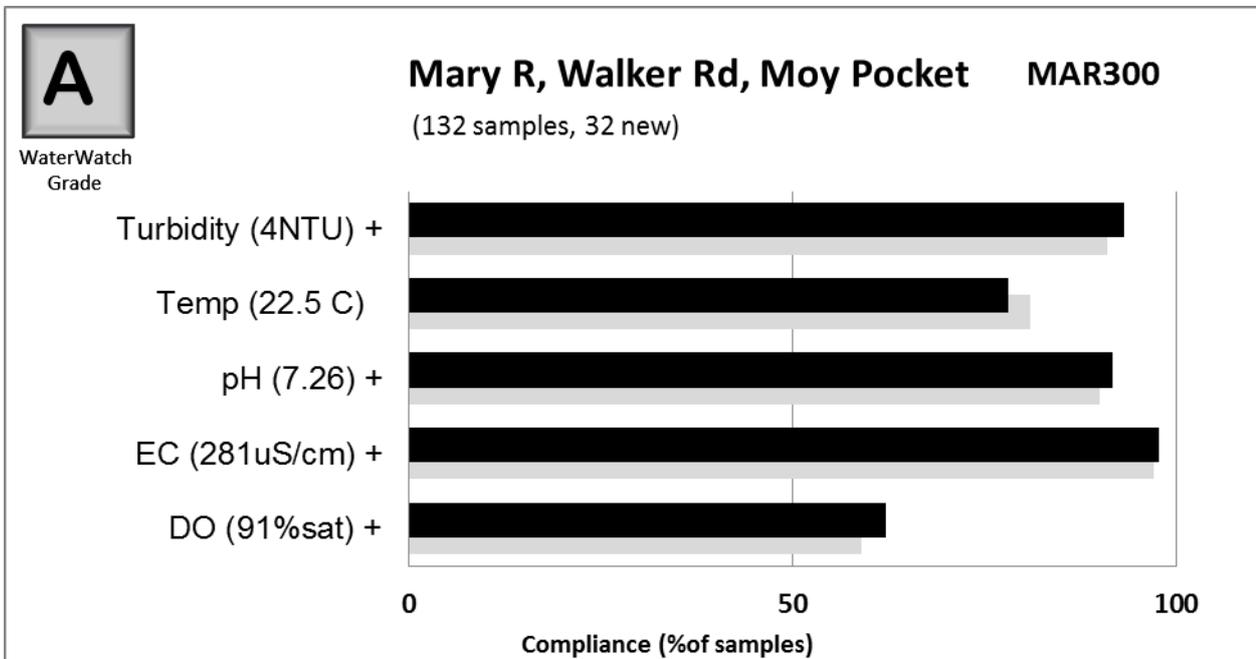
- Good sample size.
- Turbidity levels are highly compliant with guideline level.
- In the past this site has shown high pH levels (alkaline) because of profuse growth of aquatic plants and algae. However pH compliance has improved significantly over the last 3 years.
- Analysis shows DO levels have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



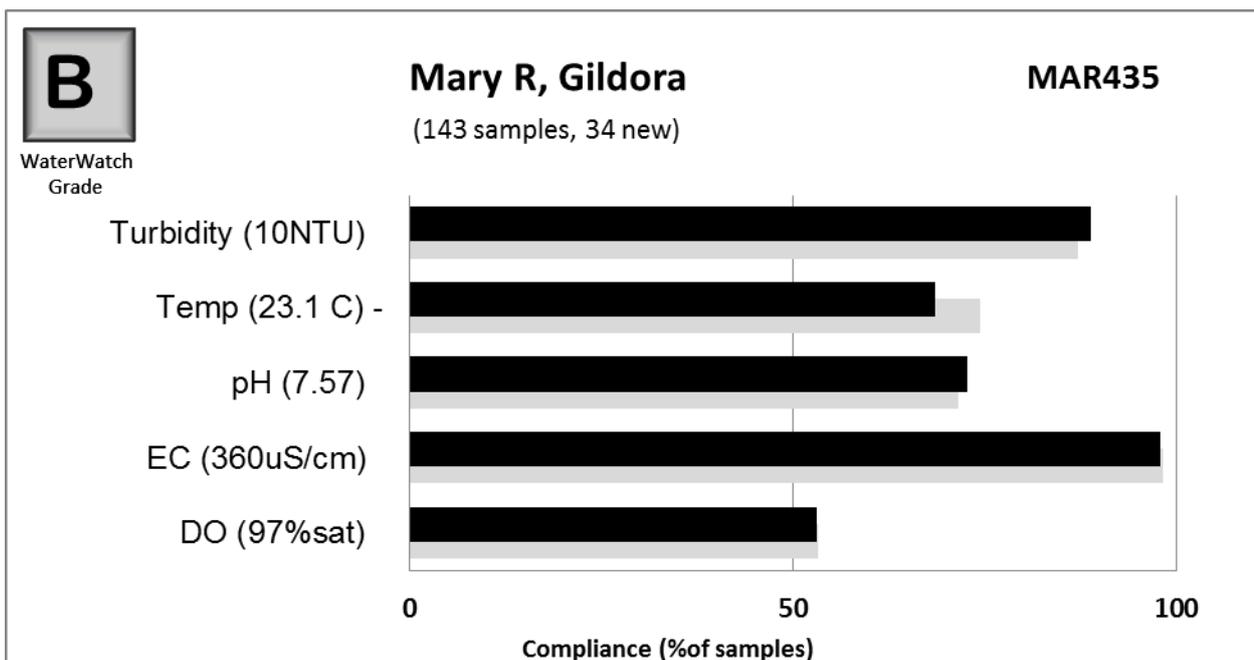
- Excellent sample size.
- Excellent electrical conductivity compliance over the past three years.
- Significant improvement in compliance for turbidity over the past three years.
- Maintaining an overall grade of A (2013 Waterwatch Grade = A) over the past 3 years.



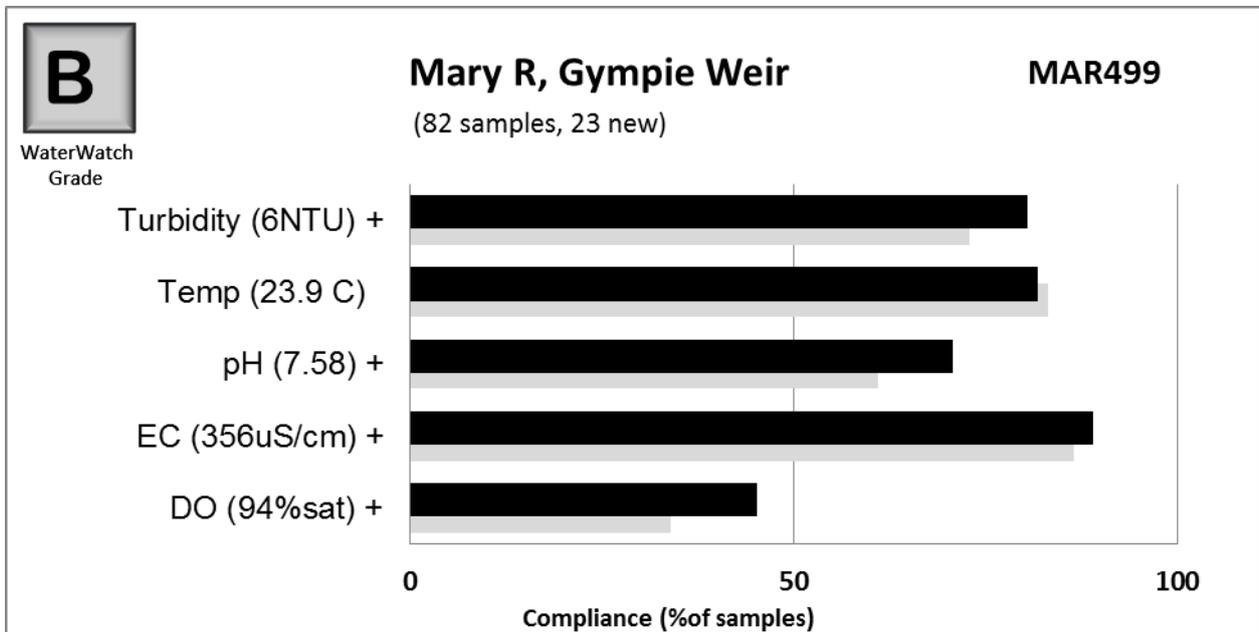
- Excellent sample size, gold medal award winner!
- Excellent electrical conductivity compliance.
- Significant increase in compliance for turbidity over the past three years.
- Maintaining an overall grade of A (2013 Waterwatch Grade = A) over the past 3 years.



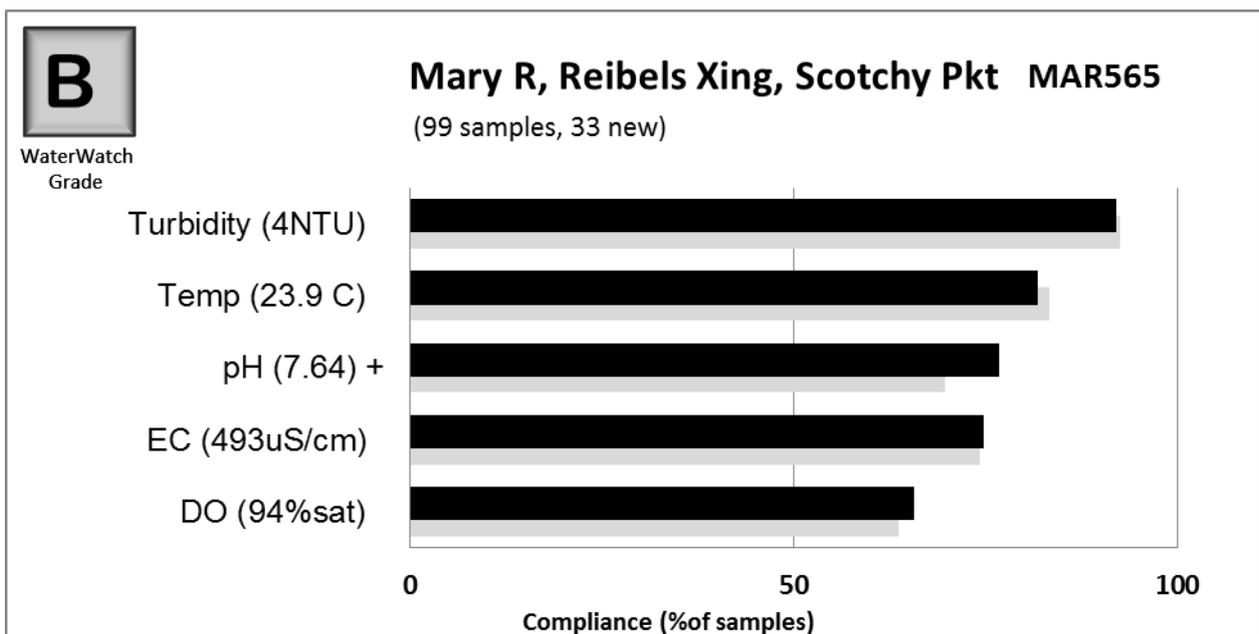
- Excellent sample size, gold medal award winner!
- Excellent electrical conductivity compliance.
- Significant improvement in compliance for turbidity, pH and DO over the past three years.
- Maintaining an overall grade of A (2013 Waterwatch Grade = A) over the past 3 years.



- Excellent sample size.
- In 2013 the electrical conductivity (salinity) and pH values improved compliance, bringing the report card from a "B" to "A". However over the past three years the report card has dropped back to a "B".
- Dissolved oxygen levels have decreased over the past three years (2013 median = 99%).
- Water temperature compliance decreased resulting in the drop from an A to a B.
- Mary River sites have considerably higher water temperature levels than the sample sites located on creeks, possibly due to less riparian vegetation shading the water.

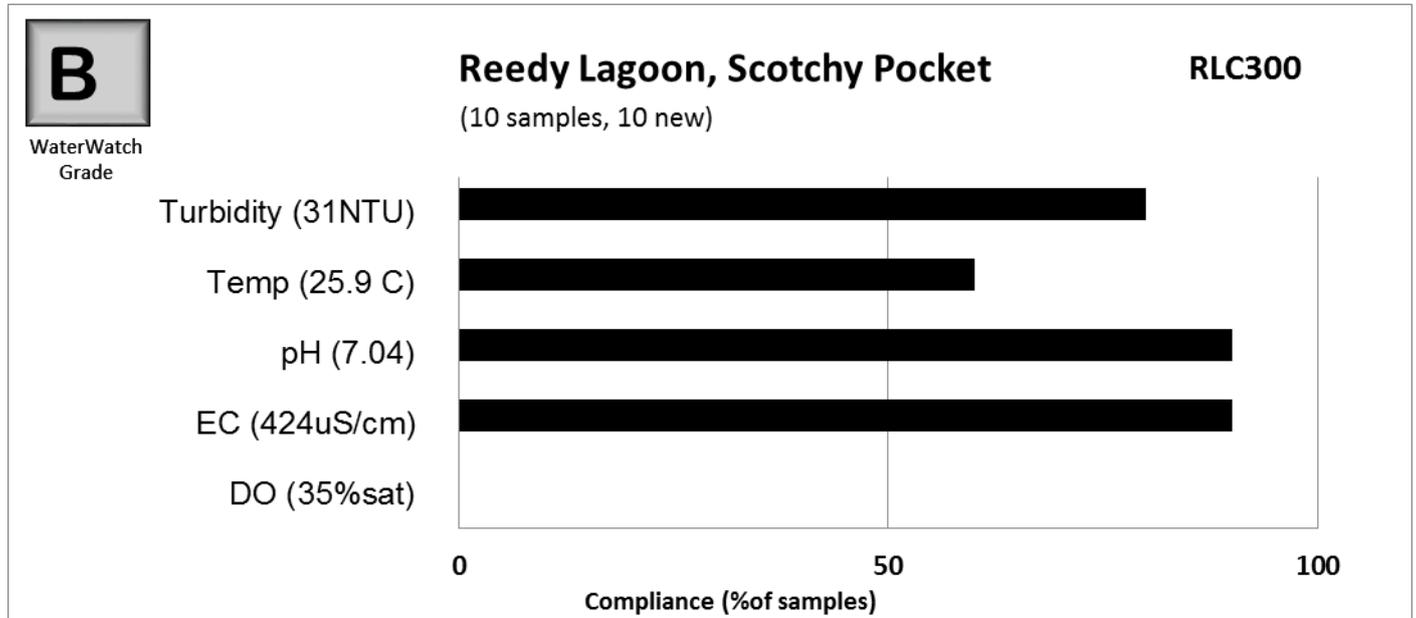


- Good sample size.
- Improvement in compliance for turbidity, EC, pH and DO over the past three years.
- Significant improvement in DO results.



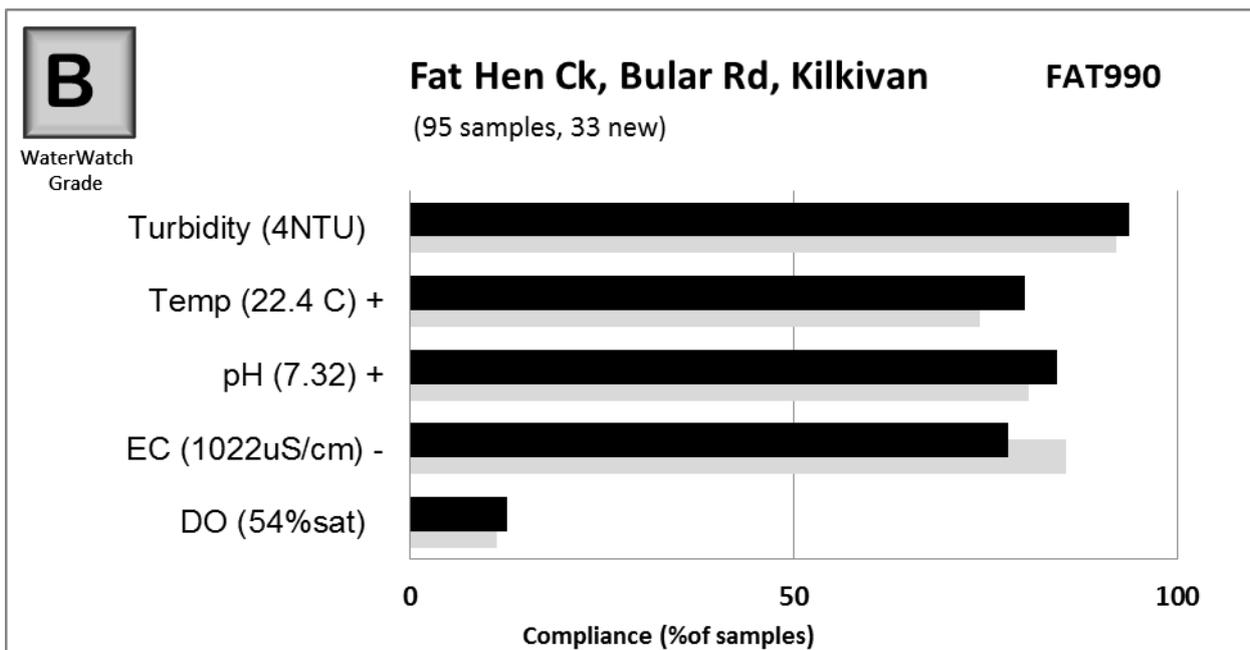
- Good sample size.
- Improvement in compliance for pH over the past three years.
- Dissolved oxygen levels are reasonably good, correlated with regular river flows and the water passing through a series of riffles / cobble beds.
- The water temperature median value (23.9 degrees) at this site and MAR499 (Gympie Wier) are the warmest Mary River sites monitored in the Gympie Region.
- Maintaining an overall grade of B (2013 Waterwatch Grade = B) over the past 3 years.

Reedy Lagoons

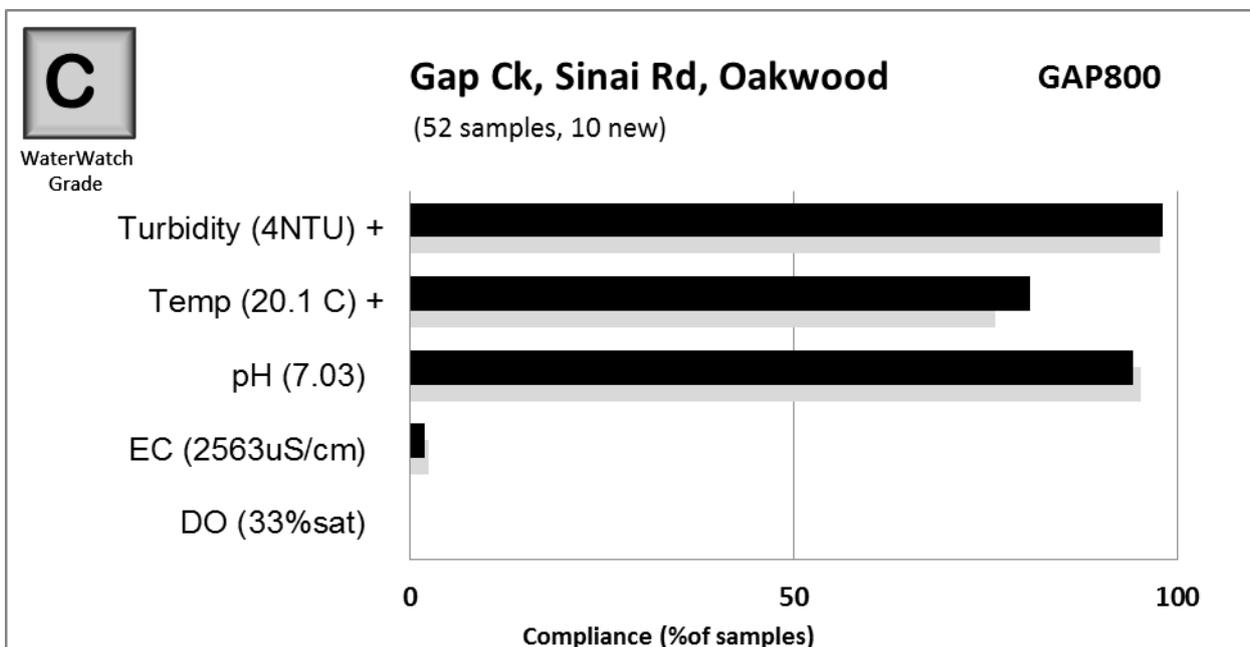


- New site
- Sample insufficient to make definitive comment on trends

Fat Hen Creek

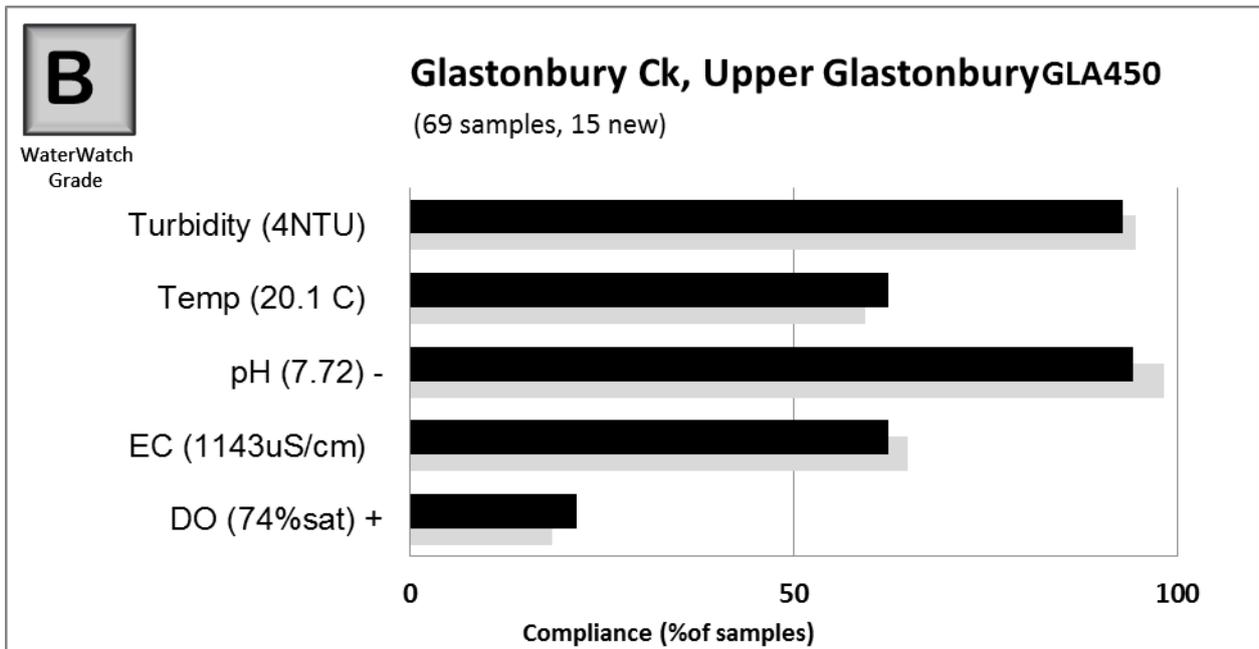


- Good sample size.
- Over the past three years there has been a significant decline in EC, which could be due to lower than average rainfall and stream flow.
- pH and temperature have improved compliance over the past three years.
- Maintaining an overall grade of B (2013 Waterwatch Grade = B) over the past 3 years.

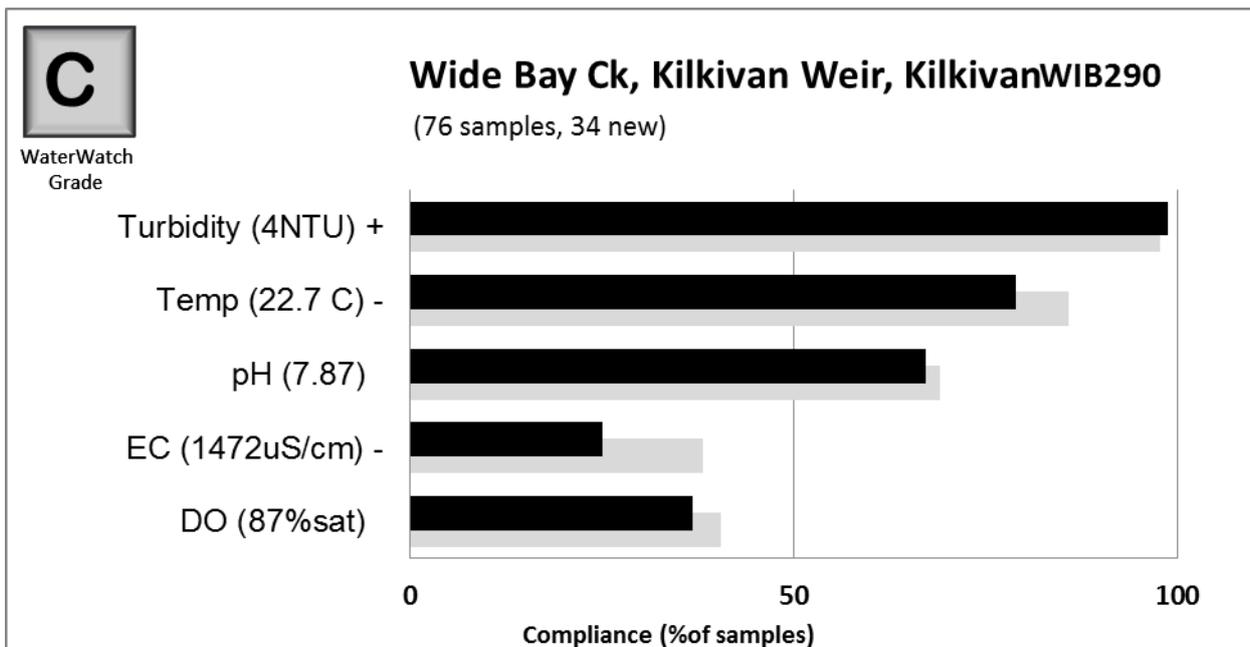


- Sample size good, very interesting site.
- The EC levels at this site are significantly higher than all other sites within the Gympie Region, one of the highest EC sample site in the entire Mary Rivery Catchment Waterwatch program.
- Good compliance with turbidity, temperature and pH.
- Exceptionally very little variance in pH over many years - with a neutral pH.
- Consistently very low DO levels recorded, which do not comply with guidelines.
- Consistently constrained to an overall grade of C (2011 & 2013 Waterwatch Grade = C).

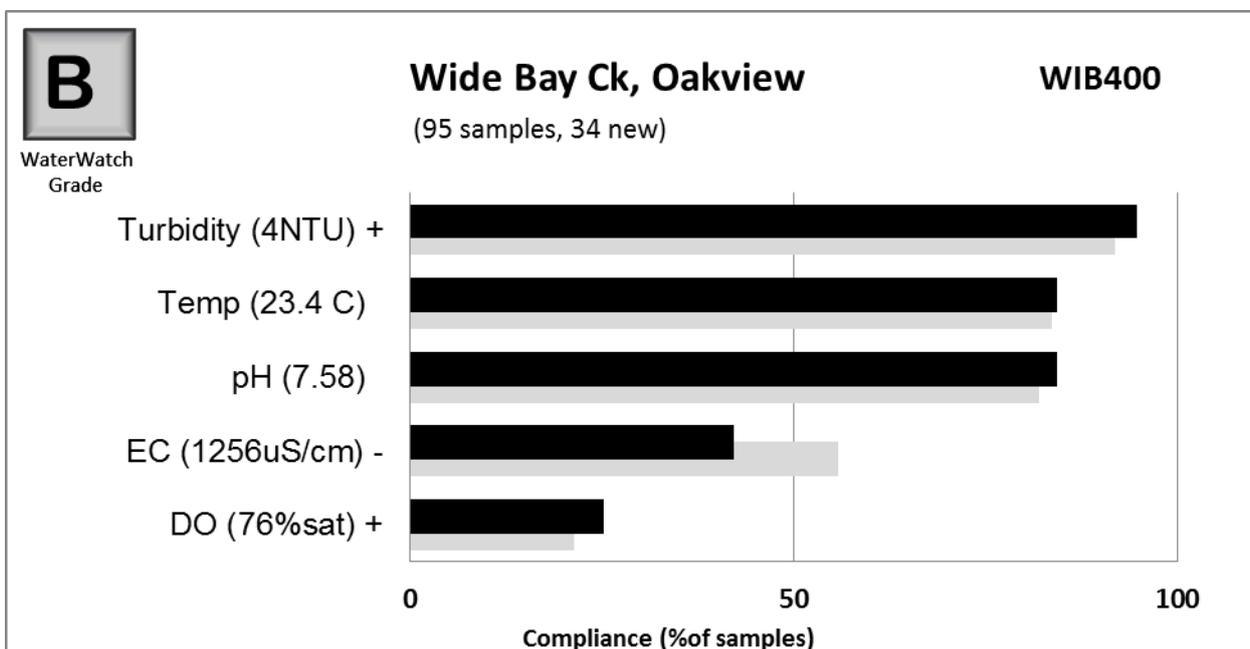
Glastonbury Creek



- Good sample size.
- There has been a decline in pH level compliance over the past three years and continues to be relatively alkaline.
- Maintaining an overall grade of B (2013 Waterwatch Grade = B) over the past 3 years.



- Good sample size.
- Significant improvement in turbidity over the past three years.
- Relatively high pH levels (alkaline), but still complies well with guidelines.
- There has been a significant decline in EC possibly due to lower than average rainfall and stream flow.
- Maintaining an overall grade of C (2013 Waterwatch Grade = C) over the past 3 years.



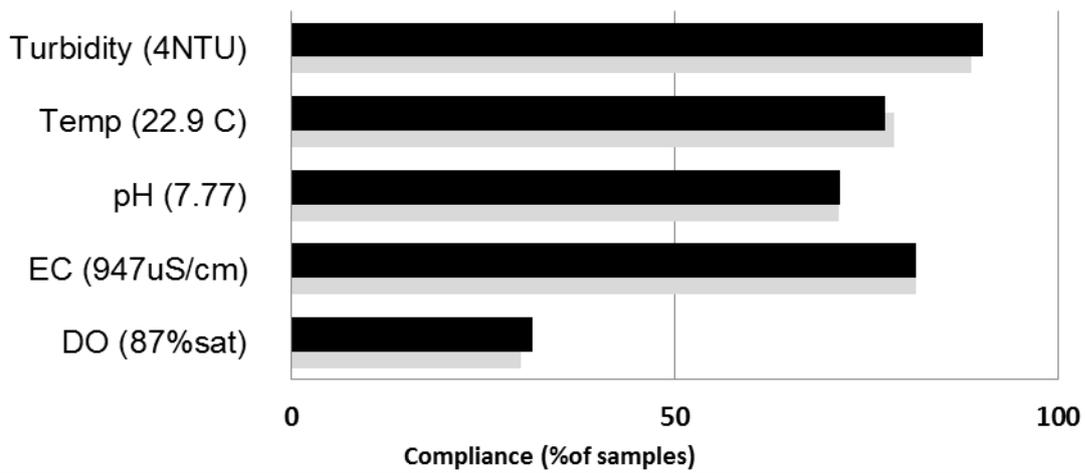
- Good sample size.
- Electrical conductivity (salinity) compliance levels have dropped significantly over the past three years, possibly due to due to lower than average rainfall and stream flow, which is consistent with the WIB290 site.
- Maintaining an overall grade of B (2013 Waterwatch Grade = B) over the past 6 years.



WaterWatch
Grade

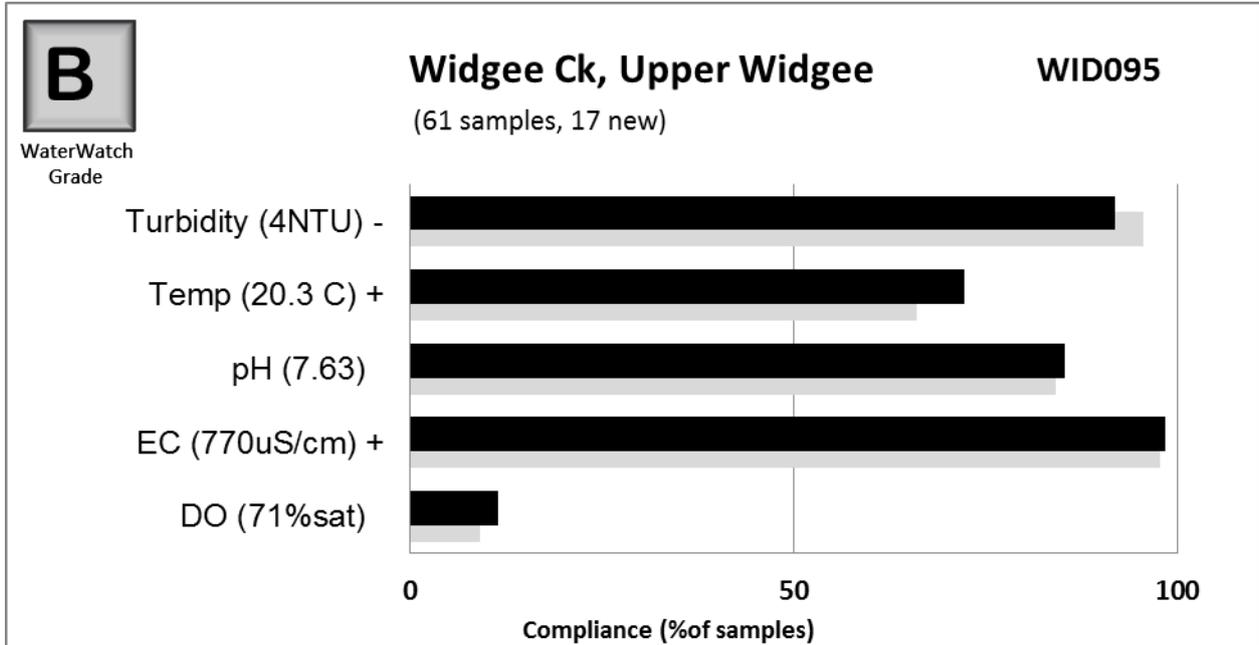
Wide Bay Ck, Wilson Bridge, Sexton WIB950

(102 samples, 32 new)



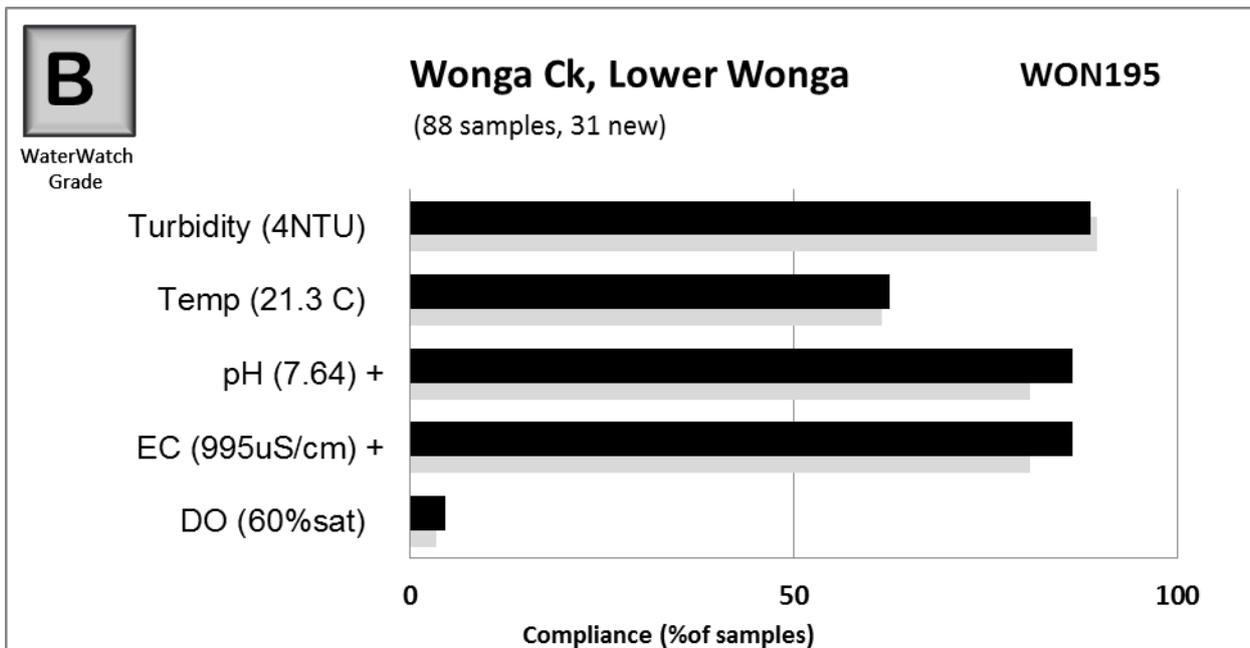
- Excellent sample size, gold medal award winner!
- This site has maintained all water quality parameters over the past three years.
- EC results at this site are much lower than the Wide Bay Creek Kilkivan and Oakview sites above.
- Maintaining an overall grade of B (2013 Waterwatch Grade = B) over the past 6 years.

Widgee Creek

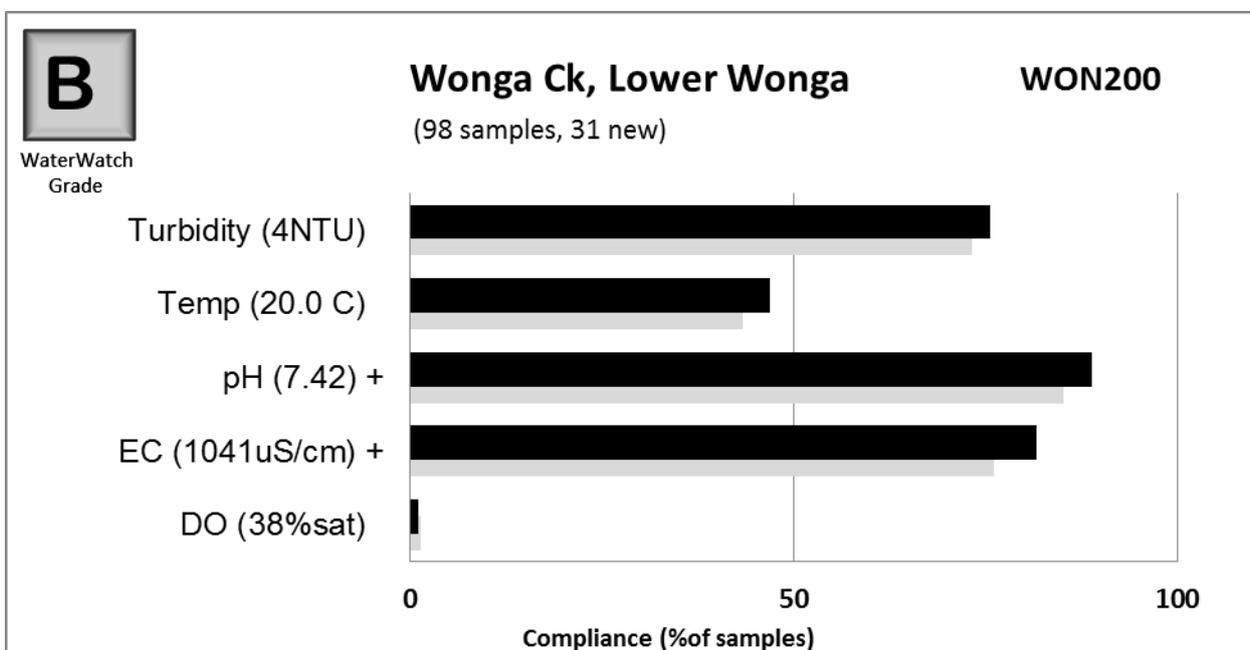


- Good sample size.
- This site experiences very little variation in dissolved oxygen levels - nearly all the readings are between 60% and 80% saturation which is just below guideline levels but is still indicative of a healthy creek.
- Excellent compliance for electrical conductivity (salinity) over the last six years.
- Exceptionally very little variance in pH - with a consistently neutral pH.
- Maintaining an overall grade of B (2013 Waterwatch Grade = B) over the past 6 years.

Wonga Creek

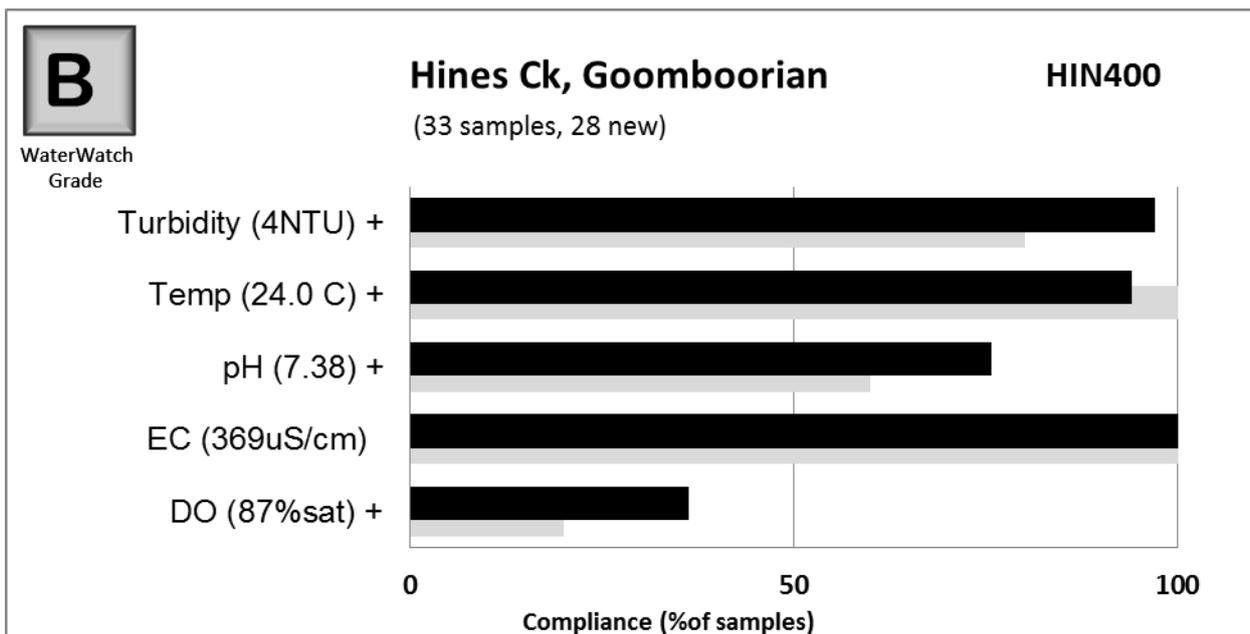


- Good sample size.
- Both Wonga Creek sites are on a borderline between a “B” and “C” rating.
- Significant improvement in electrical conductivity (salinity) levels at both sites has continued over the last six years.
- Wonga Creek at these sites is an intermittent creek which effects dissolved oxygen levels.
- Consistently low dissolved oxygen levels have been recorded at this site.
- Maintaining an overall grade of B (2013 Waterwatch Grade = B) over the past 6 years.



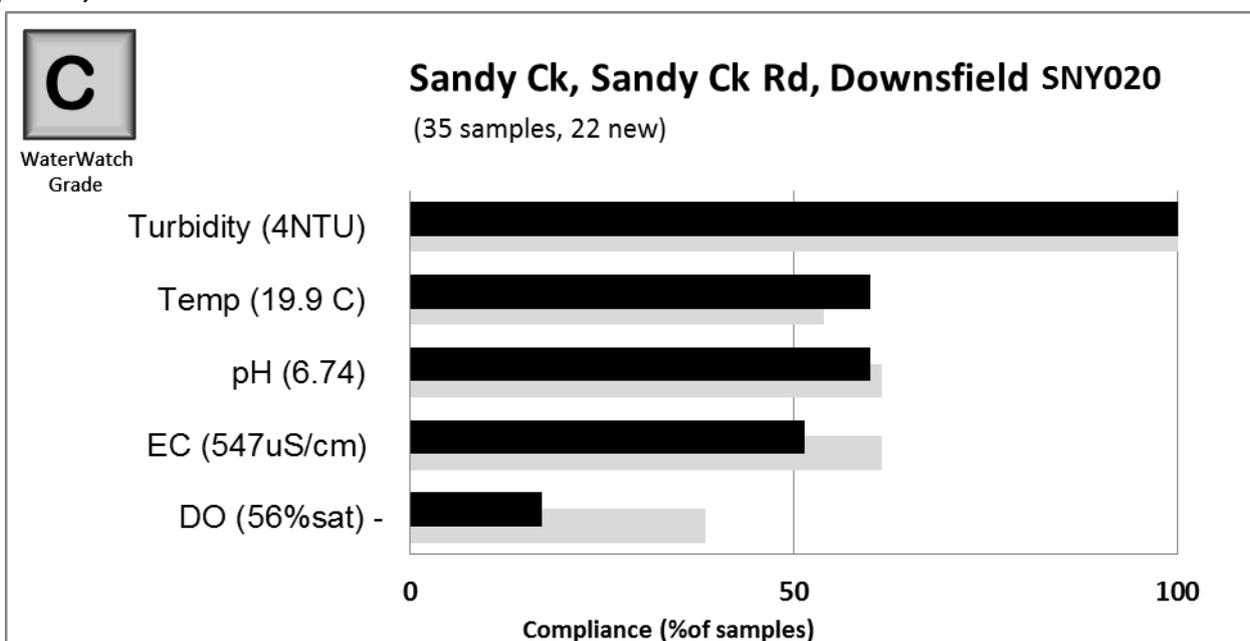
- Good sample size.
- Significant improvement in compliance of pH and electrical conductivity at this site over the past six years.
- Interestingly, water temperature at this site is cooler than the WON195 site.
- Improved overall grade to B (2013 Waterwatch Grade = C) over the past 3 years.

Eastern Mary River Catchments
Hines Creek



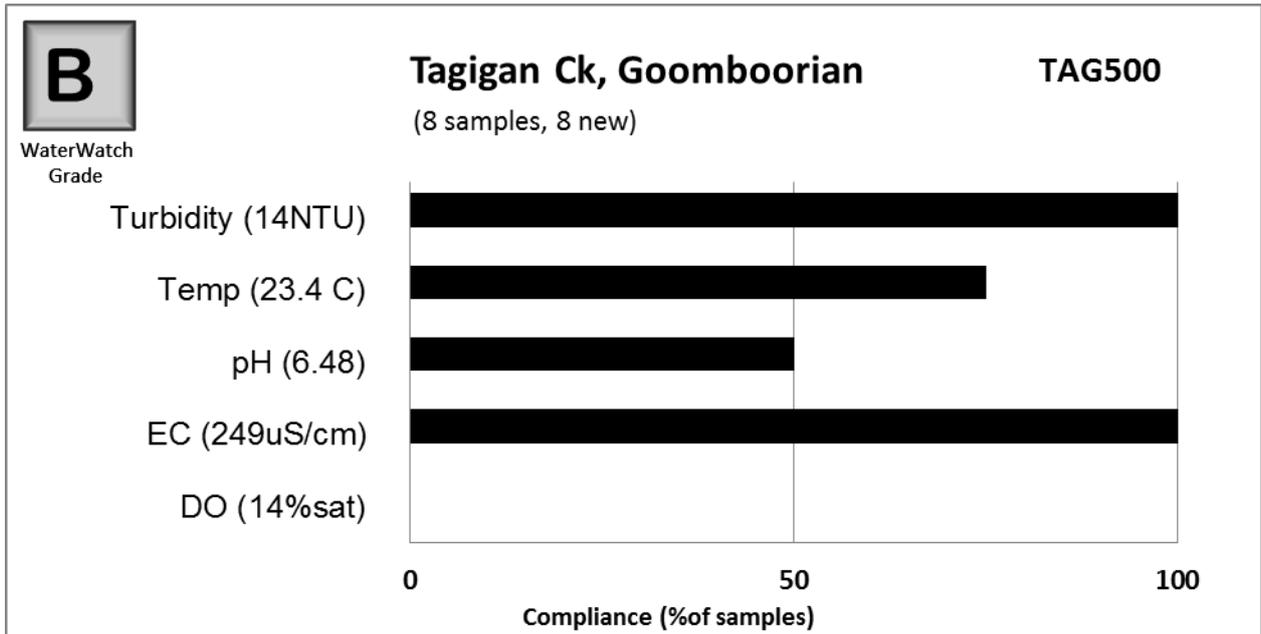
- New site, good sample size.
- Improvements in turbidity, temperature, pH and DO due to more data capturing the conditions of the site.
- This site has a relatively high water temperature (warmer than the Gympie Weir – Mary River site).

Sandy Creek, Downsfield



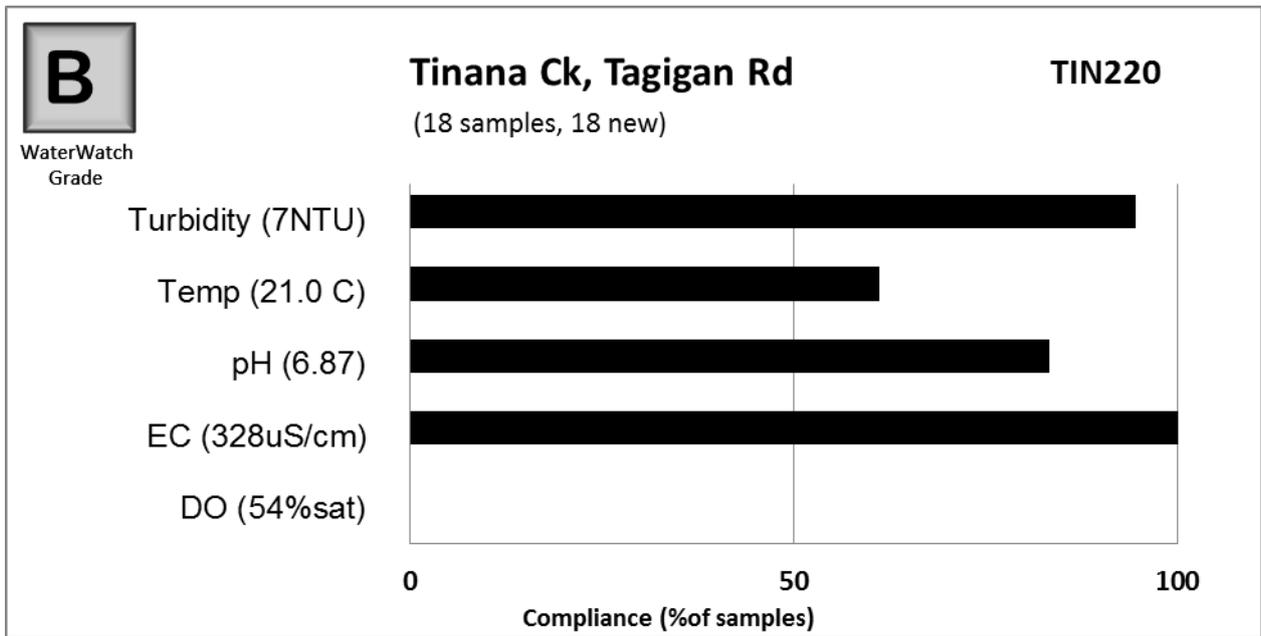
- Good sample size.
- Significant decline in DO compliance over the past three years possibly due to lower than average rainfall, which has resulted in a drop from an B to a C grade.
- Good turbidity compliance.
- Electrical conductivity (salinity) is relatively high in comparison to the Tinana Creek sites (in December 2012, maximum of 959us/cm was recorded).
- A decline in the overall grade to C (2013 Waterwatch Grade = B) over the past 3 years.

Tagigan Creek

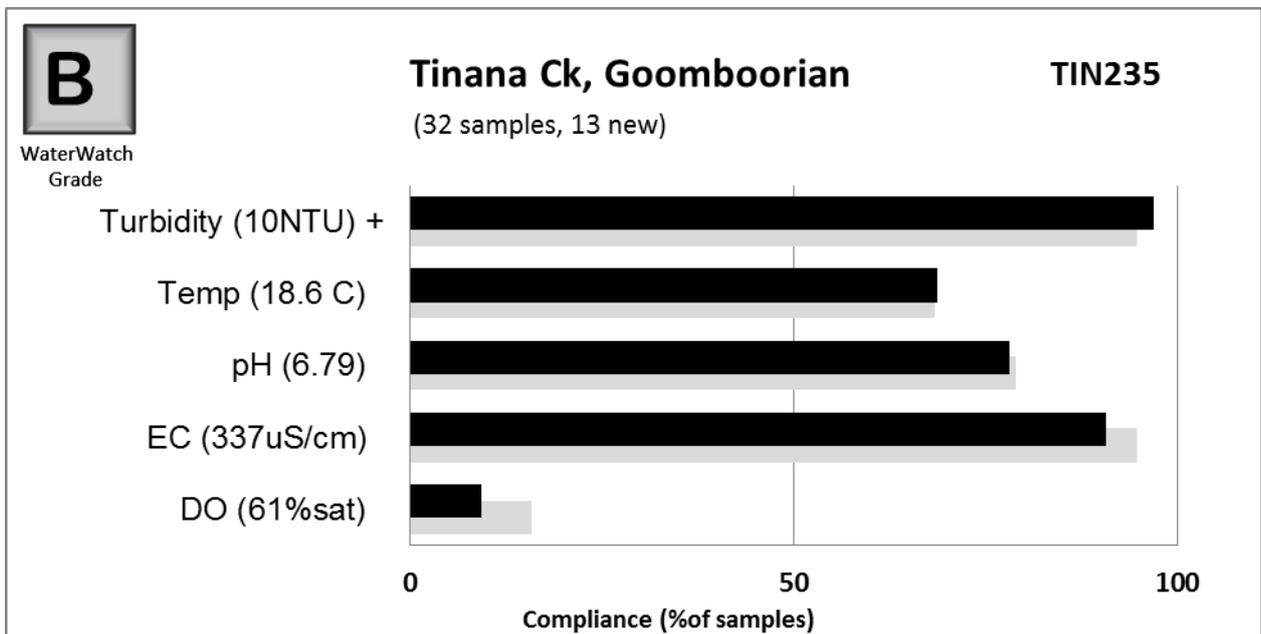


- New site.
- Sample size is not yet sufficient to make definitive comments on trends.

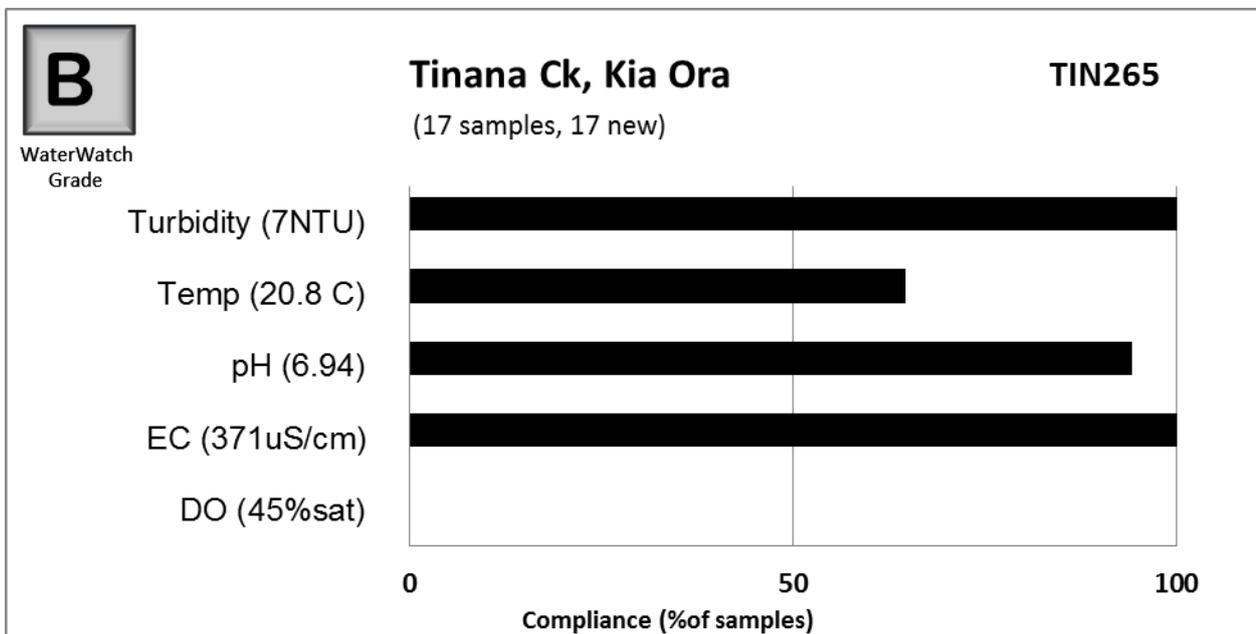
Tinana Creek



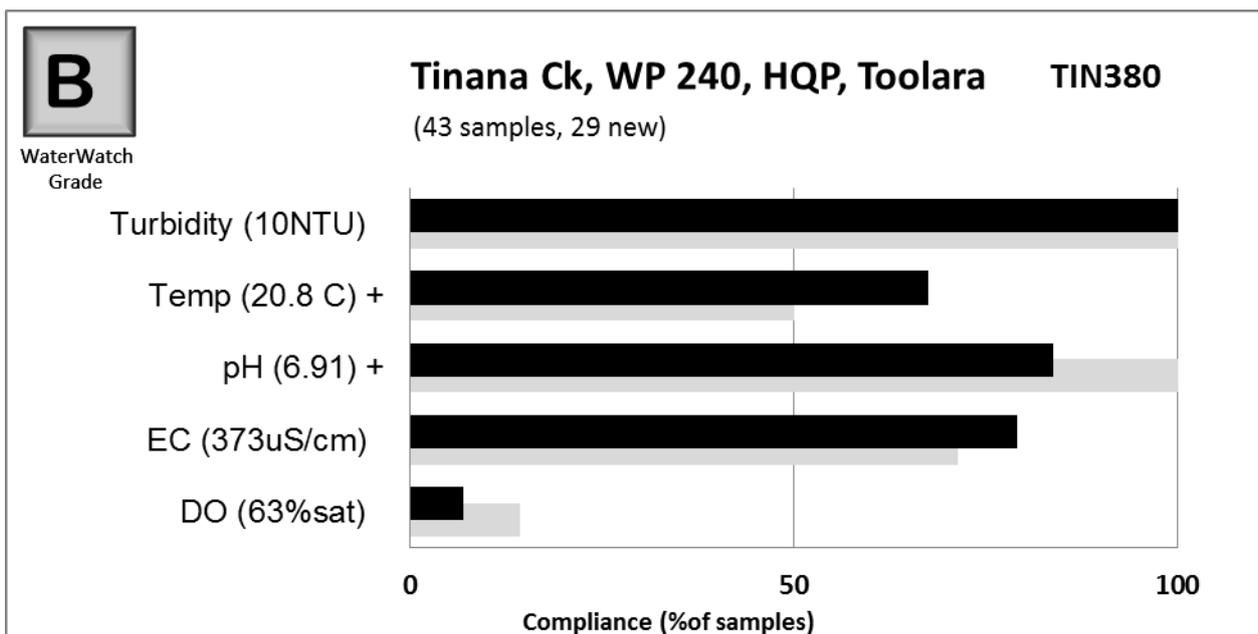
- New site.
- Sample size is not yet sufficient to make definitive comments on trends.
- Tinana Creek exhibits low natural pH levels due to the nature of this sub-catchment.
- Dissolved oxygen levels are low compared to guideline levels, which is likely to be typical of Tinana Creek – more data required to confirm this assumption.



- Good sample size.
- Good compliance for all parameters tested, apart from DO.
- Tinana Creek sites have considerably lower water temperature levels than the sample sites located on the Mary River, due to more riparian vegetation shading the water on Tinana Creek.

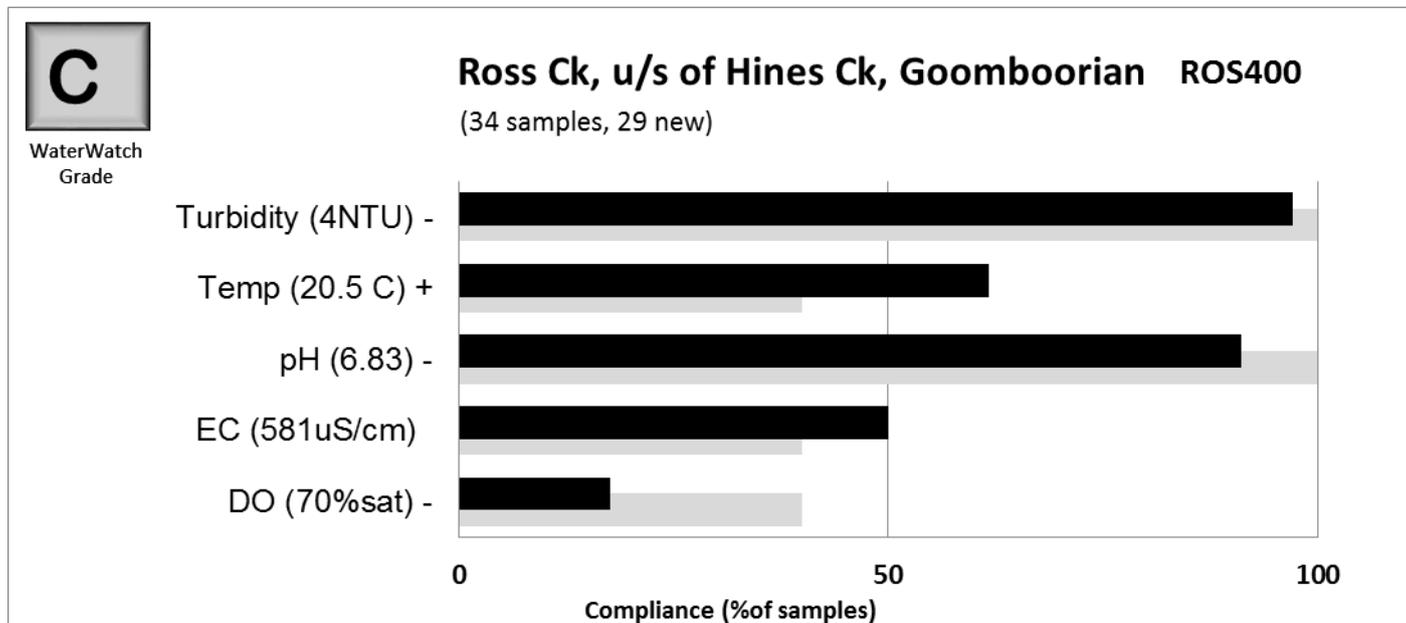


- New site.
- Sample size is not yet sufficient to make definitive comments on trends.

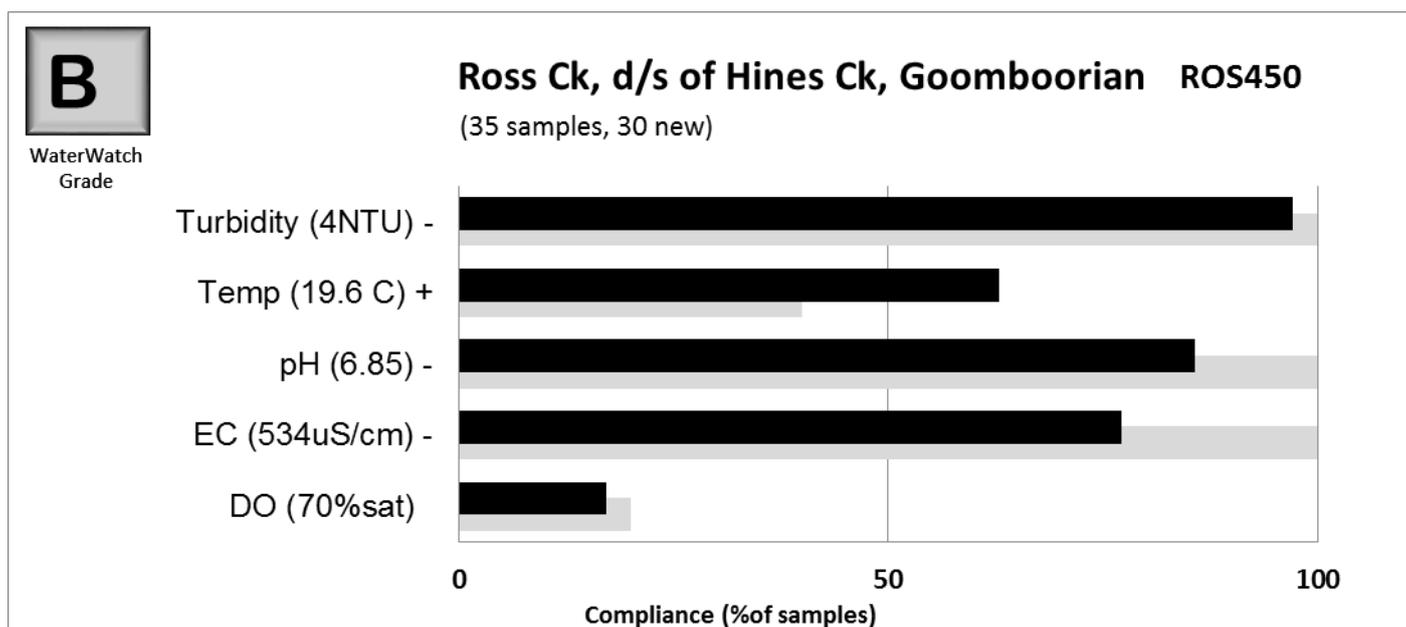


- Good sample size.
- Improvement in pH and temperature compliance over the last three years.
- Dissolved oxygen compliance is low which is consistent with all other Tinana Creek sites.
- Maintaining an overall grade of B (2013 Waterwatch Grade = B) over the past 3 years.

Ross Creek



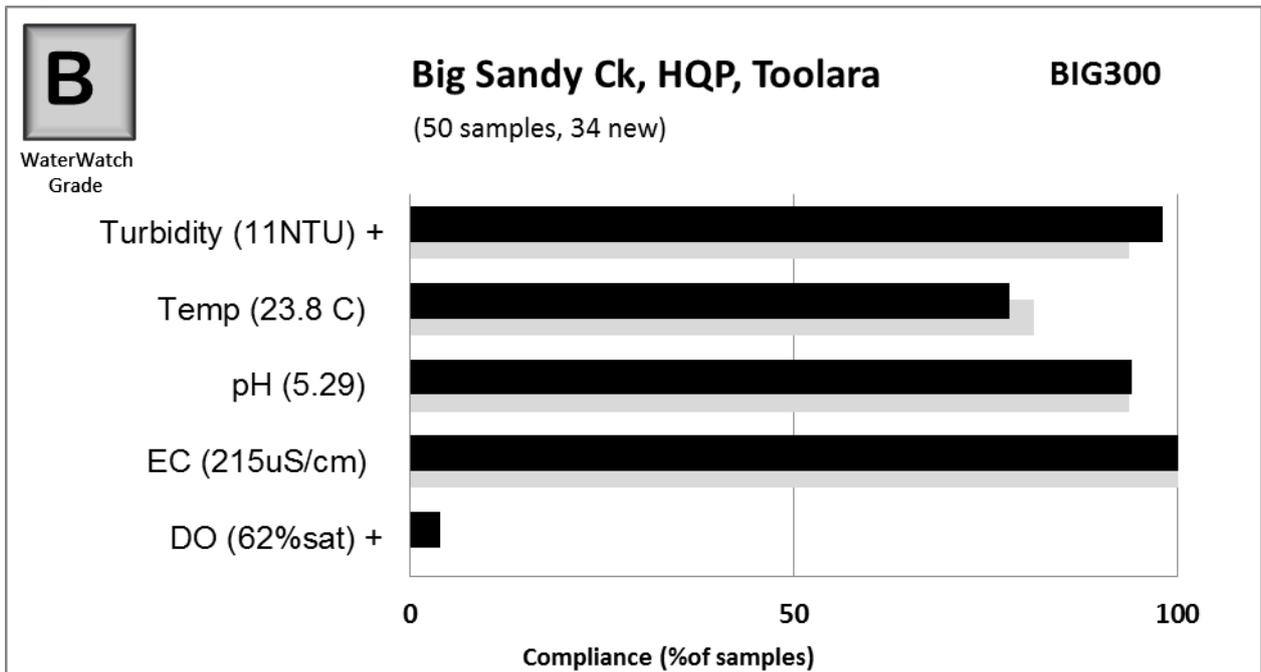
- New site.
- Good sample size.
- Good turbidity and pH compliance.
- EC median value is just above guideline level, which has resulted in a C score compared to the ROS450 which is a B.



- New site.
- Good sample size.
- Good turbidity compliance.
- Dissolved oxygen compliance is similar to the upstream site.

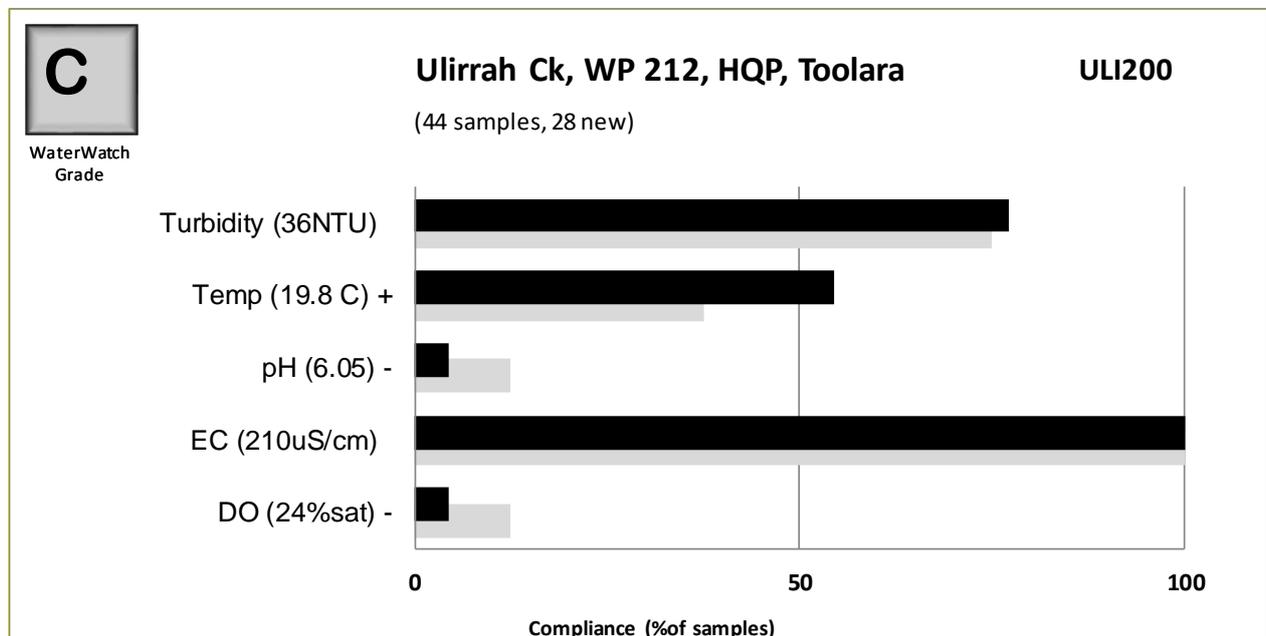
Tannin stained acidic waterways of Toolara Forest

Big Sandy Creek



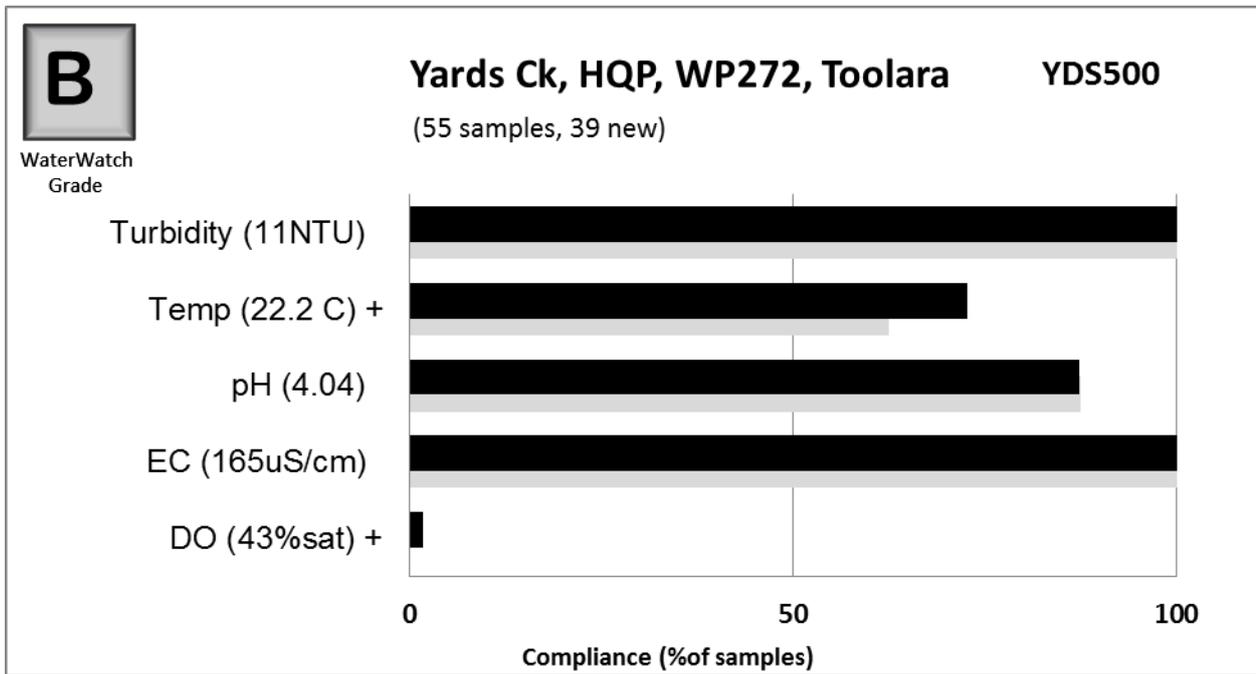
- Good sample size.
- The Big Sandy Creek site displays similar levels of dissolved oxygen compliance to that of the Tinana Creek sites. Big Sandy Creek is a tributary of Tinana Creek.
- pH is naturally low.
- Dissolved oxygen saturation does not comply with guidelines – possibly a natural occurrence.
- Maintaining an overall grade of B (2013 Waterwatch Grade = B) over the past 3 years.

Ulirrah Creek

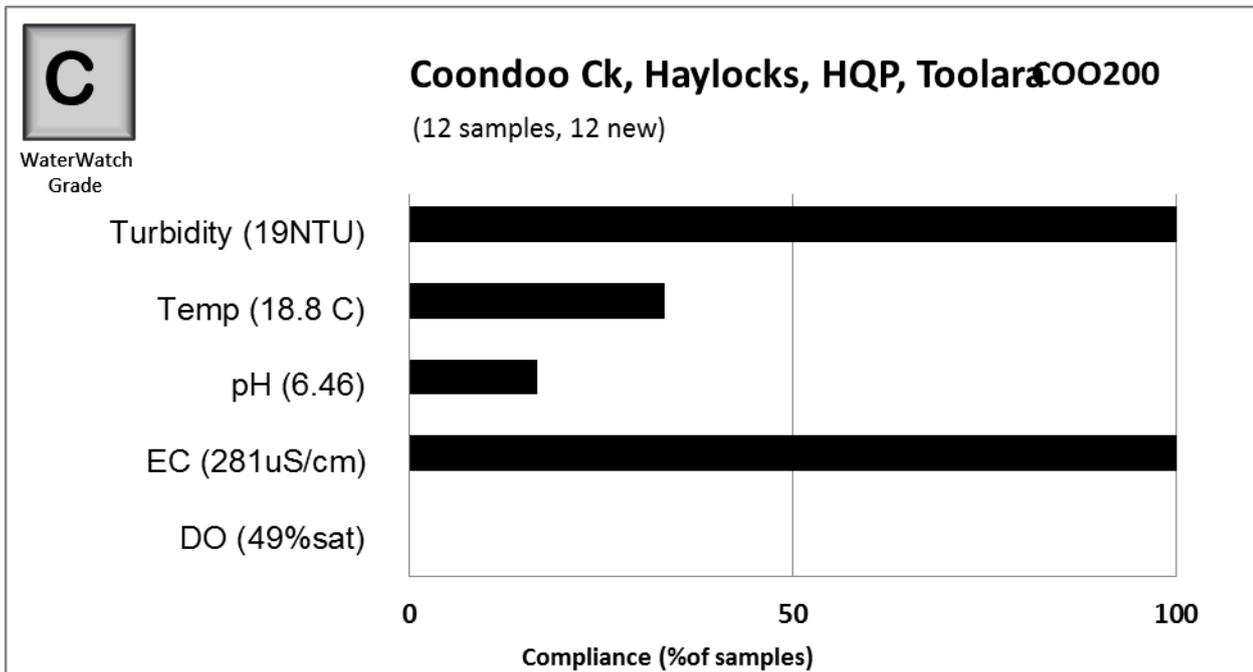


- Good sample size
- Ulirrah Creek displays low pH (acidic) levels, which is consistent with the nature of the sub-catchment.
- Excellent compliance with electrical conductivity (salinity).

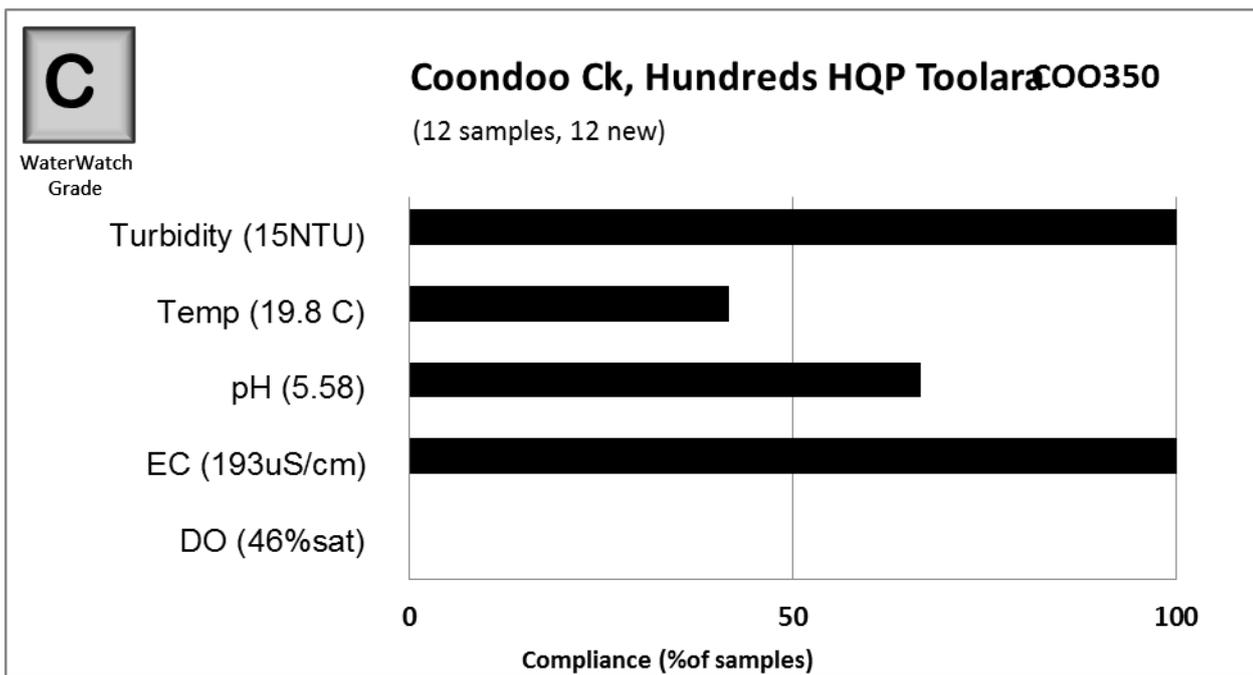
Yards Creek



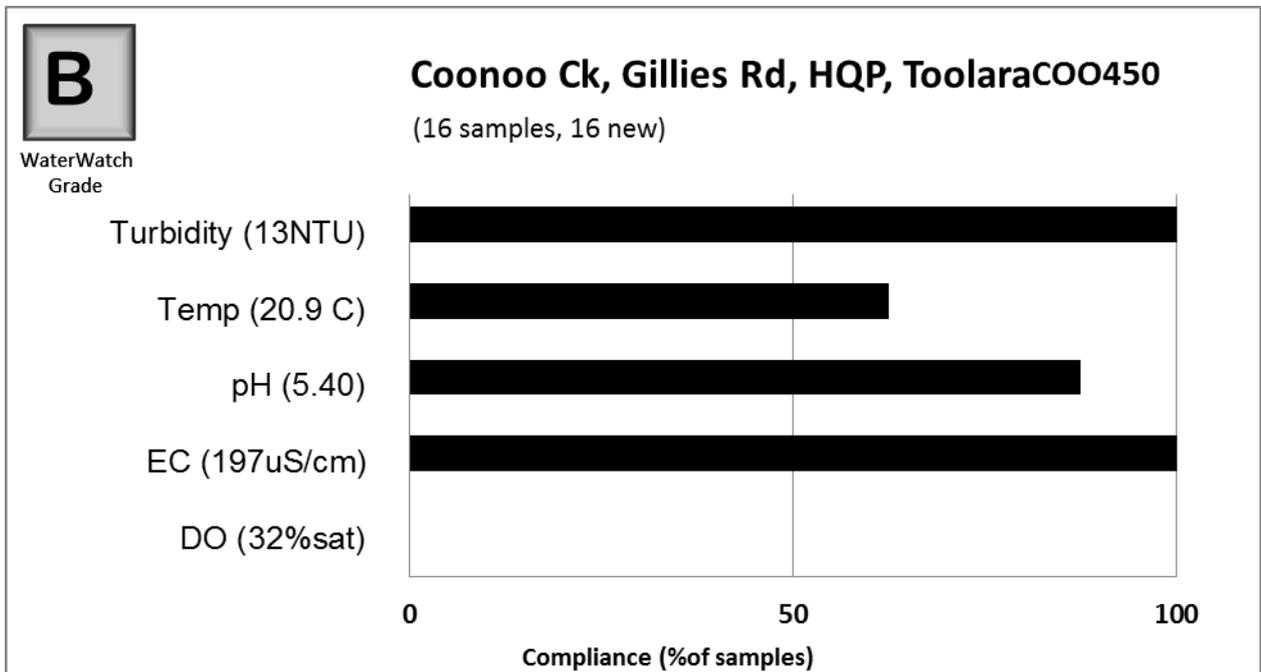
- Good sample size.
- Improvement in temperature compliance of the last three years has improved the grade from C to B.
- pH is naturally low.
- Improved overall grade to B (2013 Waterwatch Grade = C) over the past 3 years.



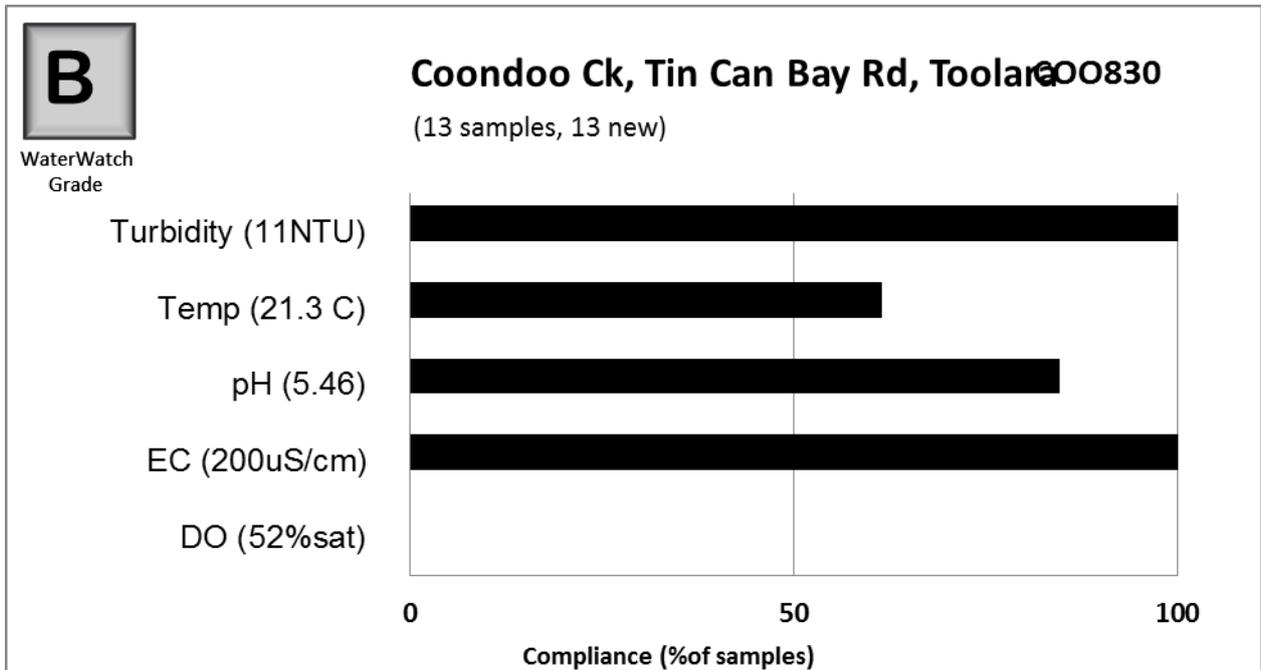
- Sample size is not yet sufficient to make definitive comments on trends



- Sample size is not yet sufficient to make definitive comments on trends

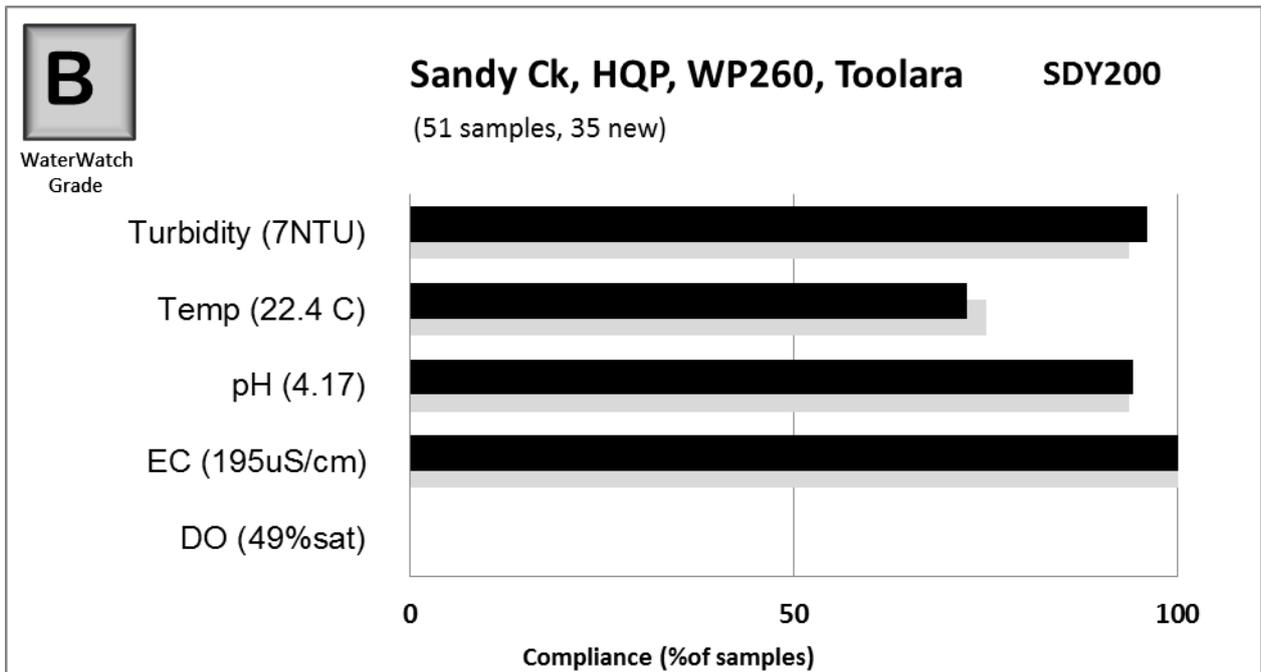


- Sample size is not yet sufficient to make definitive comments on trends

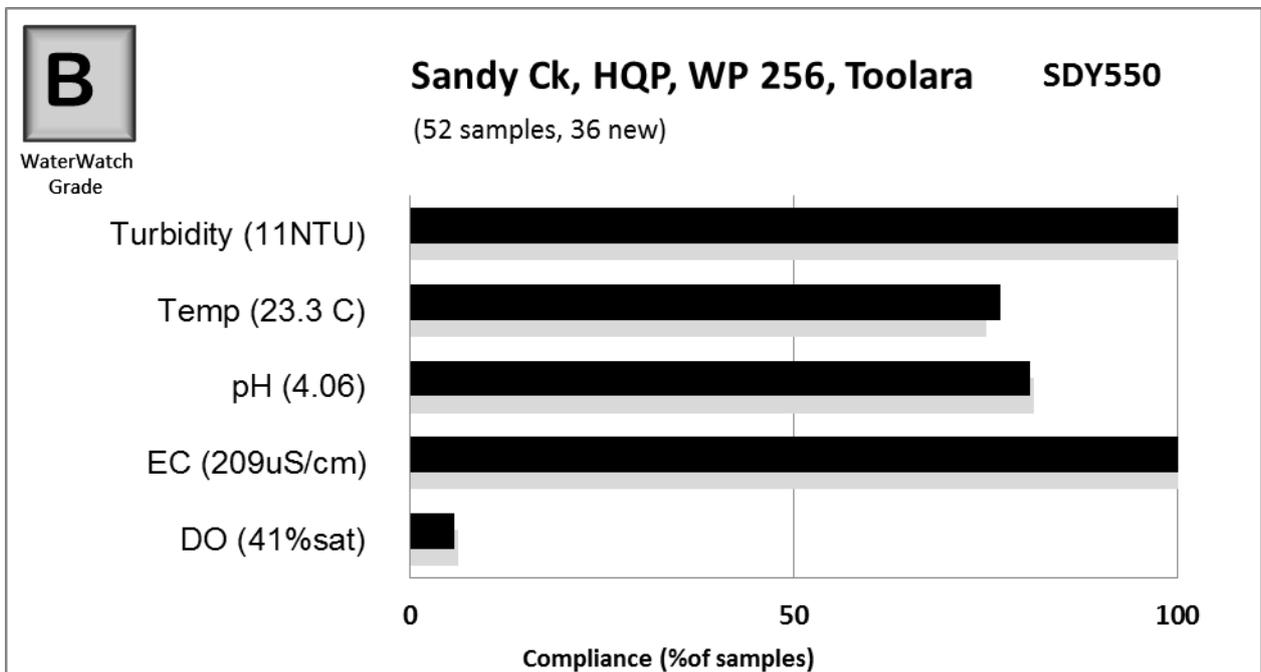


- Sample size is not yet sufficient to make definitive comments on trends

Sandy Creek – Toolara Forest



- Good sample size.
- pH is naturally low, with good compliance.
- EC is exceptionally low, with good compliance.
- Improved overall grade to B (2013 Waterwatch Grade = C) over the past 3 years.



- Good sample size.
- pH is naturally low, with good compliance.
- Temperature is warmer than the SDY200 ste located upstream.
- Improved overall grade to B (2013 Waterwatch Grade = C) 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, a percent compliance was calculated by comparing the results with data from an Upper Obi Obi Creek reference site, taking into account the season (i.e. higher expected temperatures in summer than in winter).

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 *below* 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.