Gympie – Amamoor &

Eastern Mary River Catchment

Waterwatch Report

2012 – 2013

Mary Valley Link Road bridge, January 2013

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

Introduction

In the past 12 months a new Waterwatch network has been added to the Gympie Region, in the "Eastern Mary River Catchments" located predominately in the upper Tinana Creek sub-catchment east of Gympie. In this new Waterwatch network are a suite of new volunteers, including those from HQP. HQP is now monitoring, via the Waterwatch network, sub-catchments located within their Toolara and Tuan pine plantations.

Some of the original volunteers of the Gympie-Amamoor Waterwatch network have now collected over 100 water quality samples from their site 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.

This past year saw the boom-bust weather cycle continue. Between July 2012 and January 2013 the entire catchment experienced severe dry weather with virtually no rainfall recorded during this time with many creeks drying up. Then the late start to the wet season came with a bang on the Australia Day long weekend. The rainfall which fell on the entire catchment on the 27th January resulted in levels of flooding in some districts such as Kandanga, Glastonbury, Widgee and Goomboorian not seen in many years, causing severe damage to some parts of the catchment. The Wide Bay Creek catchment broke the flood peak records again which were set in January 2011. Many families and their properties, including Waterwatch volunteers, were directly affected by the floods and we extend our thoughts and wishes to these people.

There appears to be a general improvement to the water quality of the waterways within the network, even though the network experienced an extended dry season breaking in January 2013 with a large flood. Anecdotal comments written on the datasheets reflect this general improvement in stream health. However native in-stream aquatic plants and riparian vegetation are taking some time to recover.

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 2012. There is now enough long-term data from many sites to draw some statistically valid conclusions about differences in general physical and chemical characteristics of water quality between a number of sub-catchments in this area of the catchment.

Many volunteers have expressed concern about rising electrical conductivity (EC) levels over the winter 2012 period. During this time we experienced the extended dry season which gave us an insight into the baseflow conditions of the creeks after all the alluvial aquifers have been recharged due to good rainfall conditions over the past few years. Sampling of the baseflow in the creeks during this time produced some high electrical conductivity (salinity) levels. After a number of queries from volunteers, we have analysed the long term electrical conductivity data at multiple sites to determine whether an increasing or decreasing electrical conductivity trend is now occurring.

Slip circular bank failures on the Mary River, Gympie, February 2013

Waterwatch sites monitored in the Gympie - Amamoor & Eastern Mary Catchments Waterwatch Networks

Gympie and Amamoor Waterwatch Network		
Site Code	**Creek Name**	**Location**
AMA050	Amamoor Creek	South branch
AMA100	Amamoor Creek	Bluebell
AMA800	Amamoor Creek	Amamoor township
COL300	Coles Creek	Coles Creek Road
COL850	Coles Creek	Carlson Road bridge
DEE500	Deep Creek	Randwick Rd, East Deep Creek
DEE920	Deep Creek	Bruce Highway, Gympie
DEE950	Deep Creek	Mouth with Mary River, Gympie
ELC850	Eel Creek	Long Rd, Pie Creek
KAD500	Kandanga Creek	Upper Kandanga
MAR435	Mary River	Gilldora
SRB250	Scrubby Creek	Scrubby Creek Rd, Scrubby Creek
SIX850	Six Mile Creek	Woondum bridge, Mothar Mt
TRA500	Traveston Creek	Old Traveston Rd, Traveston
TRA800	Traveston Creek	Traveston Crossing Rd, Traveston
SKY900	Skyring Creek	Old Bruce Highway bridge
YAB680	Yabba Creek	Imbil township bridge

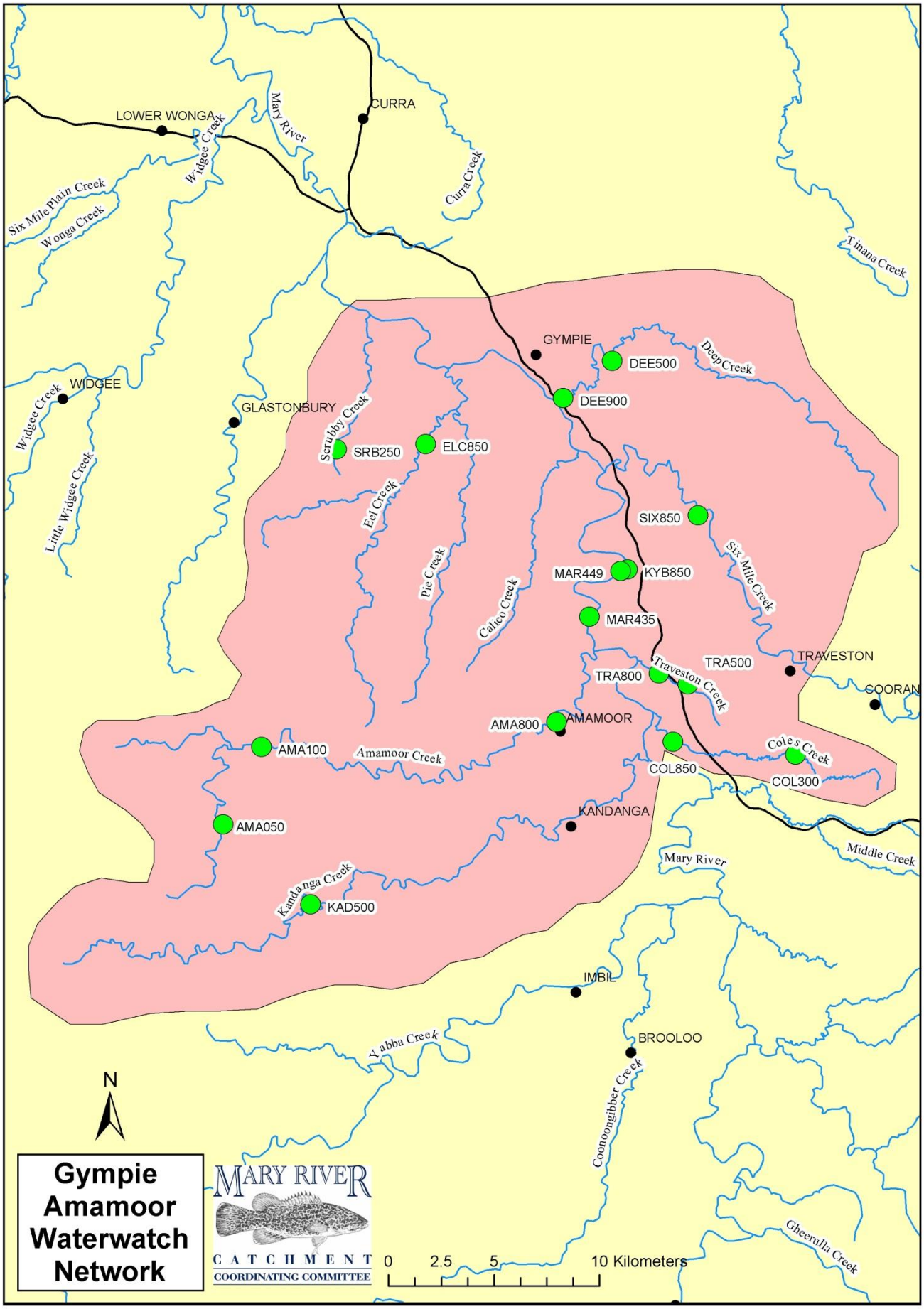
Eastern Mary River Catchments Waterwatch Network		
Site Code	**Creek Name**	**Location**
BIG300	Big Sandy Creek	Waterpoint 76 Toolara Forest
SDY200	Sandy Creek	Waterpoint 260 Toolara Forest
SDY550	Sandy Creek	Waterpoint 256 Toolara Forest
SNY020	Sandy Creek	Sandy Creek Road, Downsfield
TIN050	Tinana Creek	Tagigan Road, Goomboorian
TIN550	Tinana Creek	Bauple East, Missings bridge
TIN580	Tinana Creek	Waterpoint 240 Toolara Forest
YDS500	Yards Creek	Waterpoint 272 Toolara Forest

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 2012-13. Contributors to this report are: Col and Kath Robinson, Craig and Lesley Hanson, Bob and Lorraine Hood, Kent Hutton, Bob Fredman, Lorne and Ross Maitland, Noo Dye, Will Kingham, Jason Buckley, Shane Litherland, Graeme Draper, Jeff Clifton, Don White, Dan O'Reagan, Bart Schneemann, Bec Owen, Les & lnge Giegler, David Wilson, Ross Creek Store, Amamoor Store and HQP staff.

Mary River, Peacons Pocket, February 2013

Gympie Amamoor & Eastern Mary River Catchments Waterwatch Site Map



Summer 2013 floods

In January 2013, like the January 2011 floods, the worst flooding occurred in sub-catchments located downstream of Gympie in the middle, western and north-western sections of the Mary River Catchment.

Wide Bay Creek, particularly the townships of Woolooga and Kilkivan, reached record flood peaks again (after creating new records in 2011) and were significantly damaged. The Marodian gauging station located on lower Munna Creek also recorded a new flood peak, while locals in the upper Munna Creek catchment believe this flood was the highest in living memory. The Glastonbury Creek gauging station also recorded a new flood peak, while the Hygait gauging station on Kandanga Creek recorded the 3rd highest flood peak. In the upper Mary River catchment, the Bellbird gauging station located above Kenilworth recorded the 4th highest flood peak on record.

The Mary River at Miva, downstream of Gympie, recorded its 3rd highest flood peak since 1910, only 30cm below the flood recorded in 1974. Maryborough recorded a flood peak of 10.7m (8am 29/1/13) - its 4th highest flood peak since 1893.

The difference between the 2011 and 2013 floods was the Mary River and creeks started rising from almost cease-to-flow conditions in January 2013. Whereas in early 2011 the catchment was saturated and the river and creeks had considerably higher ambient flows before the floods began.

Rainfall

Leading up the January 2013 floods the Mary River Catchment had experienced an extended dry period from late July 2012 until late January 2013. During this 7 month period very little rainfall was recorded throughout the catchment, apart from isolated and very localised storm cells generating some rainfall. Consequently the catchment was very dry, and groundcover levels were low due to high pasture utilisation from grazing cattle. This was in stark contrast to the January 2011 floods where the catchment was saturated from extensive rainfall during 2010. During the first half of 2012, the Mary River experienced a series of small flood events, with some tributaries (Tinana & Gutchy Creeks) on the eastern side of the river recording new flood peaks.

The highest daily rainfall totals recorded at the peak of the rain event (27/1/13) in the Mary River catchment were located in the north-western Munna Creek sub-catchment, with Brooweena (in the upper Munna Creek) recording 336mm and Marodian (in the lower Munna Creek) recording 347mm. Mt Kanigan on the eastern side of the Mary River in the Gutchy Creek sub-catchment, near Gundiah, recorded the highest daily total rainfall of 397mm. Locals recorded in the Widgee Creek catchment rainfall of 735mm for the 5 days (commencing on 24th January).

The Munna Creek sub-catchment is the Mary River catchment's largest sub-catchment with approximately 15% of the total catchment.

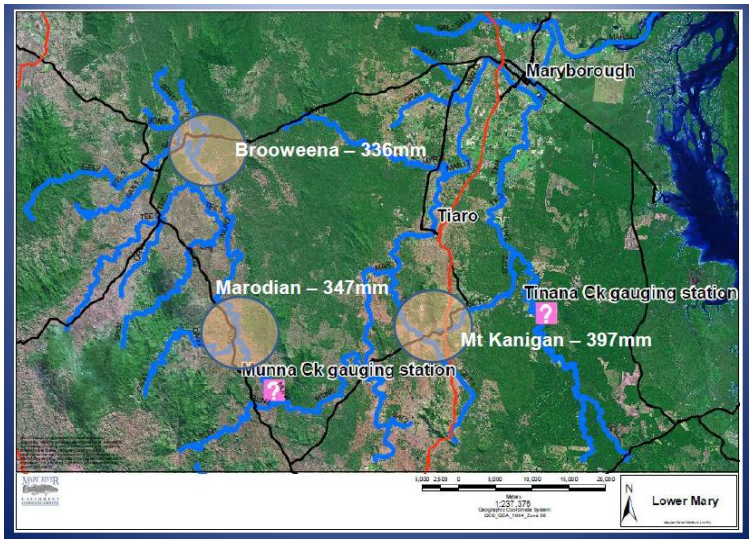


Figure 1 – peak daily rainfall recorded on 27/1/13

Monitoring Methods

Sites monitored by the network 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 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-Amamoor & Eastern Mary River Catchments Waterwatch report 3 different guidelines have been used to suit the variety of different sites:

1. Mary Catchment 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)

Mary River, Moy Pocket, May 2013

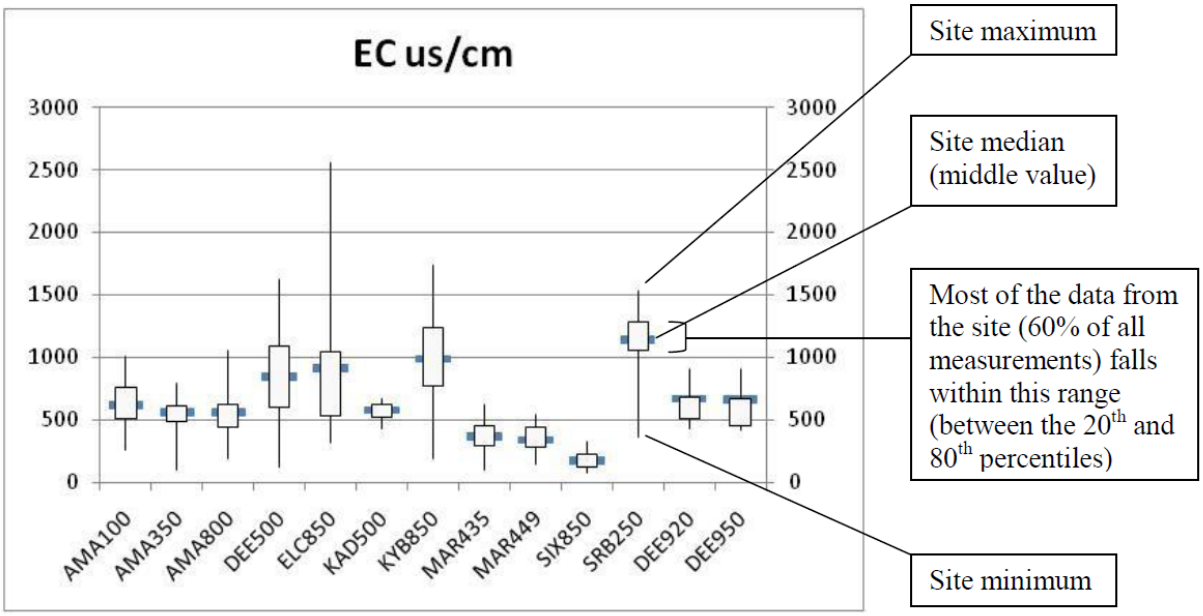
Results- inter-site comparisons

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.

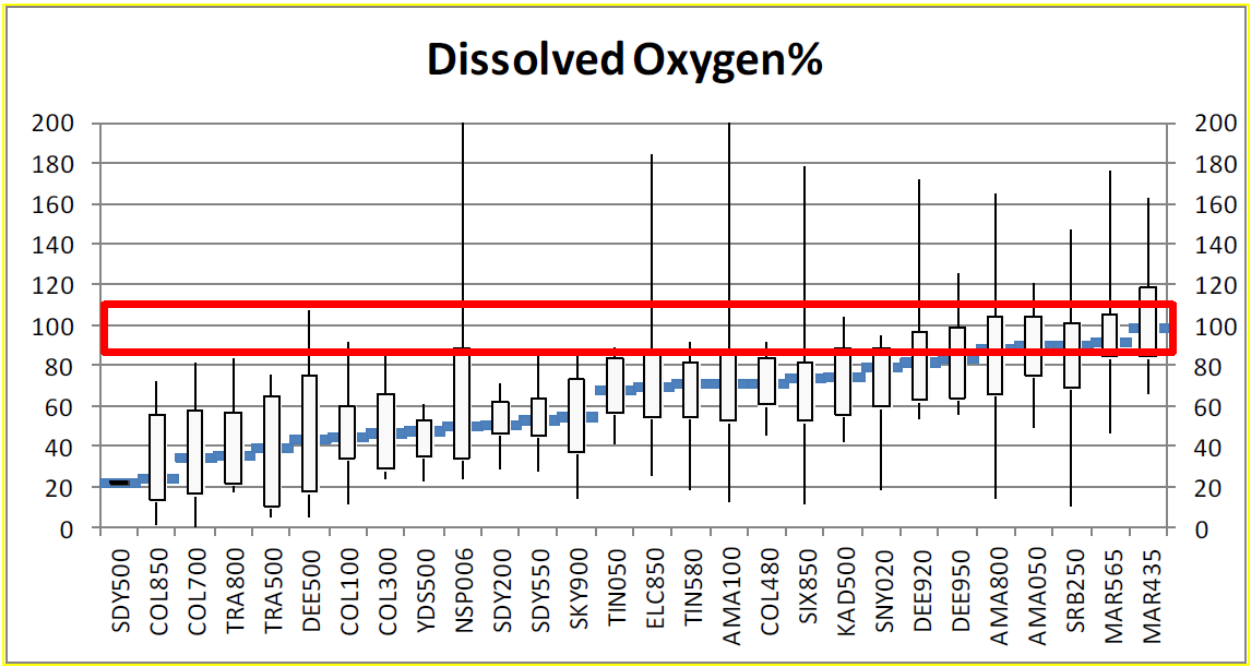
This comparison is useful for identifying sites that are unusually variable or have generally higher or lower values than other sites in the network.



Mary Street, Gympie CBD

Long-term inter-site comparison of dissolved oxygen levels (all data collected)

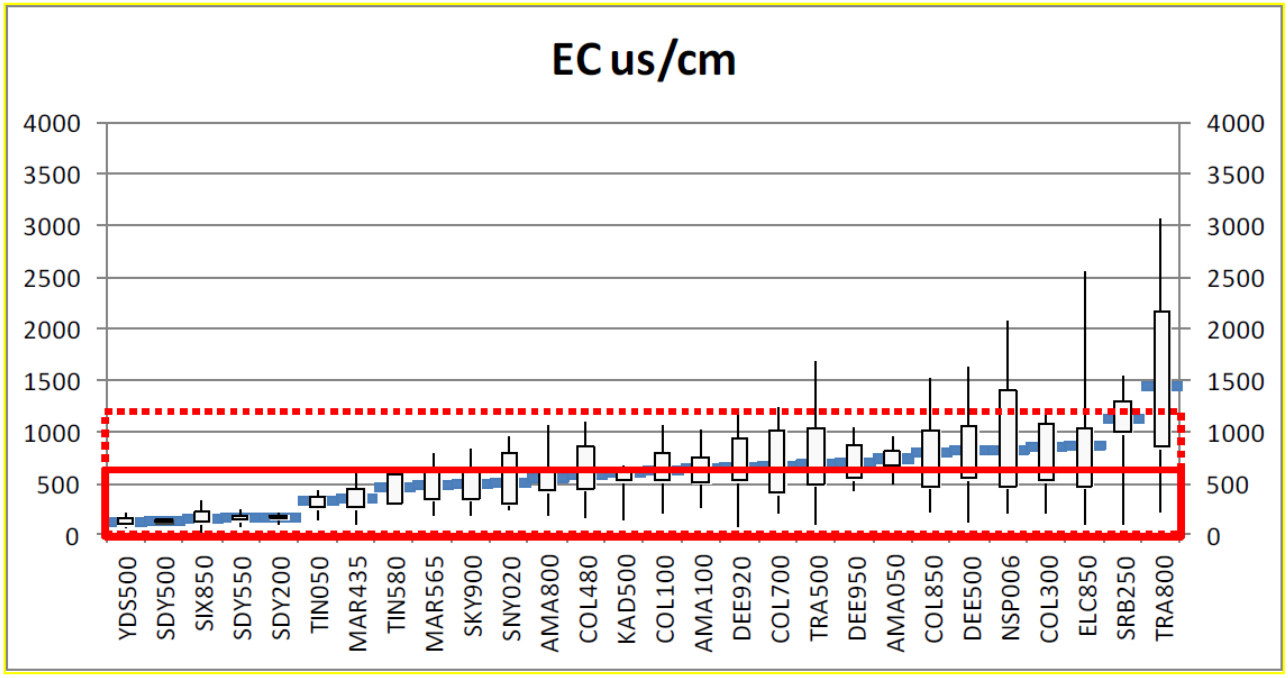
in the Gympie Amamoor, Eastern Mary Catchments Waterwatch Network



- This graph illustrates all the long-term data collected from each site, not just the last 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 can vary over a wide range eg. 30% to 150%. In undisturbed waterways the oxygen levels are generally maintained within a smaller range
- The regularly flowing Mary River sites in this network are generally within the dissolved oxygen water quality guidelines with less overall variation for dissolved oxygen than the intermittantly flowing creeks. However the Mary River sites can still experience extreme values in dissolved oxygen levels.
- The sites in the Coondoo Ck system (Sandy Creek) are consistently low in oxygen, with little variation
- Intermittent creeks with high inputs of carbon (like Coles and Traveston Creek) show generally low oxygen levels, coupled with very high variation and instability in oxygen levels

Long-term inter-site comparison of electrical conductivity (salinity)

in the Gympie Amamoor & Eastern Mary Catchments Waterwatch Networks



- This graph illustrates all the long-term data collected from each site, not just the last year's data. The solid red line shows the lowland freshwater 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), applicable to upper Amamoor Ck, Eel Creek, and Scrubby Creek

- 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. More recent data does not include these long drought periods

- Mary River and Six Mile Creek have consistently complied with EC guidelines

- The more intermittently flowing creeks such as Scrubby, Eel, Coles and Traveston Creeks generally record higher EC values, and larger variation. Traveston Creek (TRA800) has the highest EC level and shows exceptional variation in electrical conductivity. High EC in the baseflow of these creeks is likely to be closely linked to local geology and landscape features.

- Deep Creek displays similarly high EC values and large variations, although Deep Creek has more reliable flow than the intermittently flowing creeks within the Waterwatch network (as above).

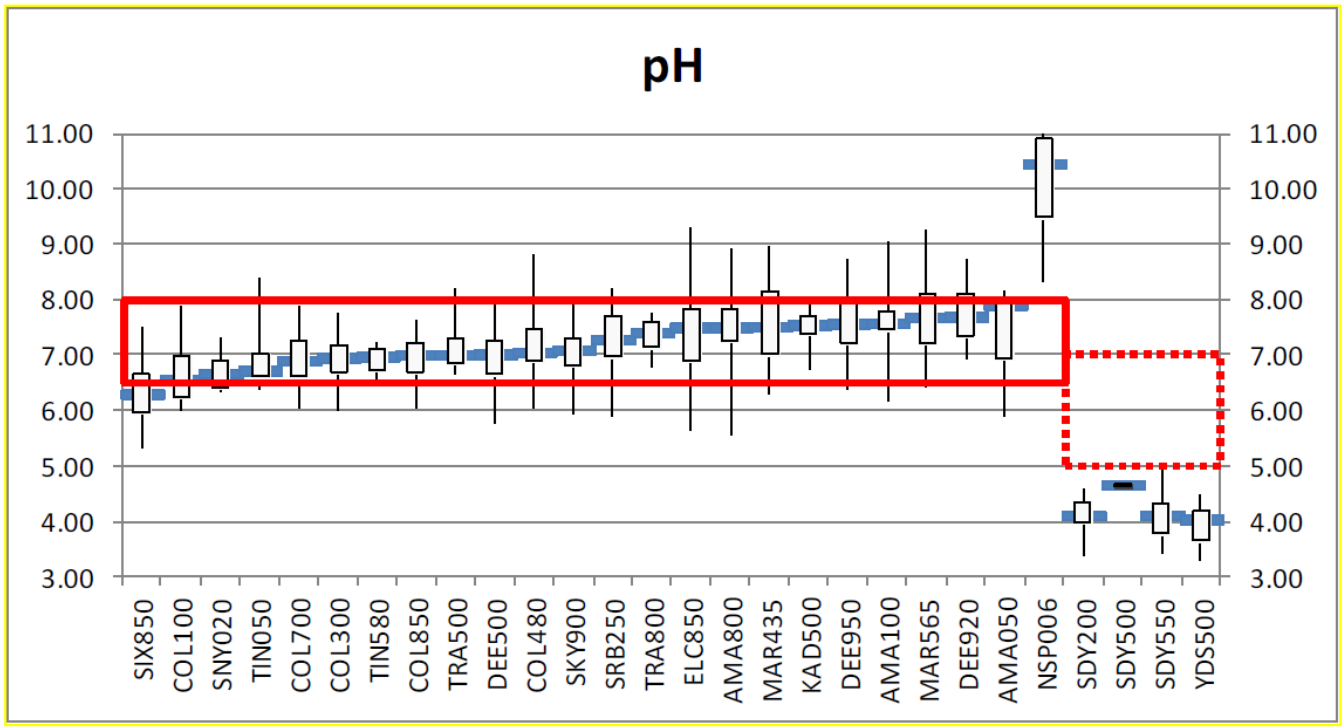
- The sites in the upper Tinana, Coondoo and Six Mile Creek systems show very low levels of electrical conductivity

- The majority of sites in the Gympie area have consistently recorded higher than the electrical conductivity (salinity) guideline for many years. Based on past experience salinity issues (e.g. salt-scalds) crop up after good seasons when the water-table is recharged and groundwater has moved up the soil profile closer to the soil surface. Consequently the district could experience salinity outbreaks over the next few years.

- Further analysis of the long-term trends for electrical conductivity is being conducted.

Long term inter-site comparison of acidity

in the Gympie Amamoor & Eastern Mary Catchments Waterwatch Networks



- This graph illustrates all the long-term data collected from each site, not just the last 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). The red dotted rectangle illustrates the scheduled guidelines for tannin-stained freshwaters (applicable to the Conndoo Ck system)

- It is clear that the scheduled guidelines for tannin-stained freshwaters in the Mary do not match the waterwatch values recorded in the Sandy Ck/ Coondoo sites – all of which are in well-preserved sections of the creek. There may be a case for deriving a set of local guidelines for this system, similar to those that have been derived for individual freshwater lakes of high ecological value on the Fraser Island and Stradbroke Islands.

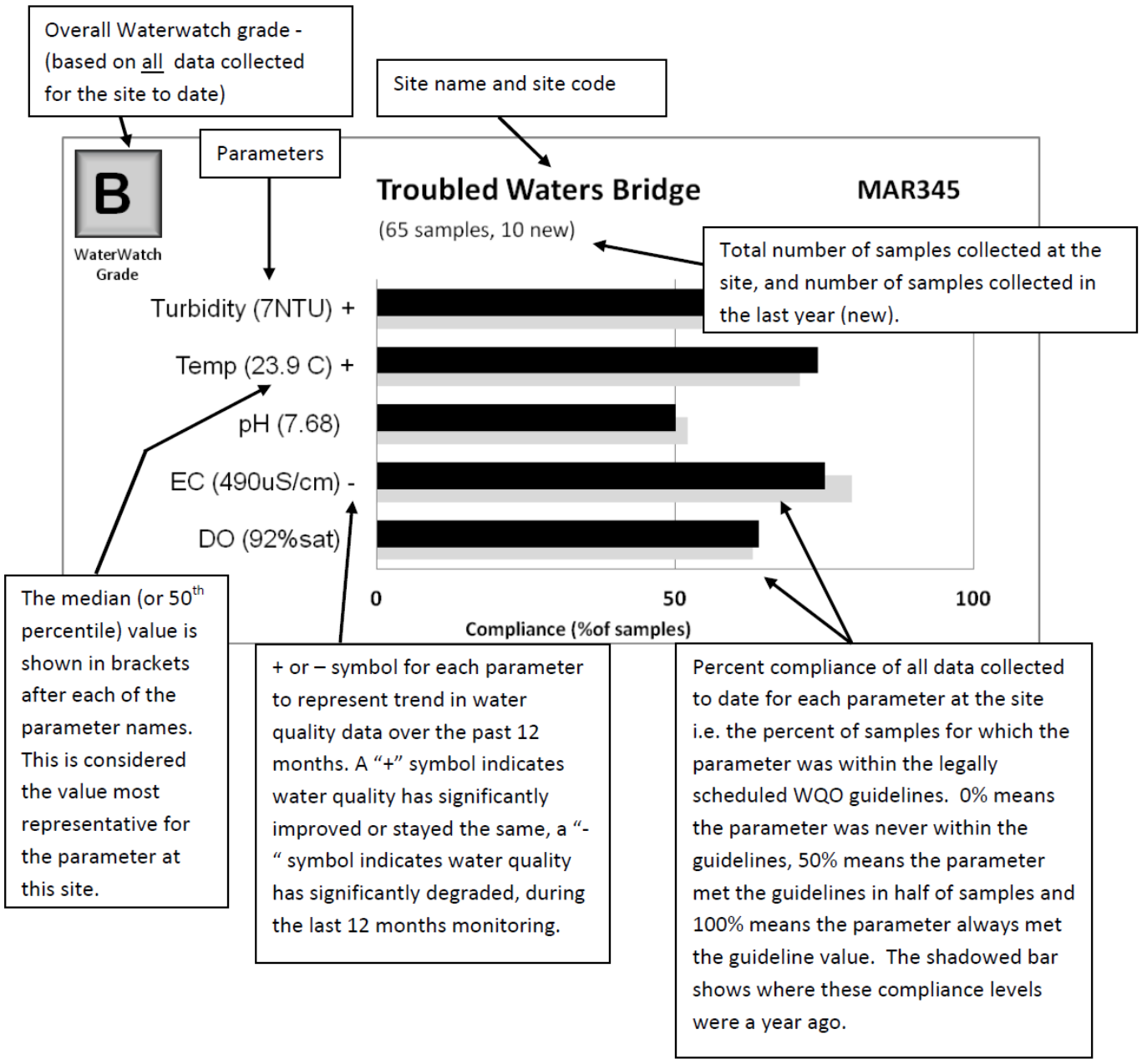
- All natural sites other those in the wallum system show generally good compliance with scheduled pH values. (NSP is an artificial settling pond in a cement works, designed to stop contaminated water from entering natural waterways.)

- Six Mile Creek consistently shows low pH (acidic) levels, which is consistent with the nature of the sub-catchment. There may be a case for deriving a set of local water guidelines for the Six Mile Creek catchment.

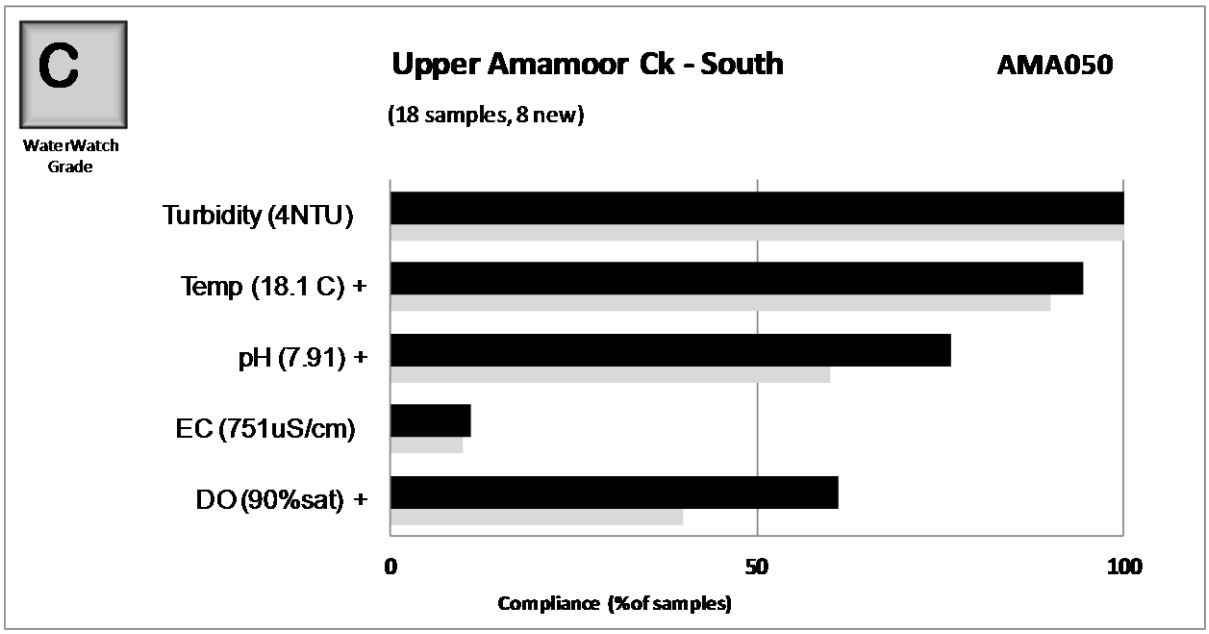
Flood channel of the Mary River, Traveston Crossing

Results - site report cards

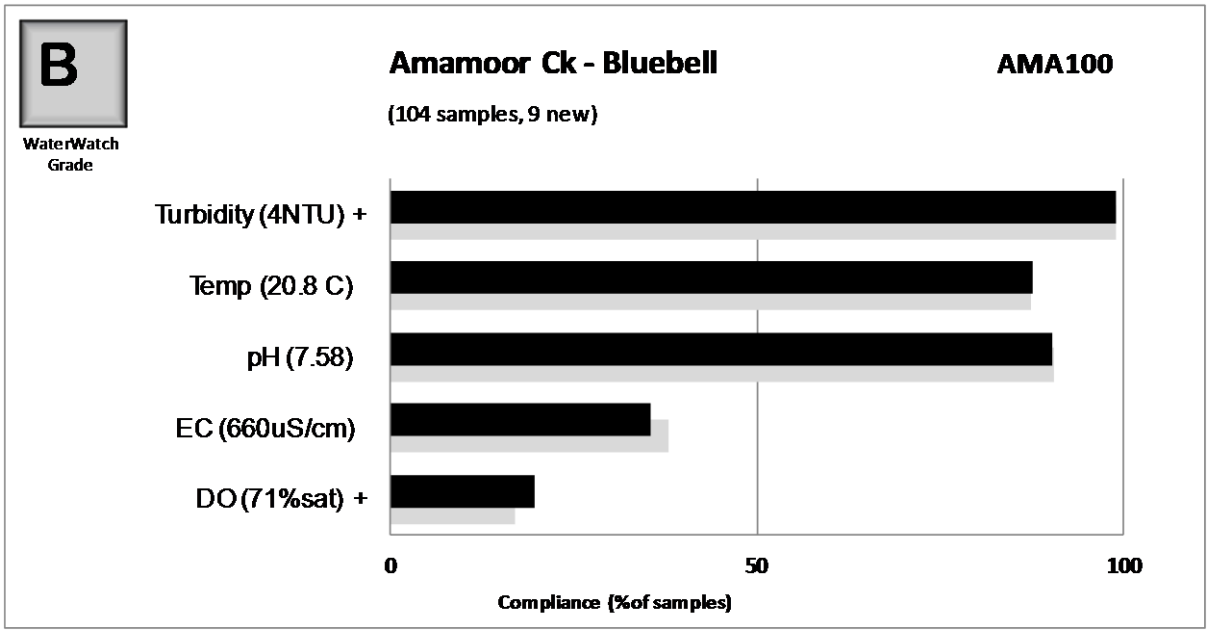
The long-term data from each site is analysed and presented as a graphical report card. These graphs present the long-term median value of each parameter and the level of compliance with the relevant guidelines across all the individual samples from that site. The illustration and descriptions below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



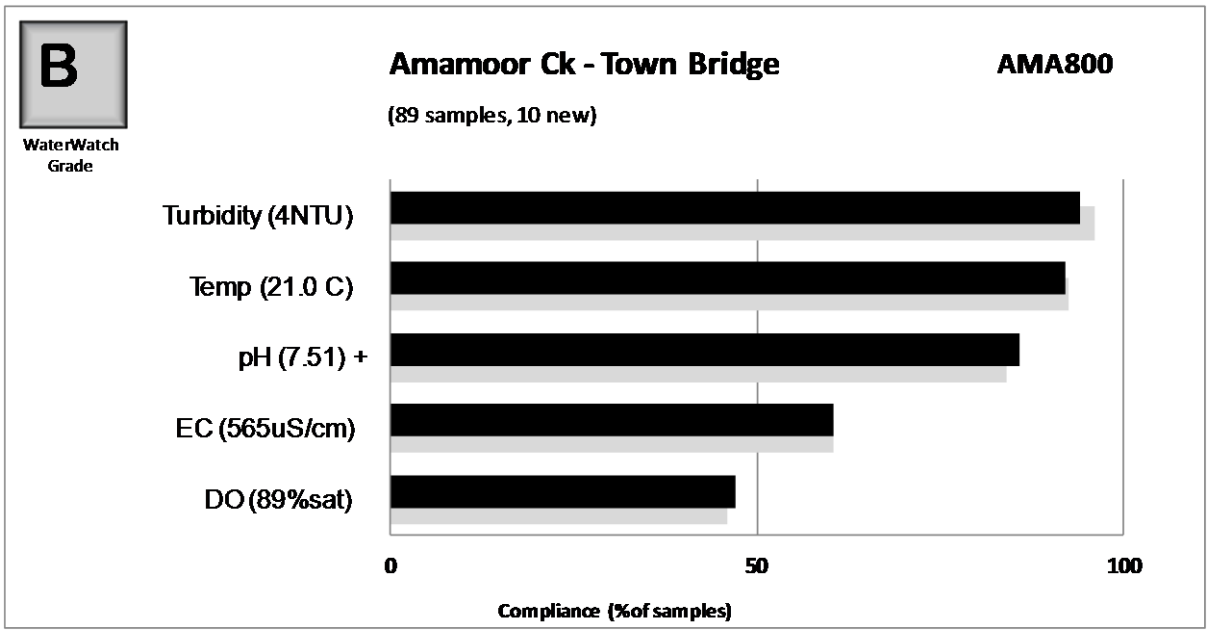
Amamoor Creek



- Good sample size, enough data for analysis
- An improvement in compliance for temperature, pH & dissolved oxygen over the past 12 months
- Turbidity has remained very low, with good compliance
- Electrical conductivity (salinity) levels rarely comply with guidelines - which is possibly consistent with the nature of the sub-catchment



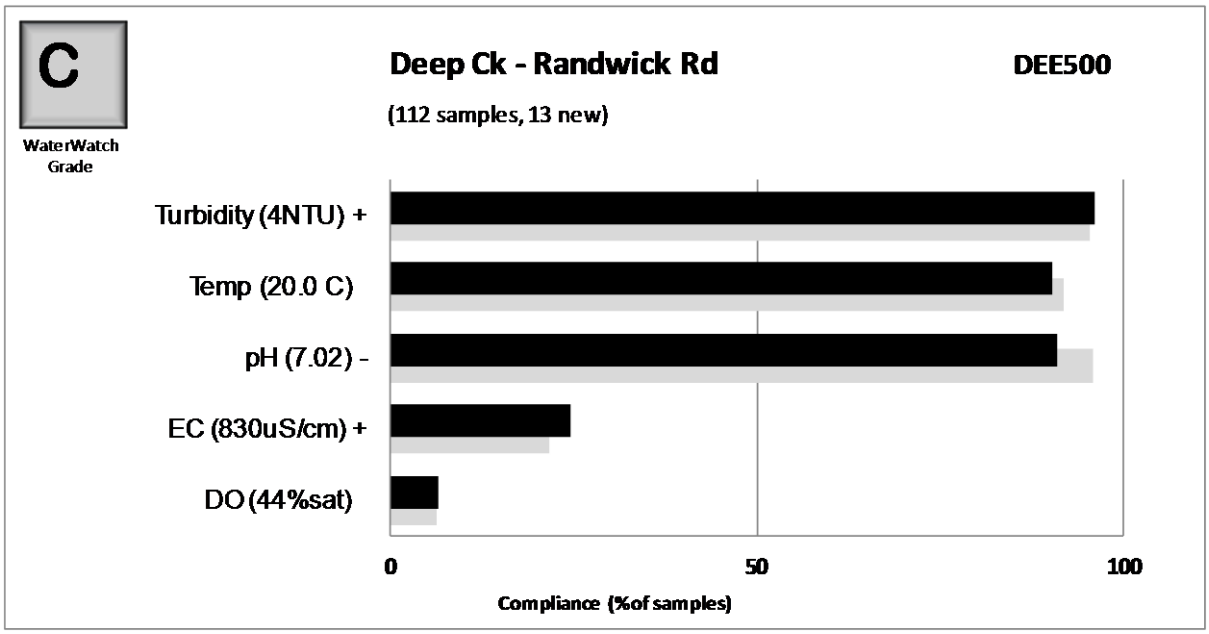
- Dissolved oxygen levels in the past 12 months are now more compliant than 2011/12
- Excellent sample size (gold medal award winners!)
- Electrical conductivity (salinity) levels rarely comply with guidelines - which is possibly consistent with the nature of the sub-catchment
- Very good turbidity results, reflected in low sediment loads of the sub-catchment



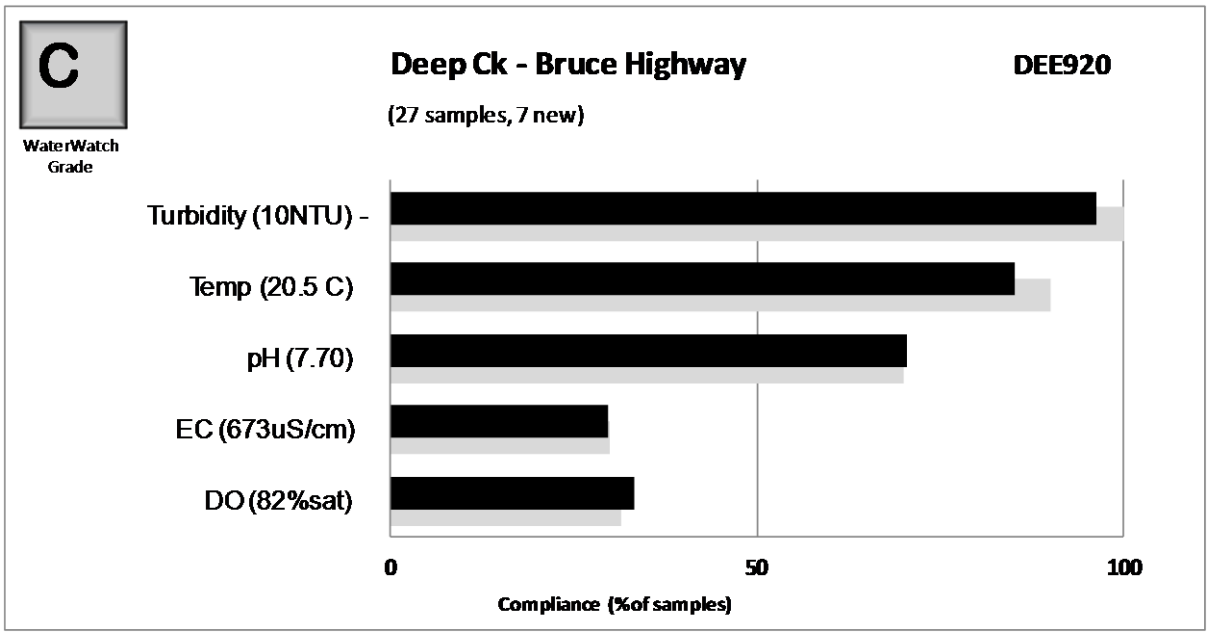
- Good sample size
- This site has seen an improvement in compliance with pH in the last 12 months
- Better electrical conductivity (salinity) and dissolved oxygen compliance than Amamoor Creek, Bluebell – most likely due to more reliable creekflows because the site is located lower in the sub-catchment.

Mary River, Cambroon January 2013

Deep Creek

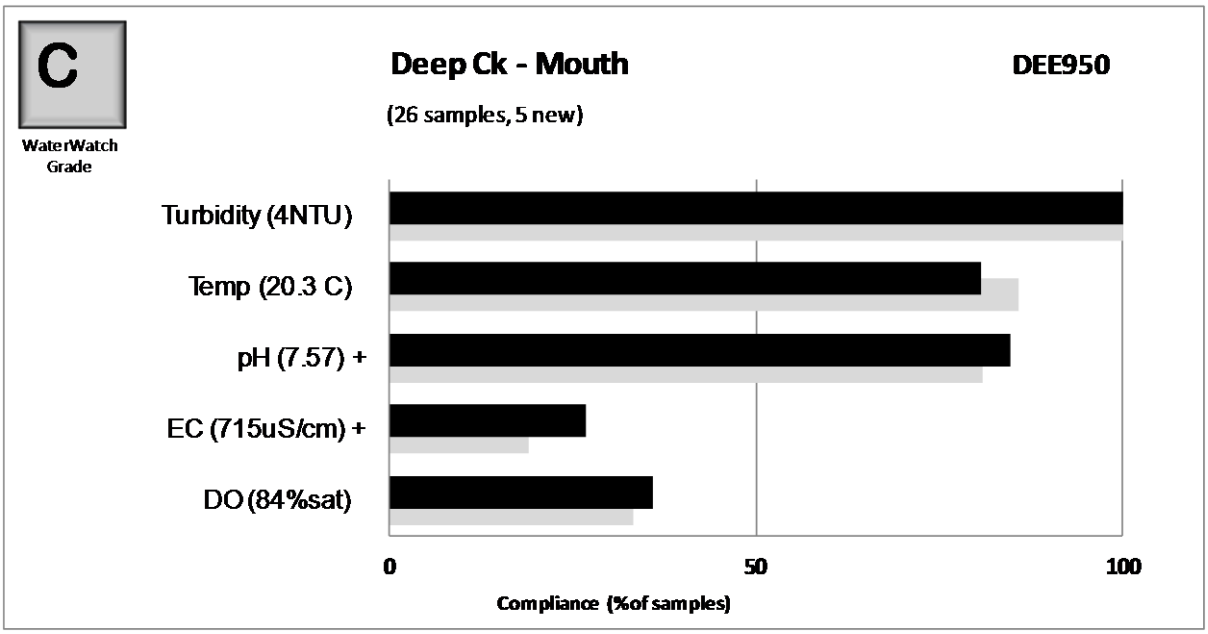


- Excellent sample size (gold medal award winners!)
- Good compliance for turbidity and temperature
- Slight decline in pH compliance compared to 2011/12 report
- Consistently higher electrical conductivity (salinity) levels than other sub-catchments – higher EC levels than Amamoor Creek, however there has been an improvement over the past 12 months.



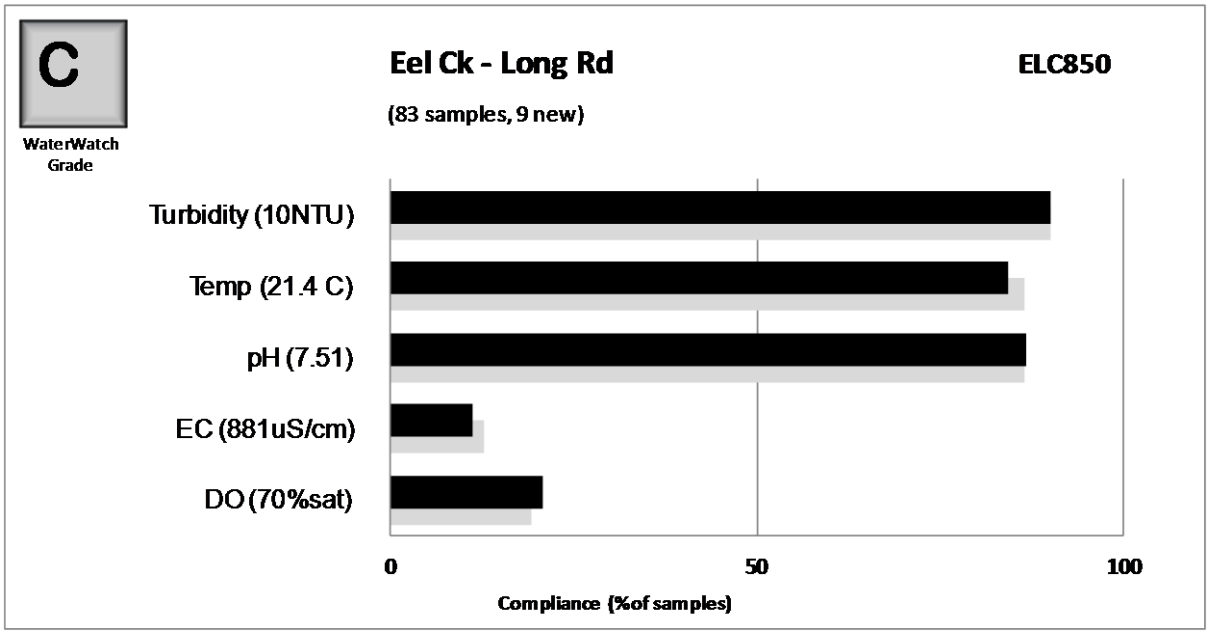
- Turbidity compliance has fallen in the past 12 months
- Continued low compliance with guidelines for dissolved oxygen, better compliance than Randwick Rd site
- Good sample size for analysis.

- Better electrical conductivity (salinity) compliance than upstream sample site on Randwick Rd, Deep Creek, due to the influence from the Mary River.



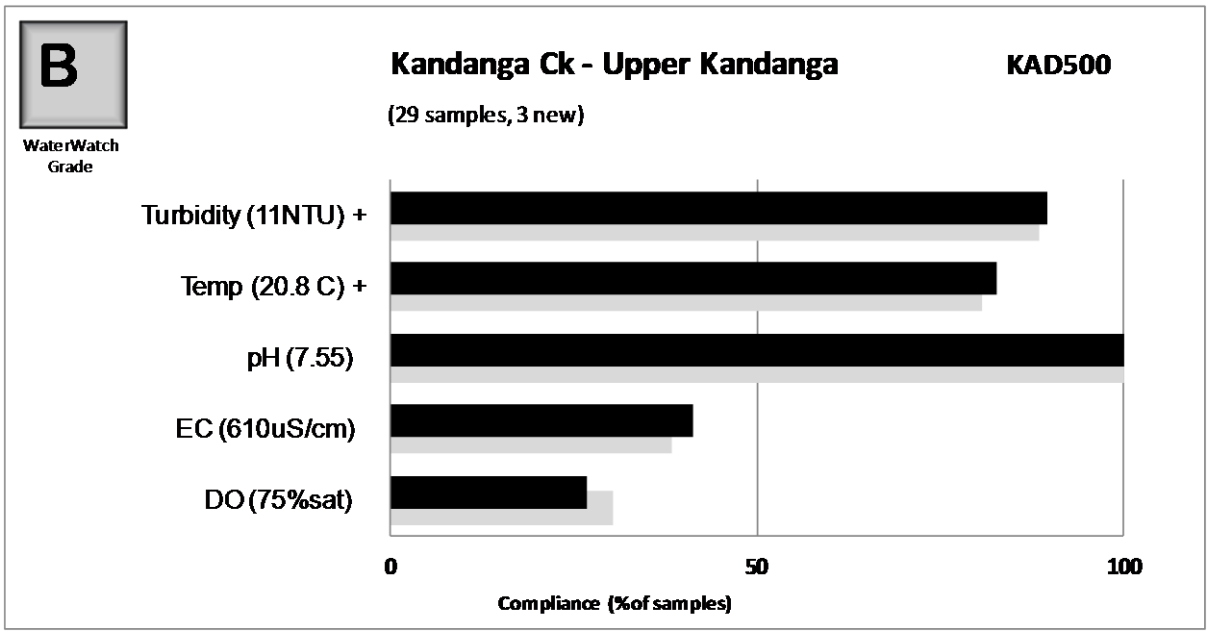
- Good sample size to make comments on trends.
- Electrical conductivity (salinity) levels and pH have shown an improvement in compliance over the past 12 months.

Eel Creek



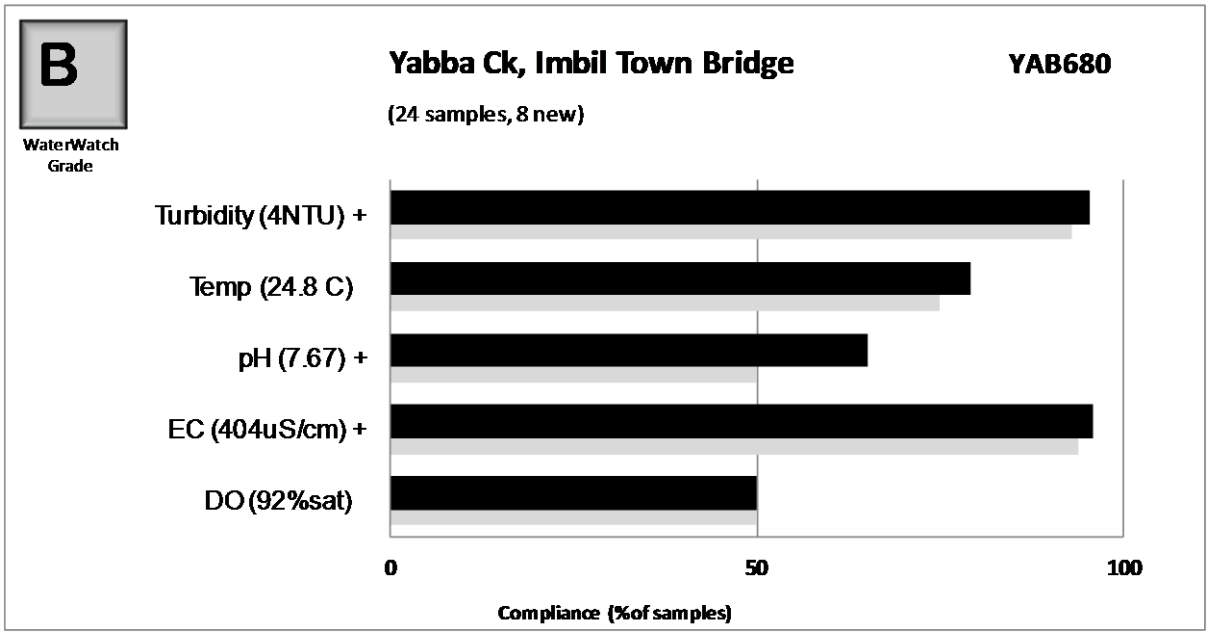
- Good sample size
- Consistently higher electrical conductivity (salinity) levels than Amamoor and Deep Creeks
- This year the site has maintained good compliance for turbidity, temperature and pH values

Kandanga Creek



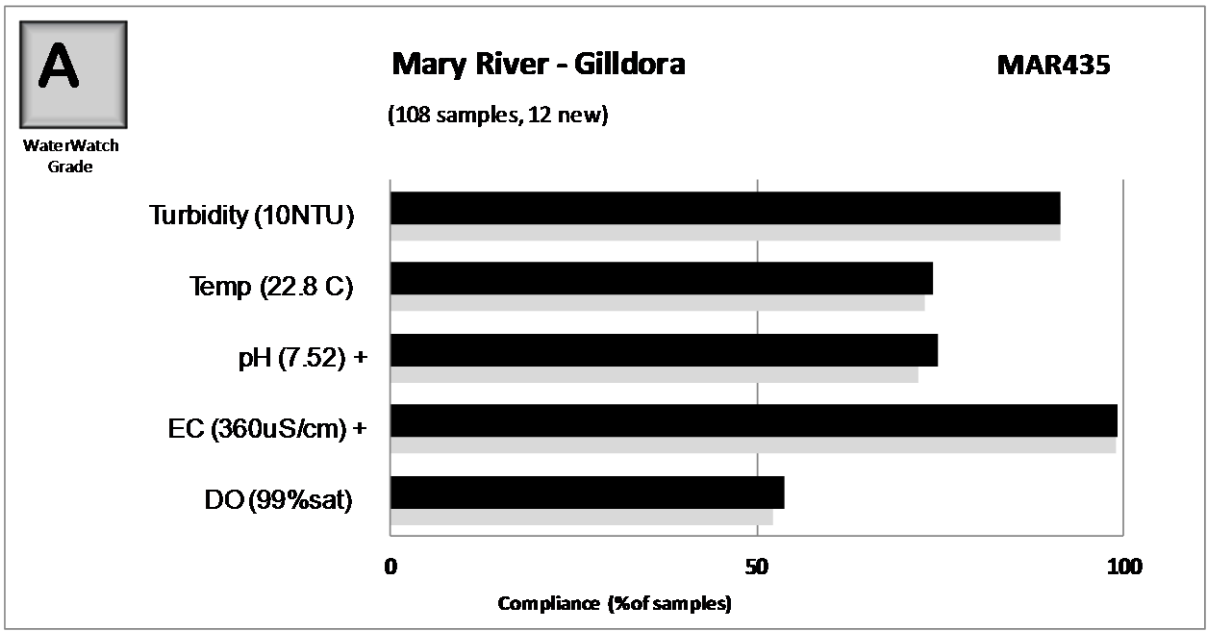
- Good sample size
- This year's data indicates an improvement on temperature and turbidity compliance over the past 12 months

Yabba Creek



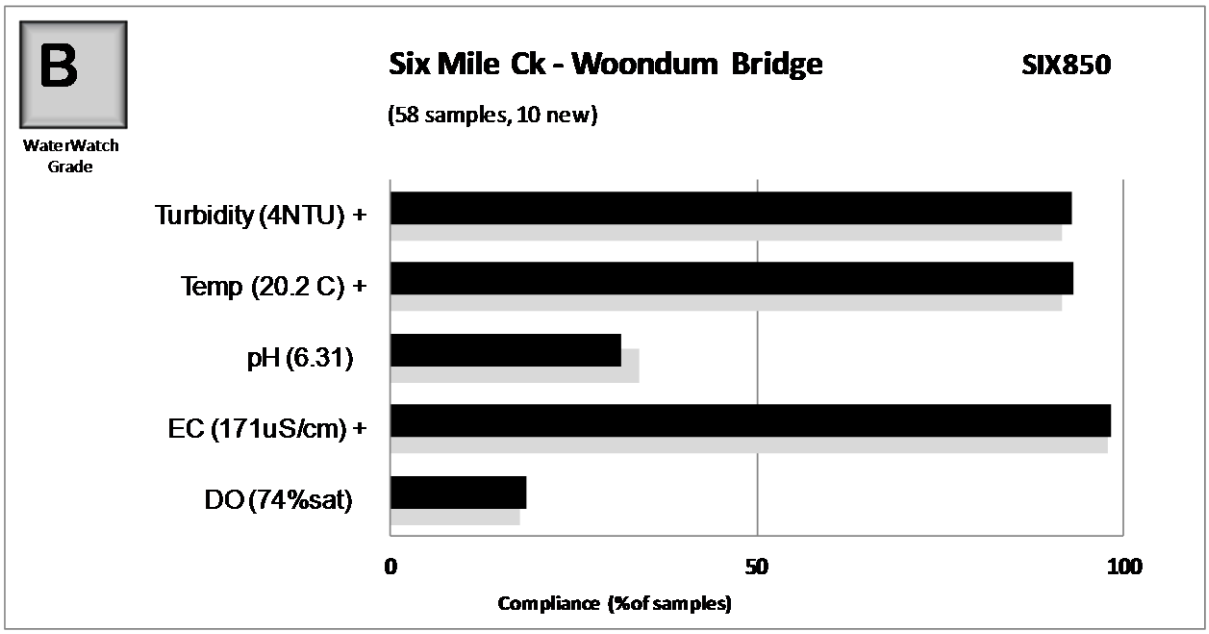
- This site has just become a regular Waterwatch site in the past 12 months, however there were a number of old water quality measurements taken over previous years which have been included in this report.
- In the past this site has shown high pH levels (alkaline) because of profuse growth of aquatic plants and algae. However pH compliance has improved significantly in the past 12 months.
- In the past dissolved oxygen levels have been highly variable at this site.

Mary River



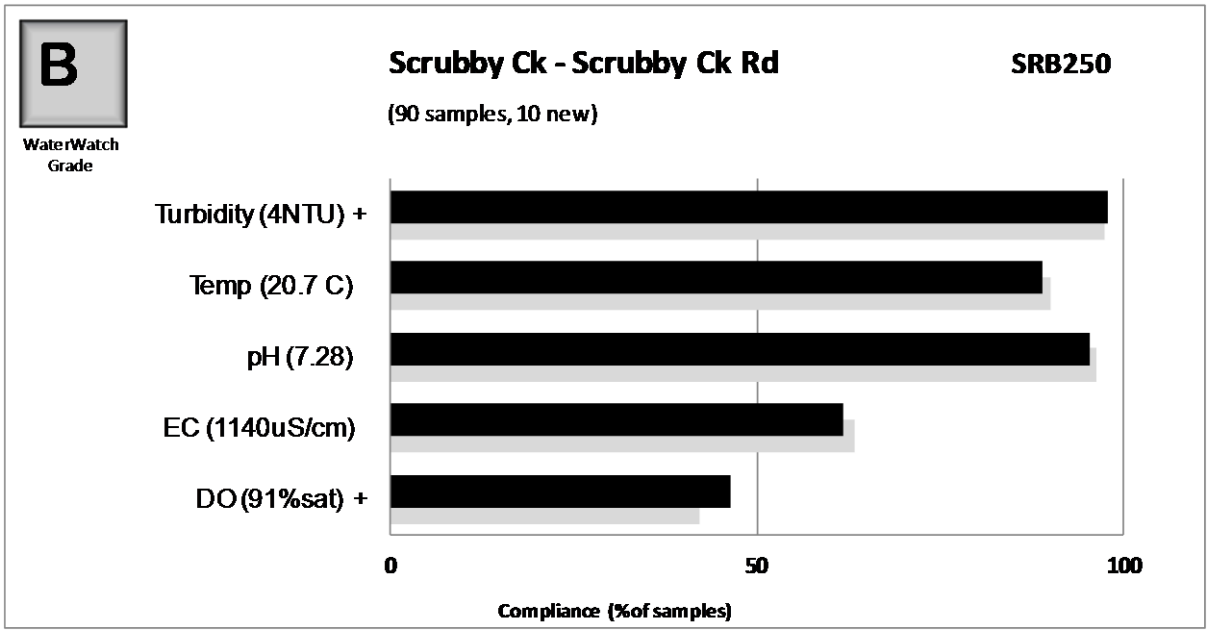
- Excellent sample size (gold medal award winner!)
- This year electrical conductivity (salinity) and pH values have improved compliance compared with the previous 12 months, bringing the report card from a “B” to “A”
- Good electrical conductivity (salinity) compliance – correlated with regular river flows
- 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

Six Mile Creek



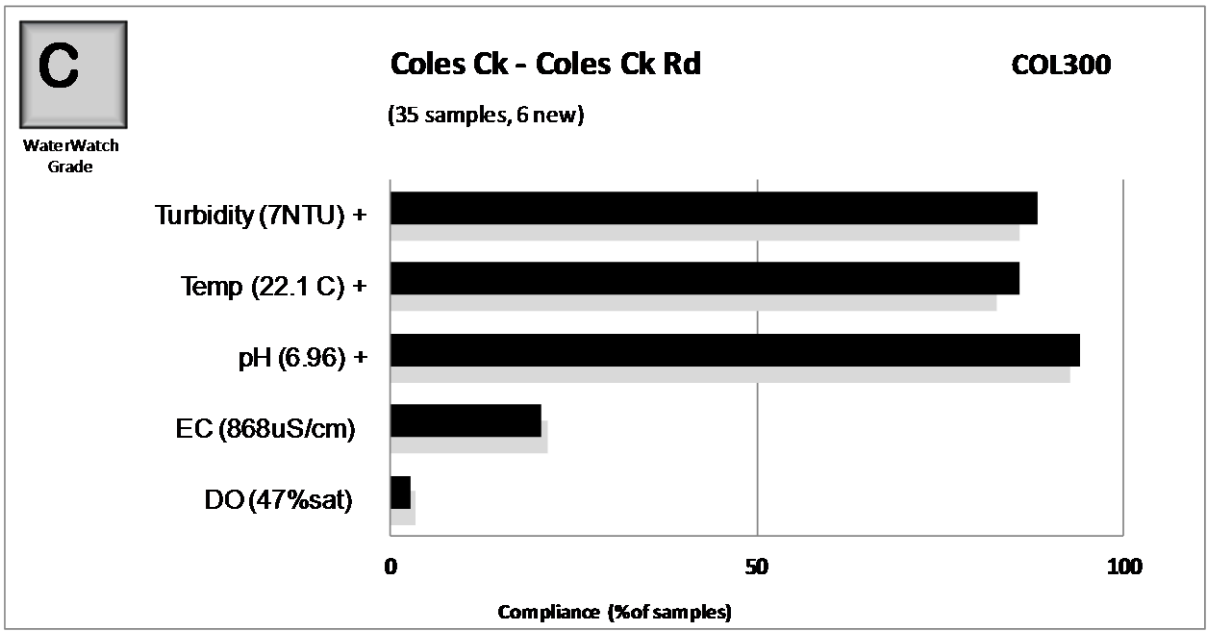
- Naturally acidic sub-catchment
- Improved compliance over the past 12 months for turbidity, temperature and electrical conductivity (salinity)
- This site has highly variable dissolved oxygen levels resulting in a lower compliance level overall.

Scrubby Creek

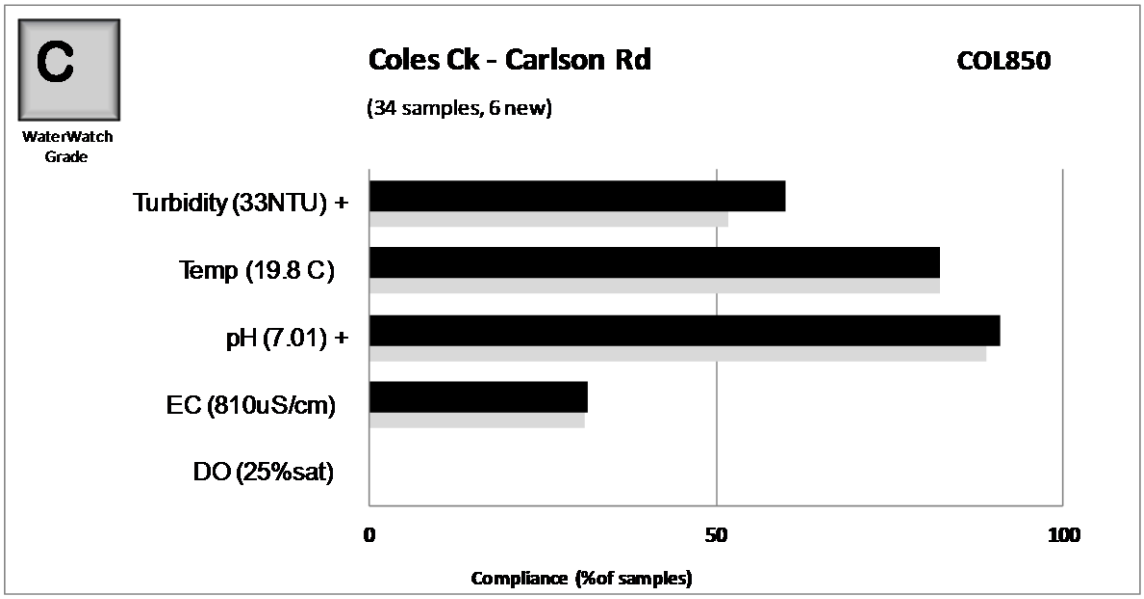


- Good sample size
- A very high EC level is consistently recorded at this site, consequently it is more appropriate to apply the North-western Mary Catchment EC guidelines (<1200 us/cm)
- Dissolved oxygen compliance has continued to improve over the past 12 months
- Turbidity compliance has improved over the past 12 months

Coles Creek

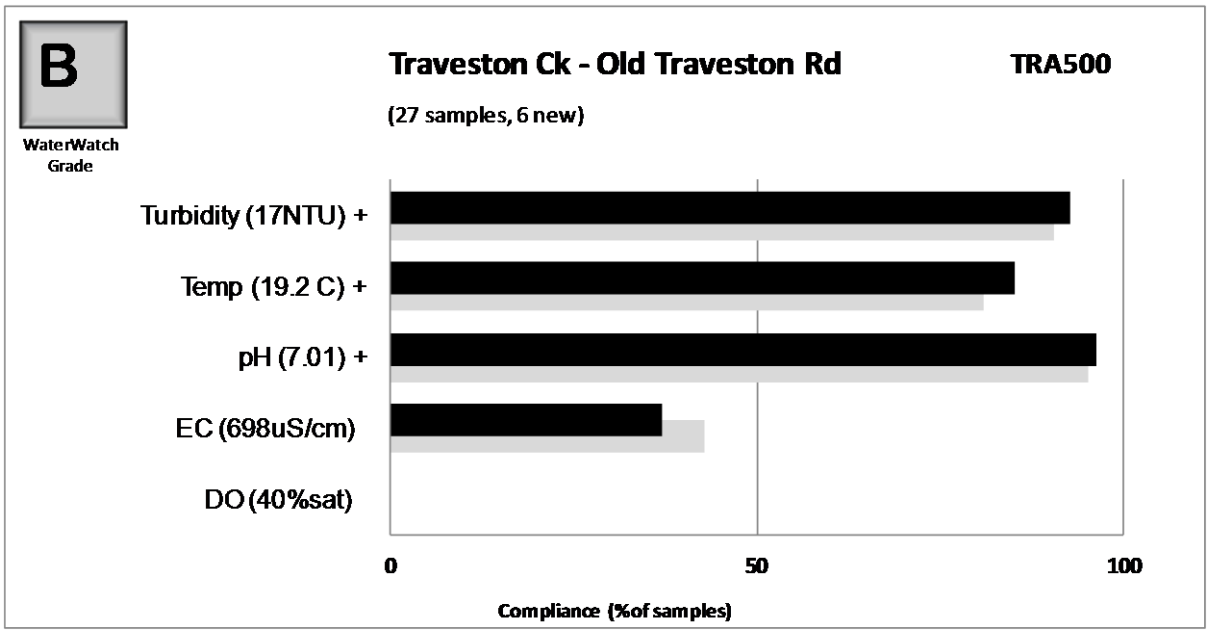


- Improved compliance with temperature, pH and turbidity over the past 12 months
- At the Coles Creek sites the low compliance with dissolved oxygen guidelines is due to very low overall levels of dissolved oxygen collected when sampled. It is assumed that due to Coles Creek displaying low to nil creekflows coupled with high leaf litter inputs from the shaded riparian zone, results in low DO levels.
- At the Coles Creek (COL300) site electrical conductivity (salinity) is consistently above the guideline level

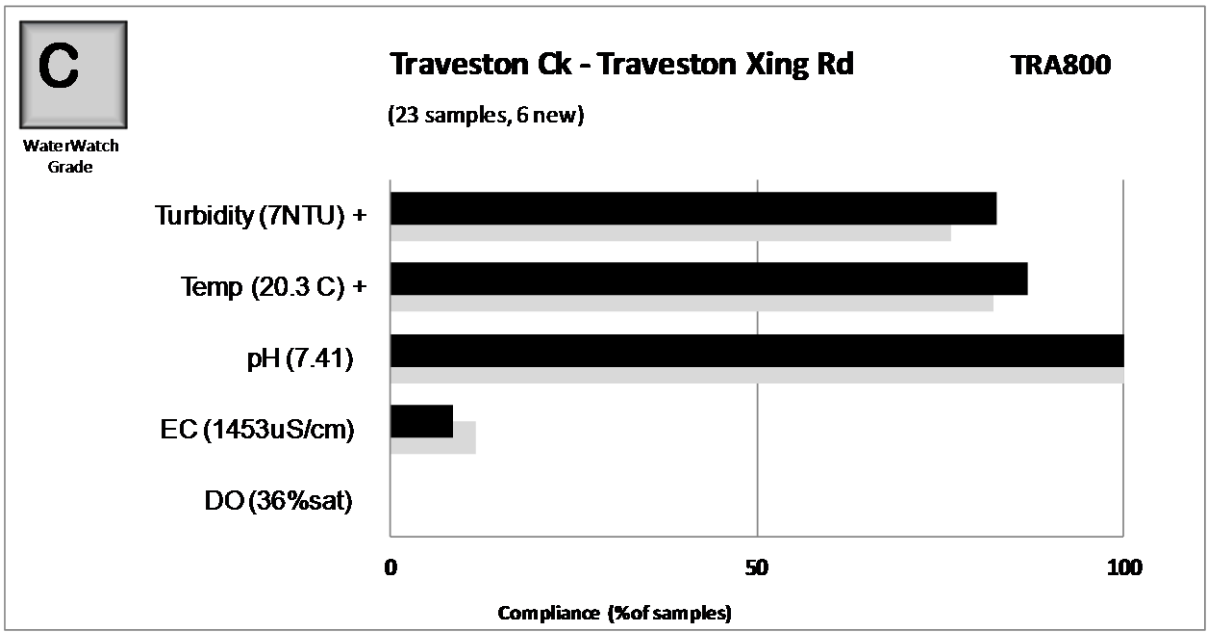


- slight improvement in turbidity compliance – overall turbidity levels have decreased.
- Consistently not complying with dissolved oxygen guidelines. Deciduous Chinese Elm dominates the creek edge, low DO compliance possibly due to high organic matter (leaf) input.
- Improved compliance for pH in the past 12 months
- Good temperature regulation possibly from riparian shade cover
- At the Coles Creek (COL850) site electrical conductivity (salinity) is consistently above the guideline level

Traveston Creek

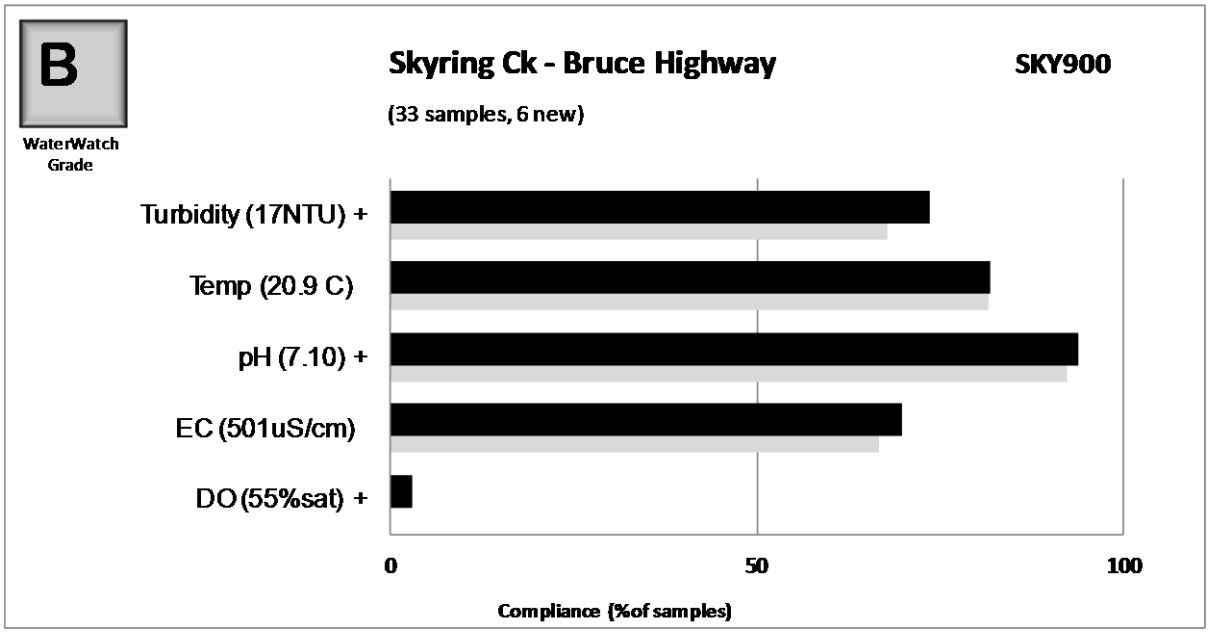


- Site consistently not complying with dissolved oxygen guidelines. Generally Traveston Creek has low to nil flows coupled with high leaf litter inputs from the shaded riparian zone.
- Good temperature regulation due to riparian zone shading



- Improved compliance for turbidity and temperature over the past 12 months
- Site consistently not complying with dissolved oxygen guidelines
- A localised high electrical conductivity (salinity) level has been detected in this vicinity, with the cause as yet unknown – highest median EC level recorded in this Waterwatch network.

Skyring Creek



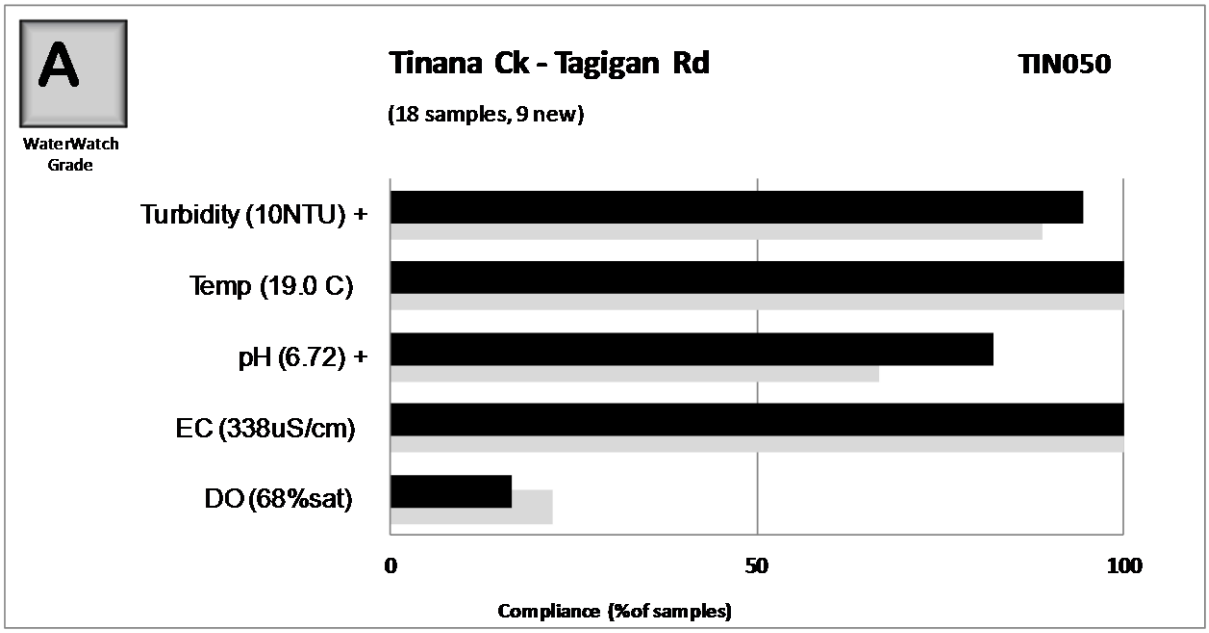
- Good sample size
- Improved compliance for turbidity and pH at this site over the past 12 months
- This site on Skyring Creek has improved dissolved oxygen compliance over the past 12 months
- Electrical conductivity levels (salinity) compared to Traveston Creek are significantly lower

Wide Bay Creek inundates Woolooga township

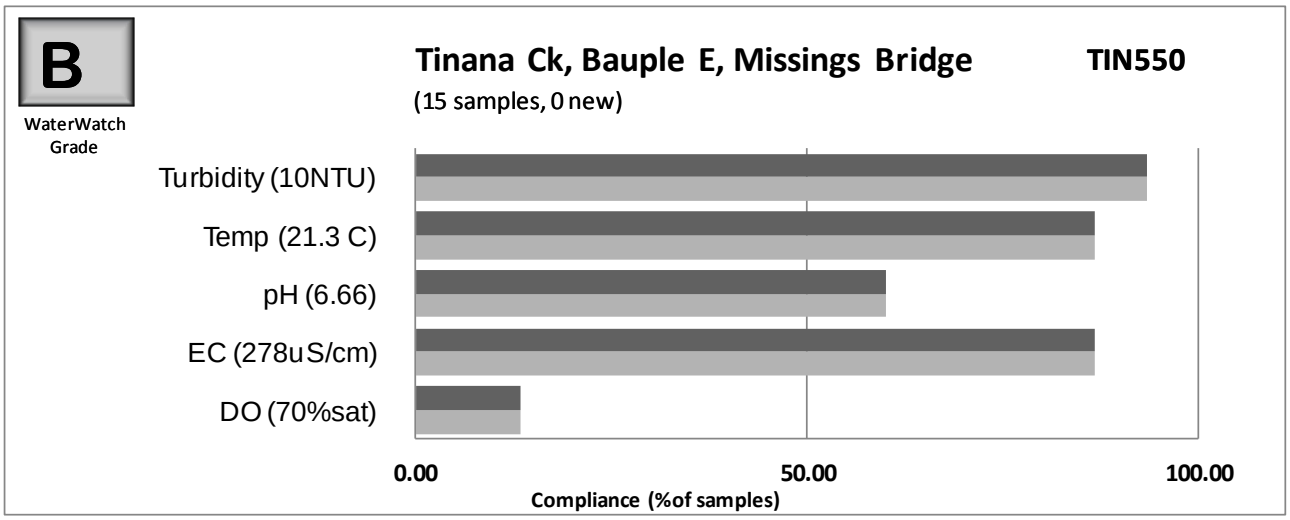
Widgee Creek flood flows

Eastern Mary River Catchments

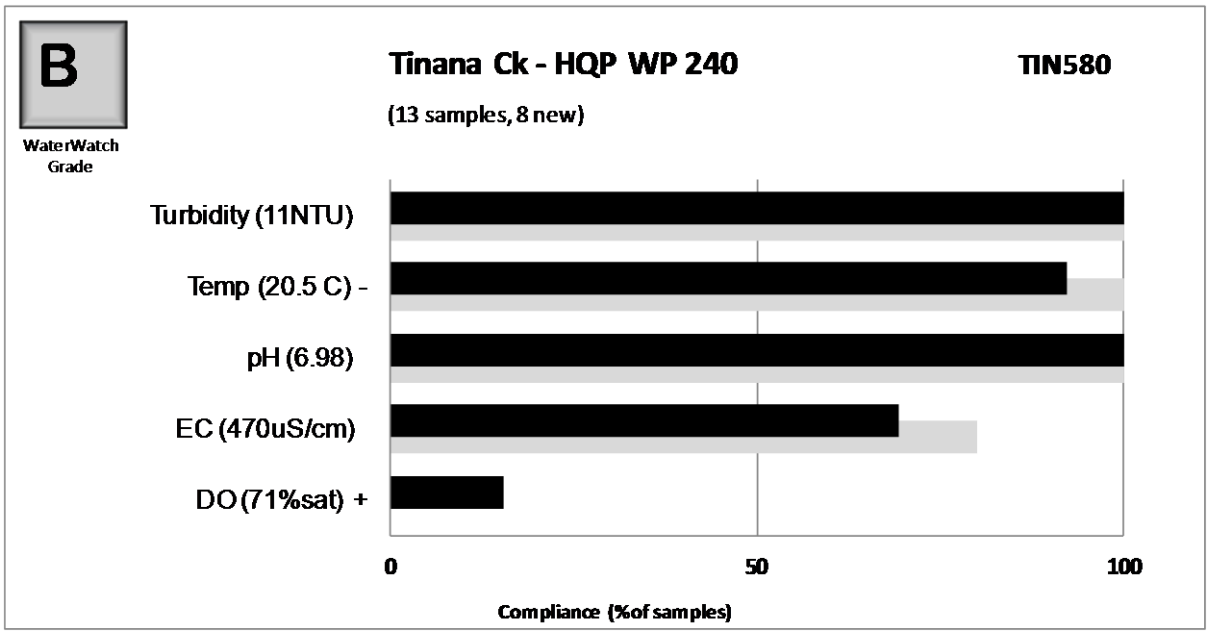
Tinana Creek



- Sample size is not yet sufficient to make definitive comments on trends
- Good compliance for all parameters tested
- Tinana Creek sites have considerably lower water temperature levels than the sample sites located on the Mary River, possibly due to less riparian vegetation shading the water
- Dissolved oxygen levels are low compared to guideline levels

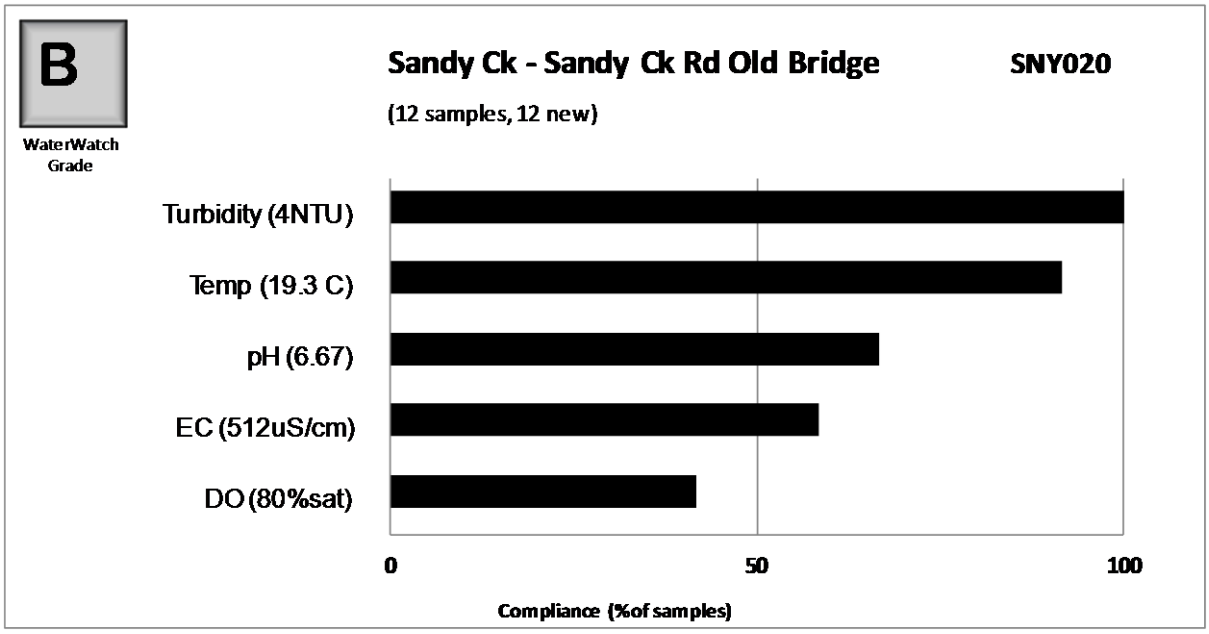


- Sample size is not yet sufficient to make definitive comments on trends.
- Tinana Creek sites have considerably lower water temperature levels than the sample sites located on the Mary River, possibly due to less riparian vegetation shading the water
- Tinana Creek exhibits low natural pH levels due to the nature of this sub-catchment.



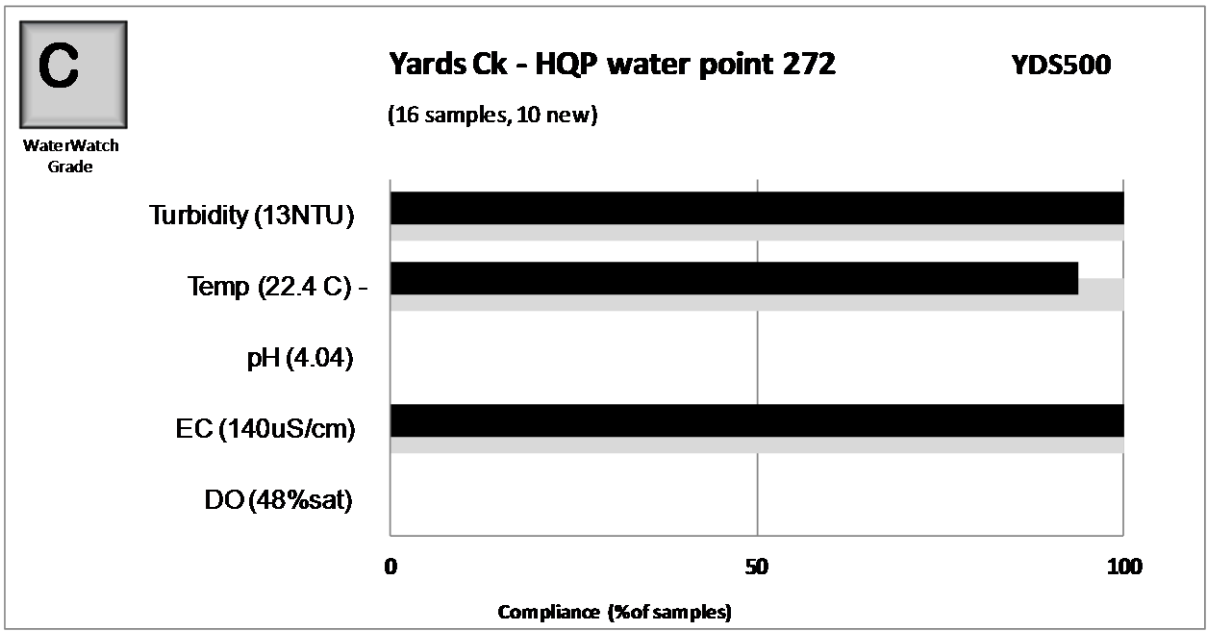
- Sample size is not yet sufficient to make definitive comments on trends
- Dissolved oxygen compliance is low naturally, possibly due to the nature of the sub-catchment

Sandy Creek, Downsfield



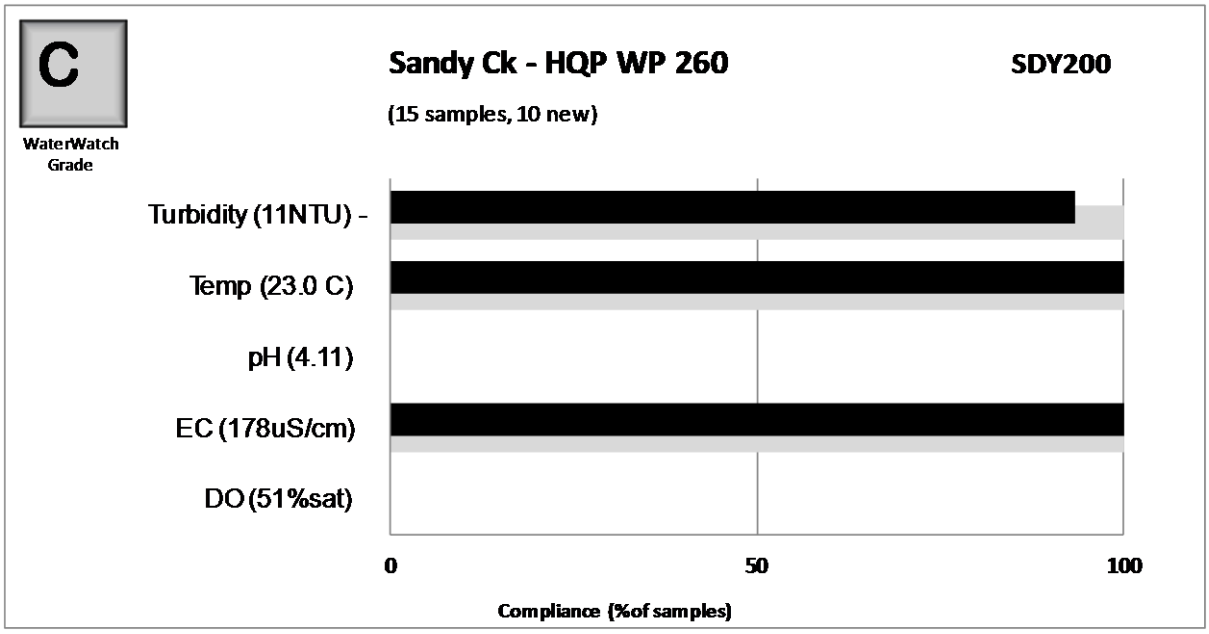
- Sample size is not yet sufficient to make definitive comments on trends
- Electrical conductivity (salinity) is relatively high in comparison to the Tinana Creek catchment.

Yards Creek

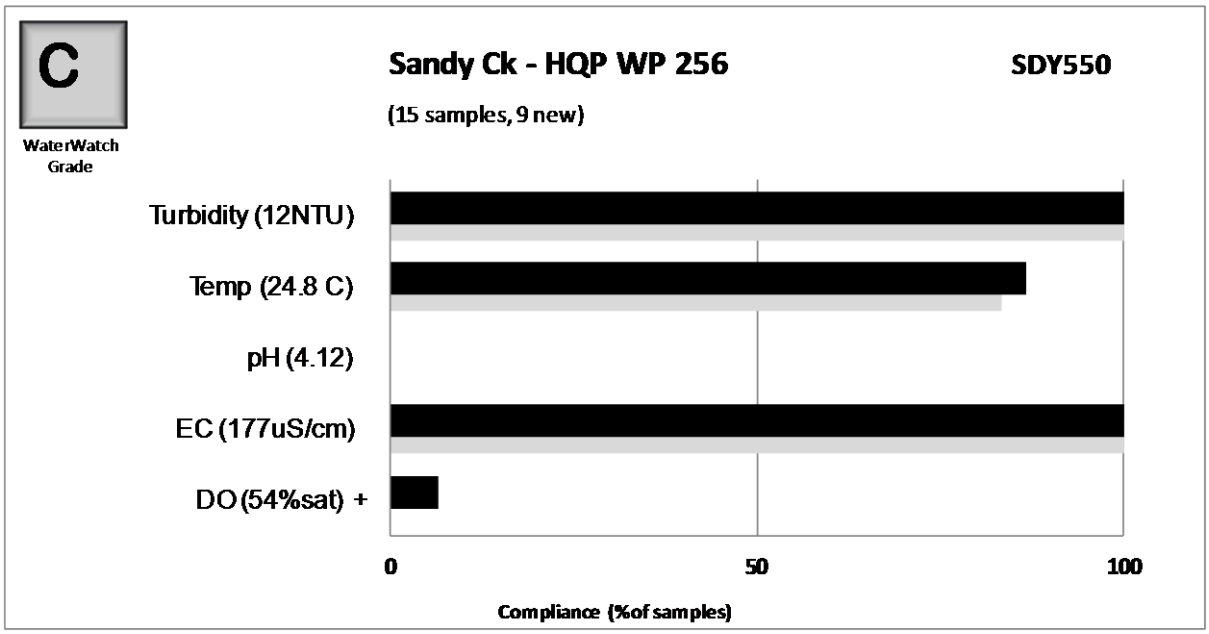


- Sample size is not yet sufficient to make definitive comments on trends
- Very acidic waterway, which does not comply with scheduled guidelines for tannin-stained, wallum waterways – possibly requiring its own guideline values (scheduled pH guideline for this waterway being 5 to 7)
- No compliance for dissolved oxygen at this site
- These waterways are chemically unique and require their own guideline values

Sandy Creek, Toolara

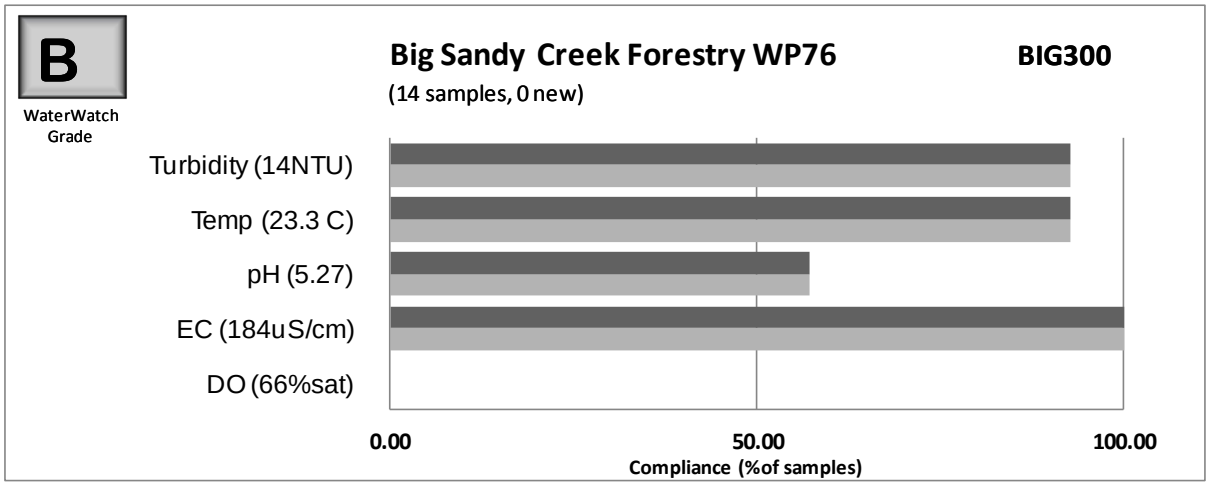


- Sample size is not yet sufficient to make definitive comments on trends
- See comments for YDS500, Yards Creek



- Sample size is not yet sufficient to make definitive comments on trends
- Some compliance for dissolved oxygen at this site

Big Sandy Creek



- The Big Sandy Creek site displays similar levels of dissolved oxygen compliance to that of the Tinana Creek sites, which is to be expected given the nature of the sub-catchment. 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.

Appendix

2013 flood heights from gauging stations

Gauging Station	February 2013 Peak Height	January 2013 Peak Height	Ranking
Bellbird – Mary River (downstream of Conondale)	6.18m 26/2/13 1.50am	8.775m	Jan'13 - 6th highest since gauging commenced in 1959 Record peak – 1989 – 11.0m, 329 097 meg/day
Kenilworth Homestead – Mary River	8.37m 26/2/13 4.19am	10.57m	
Moy Pocket – Mary River (downstream of Kenilworth)	13.60m 26/2/13 5.01am	15.266m	Jan '13 - 10th highest peak since gauging commenced in 1963 Record peak – 1999 – 16.87m, 312 336 meg/day
Fishermans Pocket – Mary River (downstream of Gympie)	19.46m 27/2/13 4.30am	20.954m	Record peak – 1999 – 23.68m
Miva - Mary River	17.69m 27/2/13 3.20pm	20.536m	Jan'13 - 2nd highest peak since gauging commenced in 1910 Record peak – 1974 – 20.8m, 641 606 meg/day
Home Park – Mary River	17.97m 27/2/13 7.00pm	23.565m	Jan'13 – New highest peak since gauging commenced in 1982
Maryborough – Mary River	8.10m 28/2/13 11.00am	10.7m 29/1/13 8.00am	
Wide Bay Ck - Kilkivan	4.63m 26/2/13 1.12am	8.971m	Jan'13 - 2nd highest peak since gauging commenced in 1974 Record peak – 2011, 8.975+ m
Wide Bay Ck – downstream of Woolooga (Brooyar)		13.78m	Jan'13- New highest peak since gauging commenced in 1909 Previous peak – 2011, 12.937m
Munna Creek - Marodian	11.12m 27/2/13 1.00am	16.713 m	Jan'13 - New highest peak since gauging commenced in 1955 Previous peak – 1955 – 16.24m, 274,492 meg/day
Glastonbury Creek	5.18m 25/2/13 9.00pm	8.331m	Jan'13 - New highest peak since gauging commenced in 1955 Previous peak – 1955 @ 81 129 meg/day
Kandanga Ck – Hygait	6.49m 26/2/13 12.20am	8.49m	Jan'13 – 3rd highest peak since gauging commenced in 1970 Record peak – 1989 – 8.77m, 114 566 meg/day
Tinana Ck – Goomboorian	?6.96m+ 25/2/13 12.50pm		Gauging station failed early in February'13 flood
Tinana Ck - Bauple	13.23m 27/2/13 3.00pm	13.043m	Record peak – 2012 – 14.14m, 91 219 meg/day
Six Mile Ck – Cooran	10.35m 26/2/13 6.00am	10.581m	Record peak – 1992 - 11.94m
Amamoor Creek	7.78m 25/2/13 11.04pm	9.67m	Jan'13 - 4th highest peak since gauging commenced in 1984 Record peak – 1989 – 10.96m
Obi Obi Ck – Maleny	1.31m 25/2/13 10.30pm	1.812m	2011 peak – 2.006m Record peak – 2.566m
Deep Creek – Cedar Pocket dam spillway	1.33m over spillway 25/2/13 6.35pm		
Yabba Creek – Borumba Dam spillway	2.96m over spillway 26/2/13 4.50am		Approx. 6 metres over spillway in January 2013

Bureau of Meteorology significant flood heights of the Mary River catchment

River height station	Feb 1893	Mar 1955	Jan 1968	Jan 1974	Apr 1989	Feb 1992	Feb 1999	Jan 2011
Kenilworth Bridge	-	13.67	11.28	12.00	12.06	9.80	11.90	-
Imbil	-	11.73	6.50	9.75	8.80	8.90	10.70	8.20
Cooran	10.69	8.66	8.81	9.58	9.15	10.25	9.65	10.22
Gympie	25.45	21.44	18.75	20.73	19.65	21.40	21.95	19.45
Woolooga	12.04	9.75	4.95	7.54	9.15	5.28	7.40	-
Miva	23.08	21.84	18.92	20.80	18.30	20.45	20.65	19.80
Marodian	-	16.08	9.12	12.36	3.51	9.31	2.55	11.99
Tiaro	21.95	20.75	17.78	20.62	15.95	18.60	18.10	17.10
Bauple East	-	-	15.54	14.88	8.42	14.37	12.73	10.25
Maryborough	12.27	11.23	9.25	10.95	6.60	9.50	8.75	8.20

n.b. this table is a combination of river height (flood) stations and flow gauging stations

Bridge flood heights in the Mary River catchment	Flood height
Kenilworth bridge, Kenilworth (Mary R)	11.2m
Cooroy, Lake Macdonald Drive (Six Mile Ck)	4.95m
Imbil, town bridge (Yabba Creek)	6.1m
Cooran, Victor Giles bridge (Six Mile Creek)	7.2m
Gympie, Six Mile Ck bridge, Bruce Highway	17.96m
Gympie, Inglewood Bridge, Bruce Highway (Deep Ck)	13.56m
Gympie, Pengellys bridge, Brisbane Road (Deep Ck)	15.82m
Gympie, Normanby bridge (Mary R)	15.92m
Gympie, Kidd bridge (Mary R)	9.23m
Bell's bridge, Wide Bay Highway (Mary R)	13.10m
Miva, Dickabram bridge (Mary R)	22m
Tiaro, Tiaro bridge (Mary R)	6.6m
Maryborough, Lamington bridge (Mary R)	5.5m

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.