



MARY RIVER CATCHMENT CRAWL OCTOBER 2015



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Mary River Month - Catchment Crawl

8th – 9th October 2015

During the Mary River Month celebrations, the Mary River Catchment Coordinating Committee once again conducted a catchment crawl in October 2015. The Catchment Crawls are designed to provide a 'snap shot' of water quality along the Mary River. Water quality parameters are measured in an effort to gain insight to trends associated with cumulative effects and any other changes along the catchment area.

On this Catchment Crawl 13 freshwater sites were sampled along the main Mary River trunk, from its headwaters in the **Conondale Ranges, downstream to the Mary River barrage** (see figure 1). A further 7 freshwater sites were sampled on the main tributaries of the Mary River (ie Six Mile, Tinana, Munna & Wide Bay Creeks). Sampling occurred in each of the shires of the Mary River Catchment. Creek junctions with the Mary River were targeted for sampling in order to gather information on the effects of tributaries flowing into the Mary River.

In addition to measuring the standard water quality parameters, MRCCC in collaboration with the Great Barrier Reef Monitoring Program, tested the chemistry parameters of the samples from the sites as well; which included nitrogen and phosphorus levels.

Furthermore, environmental DNA samples were collected for analysis at Conondale, Kenilworth, Gympie, Miva and Tiaro by researchers from Griffith University (Harmony Patricio). This process can detect and differentiate between species of organisms present in the water (ie fish and turtle species), detection methods rely on secreted faeces, skin, hair and carcasses within the water.

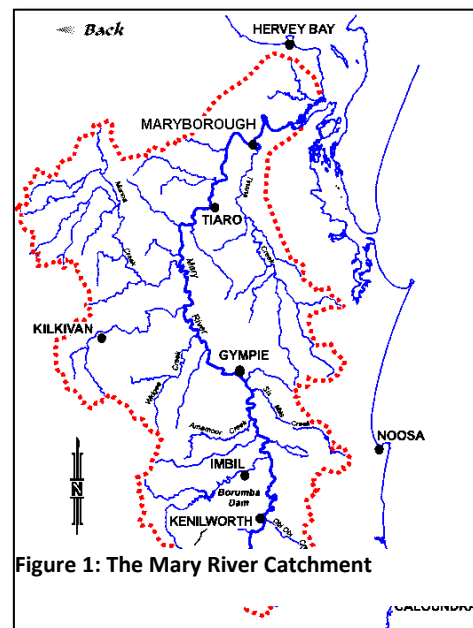


Figure 1: The Mary River Catchment

Weather Conditions

Thursday October 8th 2015 was hot, fine and sunny and Friday October 9th 2015 hot, fine and sunny until approximately mid-morning when the testing sites experienced light showers.

The Kenilworth area received 8 to 11 mm of rainfall on the 9th October one day after sampling occurred at those sites. The Tiaro area received 7 mm of rainfall on the 9th October the evening after the sampling of the lower Mary River sites.

The maximum temperature recorded at Nambour was 25.2 degrees (the closest weather station to the upper Mary sites), at Gympie 26.2 degrees and at Maryborough 26.8 degrees.

River Flow (8th and 9th October 2015)

River flow or discharge during the 2015 catchment crawl was similar to that experienced during previous catchment crawls. Generally streamflow is at its lowest peak for the entire year in October, until the first spring storm rain occurs (in late October) and inflows into the river increases due to runoff. The 2009 catchment crawl recorded much less streamflow than 2015, with some sites in 2009 discharging only one-quarter than that experienced in 2015.

Gauging station location	River height (m)	Discharge	Notes
Mary River, above Kenilworth (Bellbird station)	0.558m (<20% flow)	38 megalitres/day	Discharge increased to 80 meg/day on 10 October
Mary River, Moy Pocket station	0.819m (<20% flow)	65 megalitres/day	Discharge increased to 80 meg/day on 10 October
Mary River, below Gympie (Fishermans Pkt station)	1.772m (<20% flow)	170 megalitres/day	Discharge decreased from 330 meg/day on 5 October
Mary River, Miva station	1.628m (20-50% flow)	243 megalitres/day	Discharge decreased from 611 meg/day on 5 October
Mary River, above Tiaro (Home Park station)	1.393m (20-50% flow)	381 megalitres/day	Discharge decreased from 787 meg/day on 5 October

Equipment

- FLT 90 multi probe to measure pH, conductivity, salinity, temperature, dissolved oxygen and turbidity (and spare equipment).
- Digital camera
- Garmin hand held GPS unit
- Turbidity (clarity) tube
- 10 L bucket
- Catchment map
- Hat, sunscreen, first aid kit
- Folder, data sheets, equipment instructions, itinerary

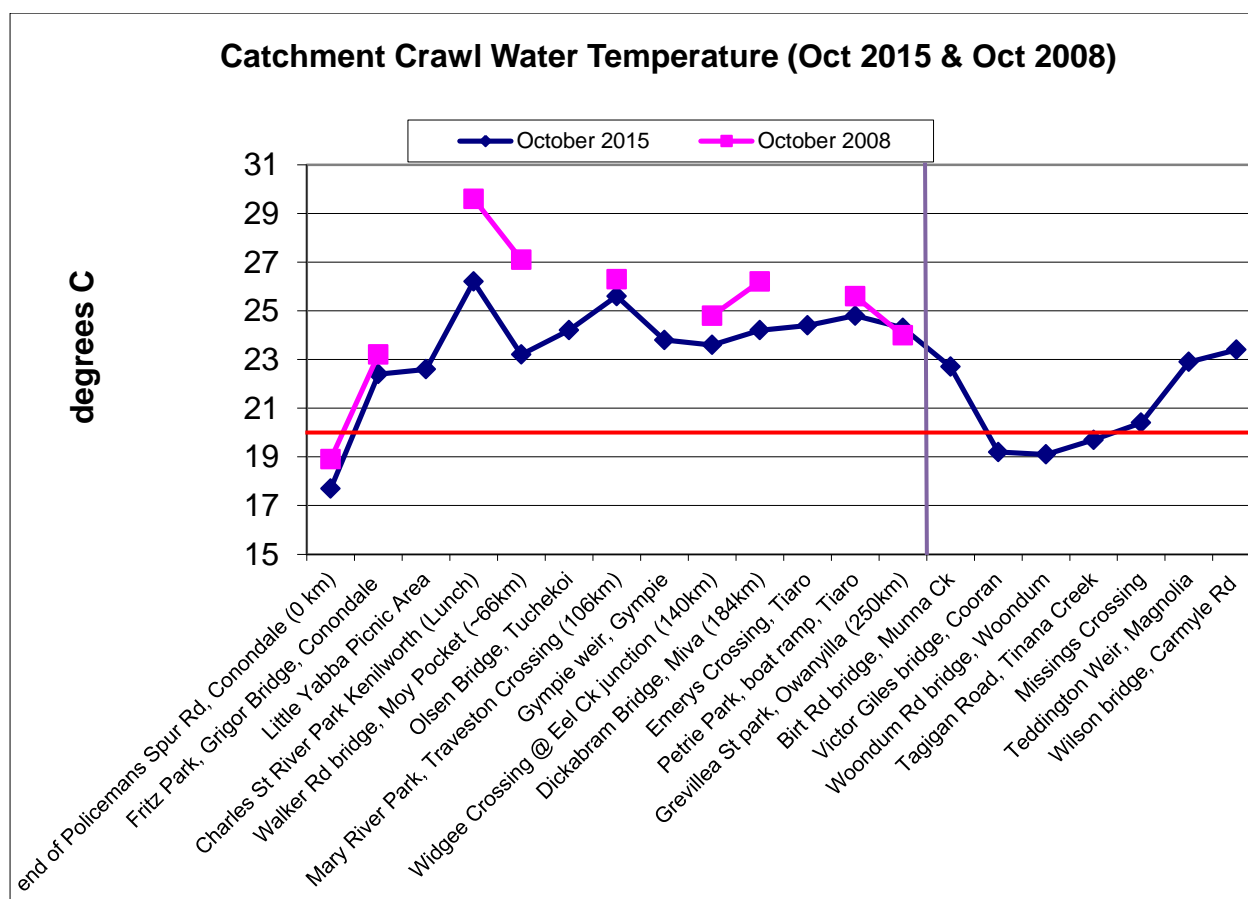
Results

Temperature

Water temperatures are considerably influenced by weather conditions and the degree to which the river is shaded by riparian vegetation. Thursday October 8th 2015 was hot, fine and sunny and Friday October 9th 2015 fine, hot and sunny until approximately mid-morning when the testing sites experienced light showers.

Following the trend observed during previous catchment crawl events, the highest temperature was recorded at Kenilworth on the Mary River at 29.9 degrees in 2008 and 26.2 degrees in 2015 (Nambour's maximum ambient temperature was 25.2 degrees). A slightly lower temperature is noted overall between 2008 and 2015.

This time of year coincides with the spawning of the Mary River Cod. Cod requires cooler water temperatures to trigger spawning (rising from approximately 12 degrees to 18-20 degrees); see red line on graph below. The only site on the Mary River suitable was the Policeman Spur Road, Conondale site. The two Six Mile Creek sites (Cooran and Woondum Road) and the Tagigan Road site on Tinana Creek are also suitable for cod spawning.

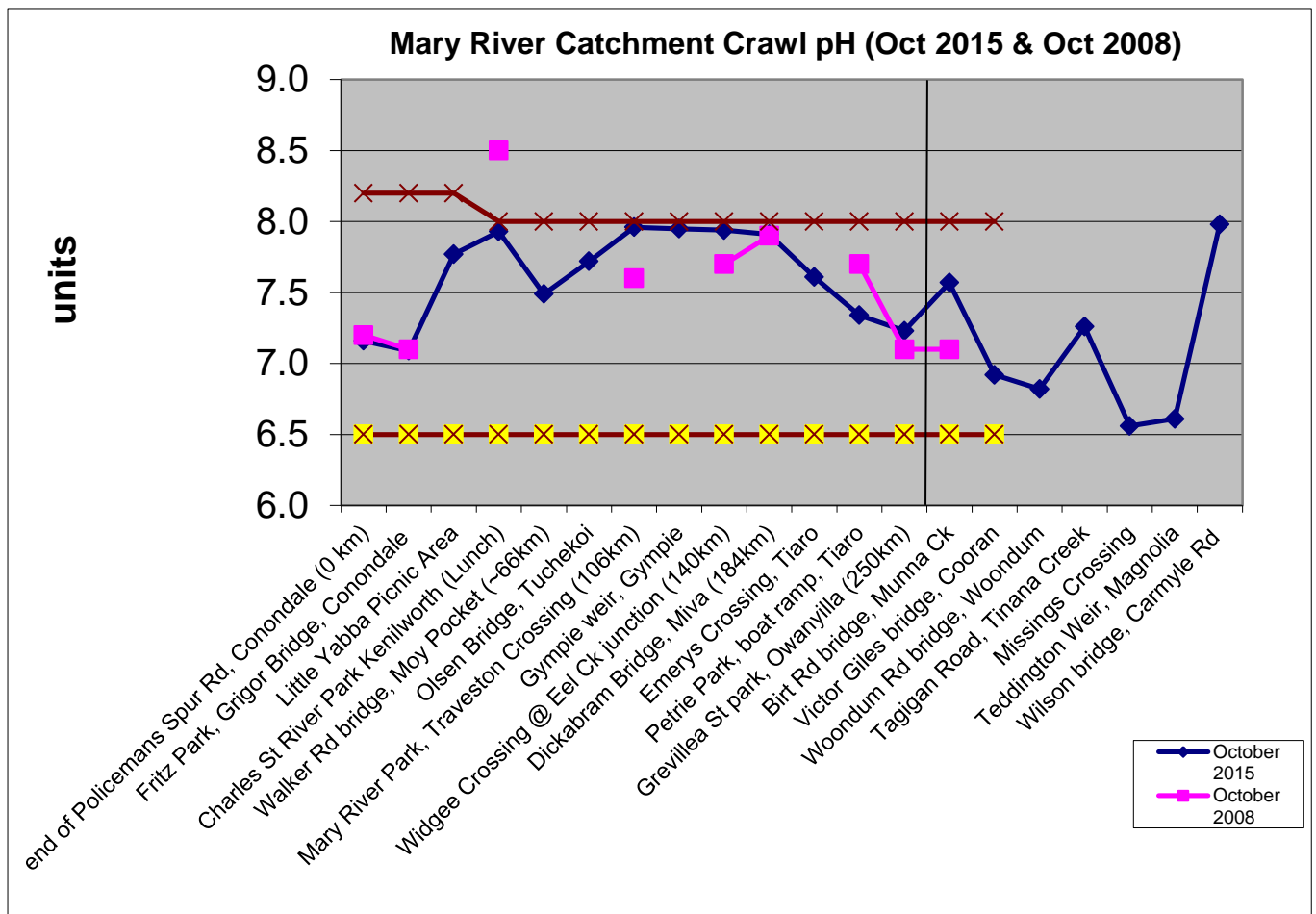


pH

In comparison to previous years, the 2015 pH levels have dropped to fall within the EPA guidelines. The 2008 pH results were similar to the 2015 findings with an occasional pH reading outside guideline values. Higher than expected pH values were recorded during the 2002 and 2006 catchment crawls.

There is a close link between water temperature and pH. Temperature is directly associated with sunlight intensity. Increased sunlight increases temperature which stimulates photosynthetic activity of aquatic plants and algae. Rapid algae growth efficiently dissolves carbon dioxide in the water, lowering carbonic acid and increases the alkalinity of the water. This process promotes the higher pH readings, particularly in the afternoon.

The maximum peaks in pH were recorded in 2002 and 2006 which coincided on average with consistently higher temperatures by comparison to the somewhat lower water temperatures measured in both 2008 and 2015. The overall drop in recorded water temperatures in 2015 again coincides with the lower pH levels to within the EPA guidelines (maximum 8.2 to 8.0 and minimum 6.5).



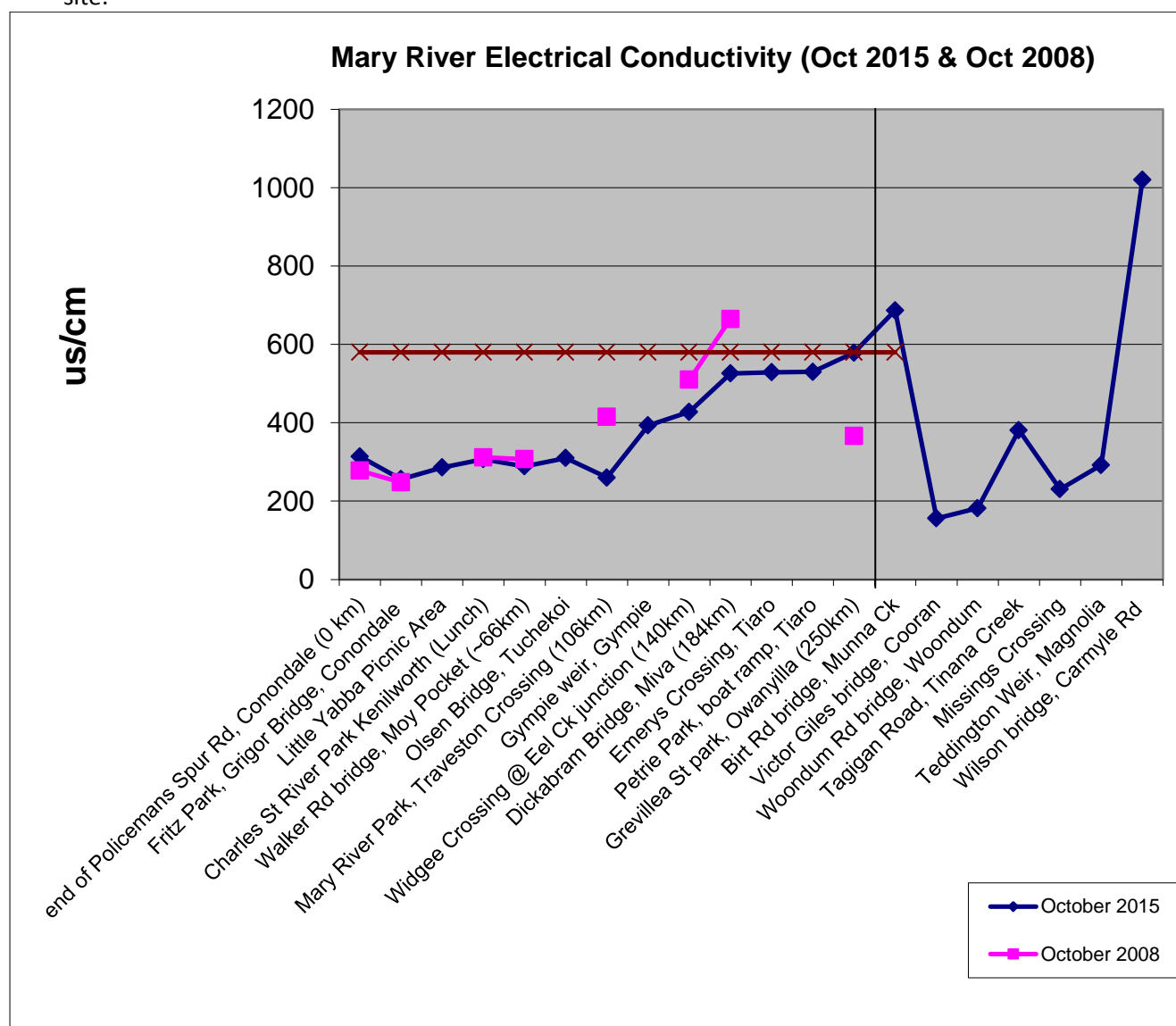
Electrical Conductivity (EC)

Electrical Conductivity (EC) is a measure of waters ability to conduct electricity. The value of EC of derived from the amount of dissolved salt content in the water. As dissolved salt increases so does the EC. Salt levels also tend to accumulate downstream in a catchment, which is reflected in increasing EC levels.

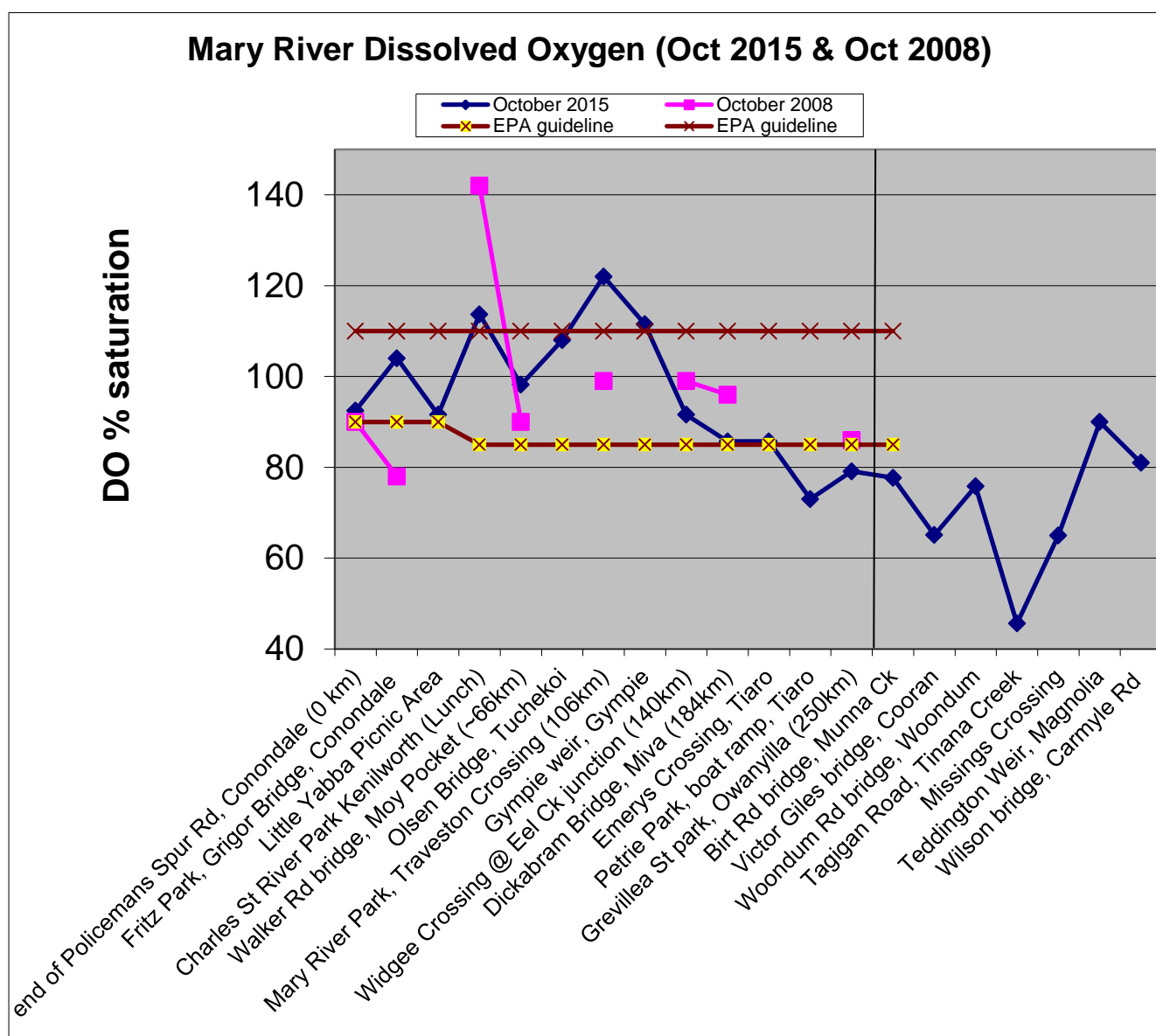
In line with previous trends identified on Mary River catchment crawls, EC peaks at Gympie and remains at the higher end of the EPA guideline (580 us/cm) further down the river.

In 2015, the 4 Mary River sites downstream from Gympie steadily increase to the EC guideline of 580 us/cm EC before peaking at the guideline level at the final testing site at Owanyilla.

In 2008 all EC values were compliant, with the exception of the Dickabram Bridge, Miva sampling site.



Dissolved oxygen



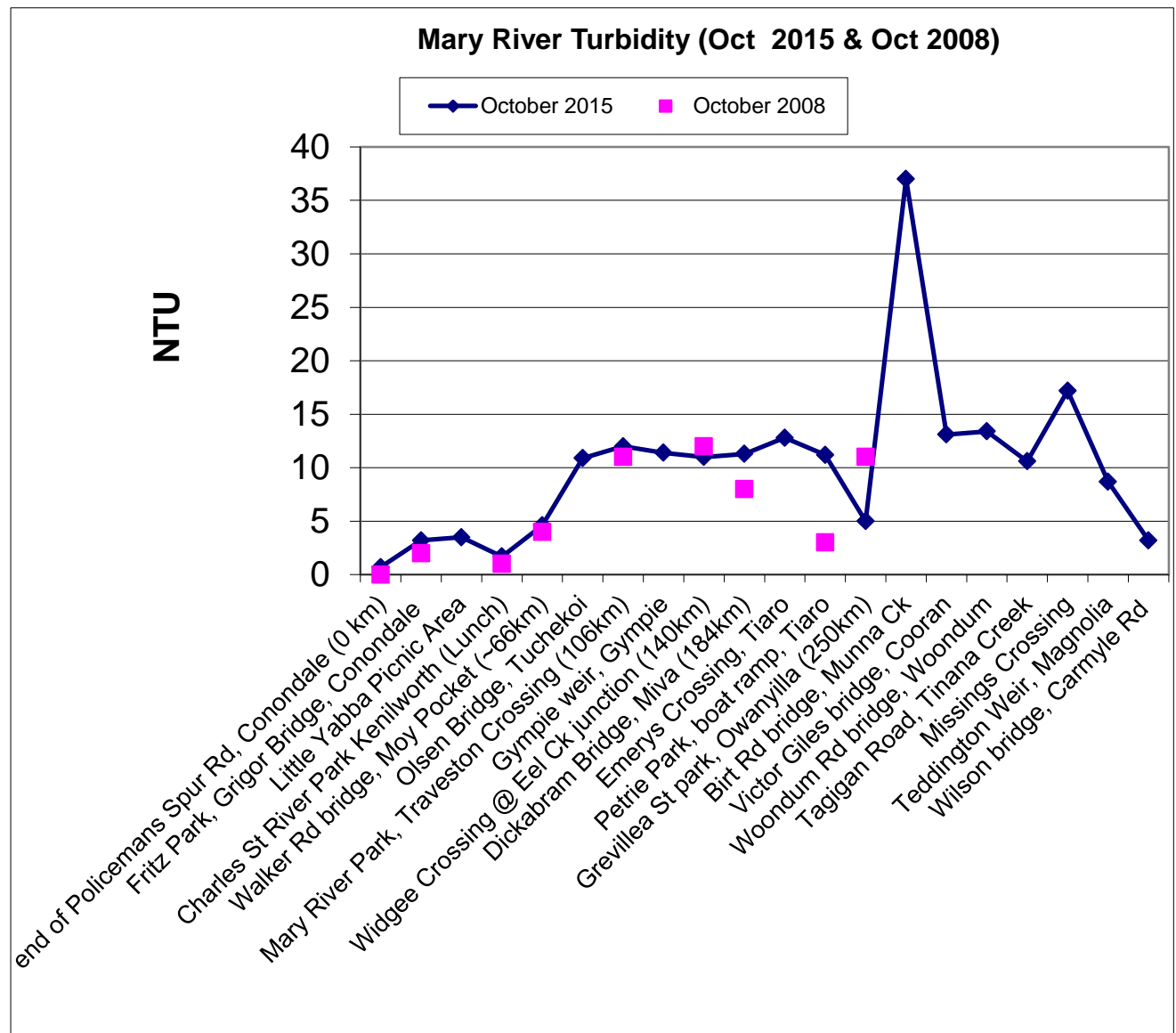
Of note, is the vast change between 2008 and 2015 levels of DO saturation at certain sites. Firstly, the Charles Street Kenilworth site in 2008 tested well over the guideline level (140%) recommended by the EPA of 110% saturation. In 2015 while still not completely compliant, the drop in DO saturation at the same site is a notable trend in the desire direction.

A spike in DO is evident at the Traveston Crossing, Mary River site, unfortunately peaking well above the EPA guideline of 110% saturation.

When comparing the levels recorded in 2015 to 2008 there is still large variability in dissolved oxygen levels along the Mary River, with the Tiaro and Owanyilla sites recording dissolved oxygen levels just below guideline (85% saturation). The Six Mile and Tinana Creek sites also recorded below guideline levels – which is typical of these systems.

Turbidity (NTU)

Turbidity is the measure of suspended sediments within the water, predominately from erosion within the catchment and stream banks. All sites complied with EPA guideline of <50NTU with similar trends to 2008, although the Munna Creek site recorded a peak of 37 NTUs.



Aquatic weeds

Consistent with previous years aquatic weed observations were recorded, 5 key species that identify as Weed of National Significance (WONS) were monitored. As previously demonstrated in 2002 through to 2008 no Cabomba weed was seen at any sites. Table 1.1 provides an outline of the sites that recorded weed infestation and relevant percentage.

In comparison to previous years, the weed observations have dramatically reduced, in particular *Salvinia* which previously was observed at most sites, was only seen at Teddington Weir, Tinana Creek. Filamentous algae on the other hand, has experienced an increase in distribution. In 2006 no observations of algae were recorded while in 2008 the Grigor bridge Conondale was the only site to record algae.

Table 1.1 Catchment Crawl Aquatic Weeds observation

Site	Salvinia	Dense Water Weed	Water Hyacinth	Cabomba	Filamentous Algae
Olsen Bridge – Tuchekoi, Mary River					<20 %
Traveston Crossing Park, Mary River					<20 %
Gympie Weir, Mary River					20-80 %
Birt Road crossing, Munna Creek					<20 %
Missing Crossing, Tinana Creek					20-80 %
Teddington Weir, Tinana Creek	<20 %		<20 %		

Nutrients

Most of the Mary River sites complied with N guidelines, apart from the Widgee Crossing site for Total Kjeldahl nitrogen.

Three sites in particular are worth mentioning, Birt Road, Munna Creek, Missings Crossing and Teddington Weir on Tinana Creek, all tested at well below EPA standard for dissolved oxygen and above guideline for nutrient levels (see graph below). Low DO levels are indicative of high spikes in nutrient levels

