

2020 MARY RIVER

Catchment Crawl

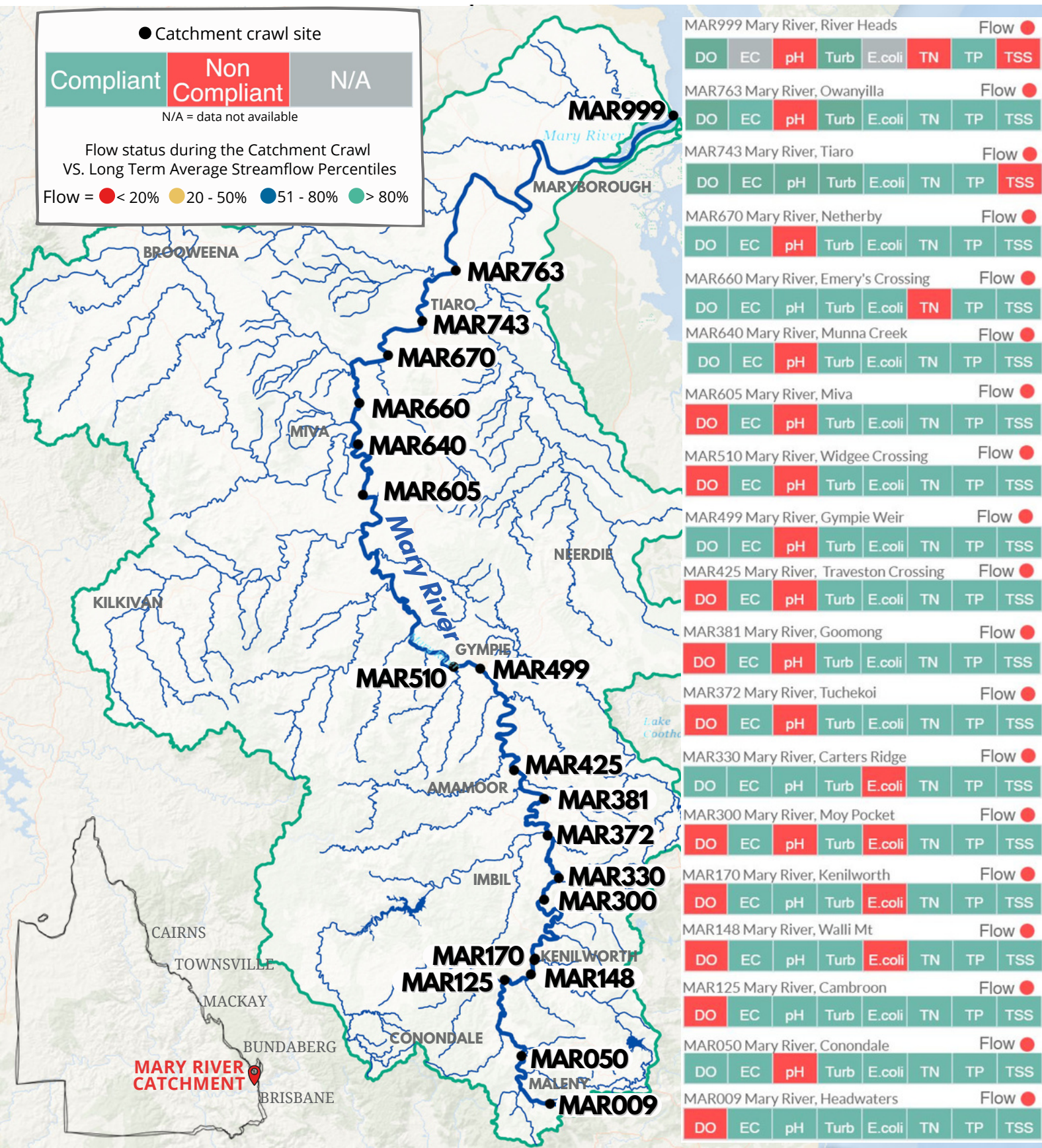
SUMMARY OF RESULTS



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All results were compared to Queensland Water Quality Guidelines^{*}. No site was fully compliant with guidelines; however, results indicate that water quality was in reasonable condition along the Mary River.



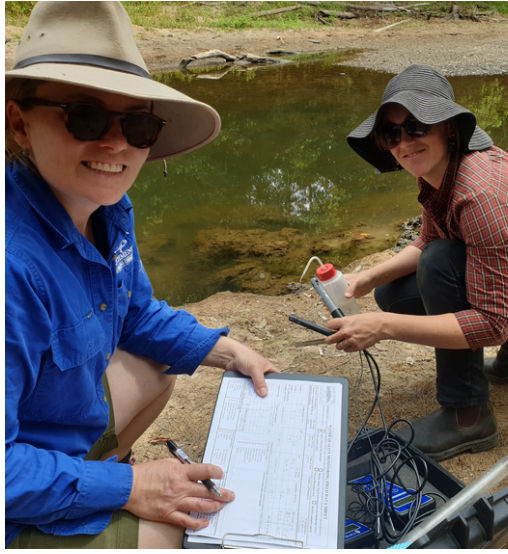
WEATHER & STREAMFLOW

Weather and stream flow can greatly influence water chemistry

Cool air temperatures resulted in cooler water temperatures at most sites. Despite a small rainfall event in the upper Mary catchment in early September, stream flow in the month prior and leading up to the 2020 Catchment Crawl was extremely low with cease-to-flow conditions at most sites. Unusually for October, parts of the Mary River were completely dry.



Above: Mary River headwaters, Maleny (MAR009)



Above: Kath Nash and Alana Ebert water testing



Above: Mary River at Petrie Park, Tiarno (MAR743)

RESULTS

Dissolved Oxygen (DO)

Several sites were not compliant with DO guidelines, with some sites being super saturated (>100% saturation). This is most likely due to no/slow stream flows observed, coupled with hotter water temperatures that promote algae growth, which super elevates DO in the late afternoon.

Electrical Conductivity (EC)

All Mary River sites were compliant with EC guidelines. A significant decrease in EC from Miva to Netherby was observed to be the lowest at some sites since 2008, probably due to no flows from the western tributaries. An unusual EC spike was recorded at Tuckekoi; the highest ever recorded, caused by no flow at that site.)

pH

A number of afternoon sites exceeded pH guidelines due to warm water temperatures that can result in alkaline pH.

Turbidity (Turb) & Total Suspended Solids (TSS)

Low turbidity was recorded at all Mary River sites. TSS results were also low, except for Tiarno (MAR743) and River Heads (MAR999).

Escherichia coli (E.coli)

Kenilworth (MAR170), Moy Pocket (MAR300) and Belli Park (MAR330) sites exceeded E.coli guidelines of 150MPN/100ml^{**}. E.coli levels at the Headwaters (MAR009) and Gympie Weir (MAR499) were just below the E.coli guideline.

Nutrients (TN nitrogen & TP phosphorus)

Unlike 2019, phosphorus levels were very low. All Mary River sites were within nitrogen and phosphorus guidelines. Organic nitrogen (both dissolved & suspended) was the dominant form of nitrogen in all samples. Widgee Crossing (MAR510) recorded the highest concentration for phosphorus out of all Mary River sites.

ENDANGERED MARY RIVER COD

October is a key time for Mary River cod spawning. The Headwaters (MAR009) was the only site cool enough for successful Mary River cod spawning at 21°C. The Mary River at Walli Mtn (MAR148) was the warmest site at 26.55°C. The endangered Mary River cod can survive in water temperatures up to 28°C. All sites were below this threshold.

WATER TESTING PARAMETERS EXPLAINED

DO Dissolved Oxygen

DO is the amount of oxygen that is dissolved in the water and is essential for all aquatic life. Fish are adapted to natural fluctuating oxygen availability; however, when DO falls below 80% saturation, fish survival is compromised.

DO is influenced by:

- temperature (warmer water holds less DO)
- stream flow and agitation through riffles (less agitation leads to lower DO)
- salinity (more saline water holds less DO)
- turbidity (more turbid water holds less DO)
- plant photosynthesis (day time = increased DO)
- plant respiration (night time = decreased DO)

EC Electrical Conductivity

EC is a measure of water's ability to conduct electricity. The EC value is derived from the amount of dissolved salt content in the water. As dissolved salt increases, so does the EC. Influences include geology, river flow, inflow of ground water into the stream and rising salt in the water table. During higher flow, the concentration of dissolved salts in the water reduces, resulting in decreased salinity, and lower EC.

pH Acidity/Alkalinity

pH is a measure of acidity or alkalinity and is measured on a scale of 1 to 14. A pH of 7 is considered neutral, above 7 is alkaline and below 7 is acidic. During the night plants respire, releasing carbon dioxide into the water which increases acidity (lowers pH) compared to day time when photosynthesising plants take carbon dioxide from the water, which increases alkalinity. Sites with high levels of aquatic plant growth would be expected to fluctuate from more acidic pH in the morning to more alkaline in the later afternoon. pH is also influenced by catchment geology.

Turb Turbidity

Turbidity is the measure of suspended sediments within the water. It is measured using the penetration of light through a liquid to approximate the level of suspended sediments. Turbidity is effectively a rapid approximation of TSS.

TSS Total Suspended Solids

TSS is a specific measurement of all suspended solids (mg/L). Sediment in water can be from *discrete sources* for example, river and stream bank erosion or runoff from dirty roads; or from *diffuse sources* such as sheet flow from a broad area of land subject to heavy rainfall events.

E.coli Escherichia coli

E.coli is a bacterium that is commonly found in the gut of humans and warm-blooded animals. E.coli levels are used to indicate the presence of faecal material in water and the possible presence of disease-causing bacteria and viruses. Sources of bacteria include improperly functioning wastewater treatment plants, storm water runoff, animal manure and carcasses.

TP Total Phosphorus

Phosphorus is a nutrient important for plant growth. In significant concentrations, extreme algal blooms can occur.

TN Total Nitrogen

Nitrogen is an essential nutrient for plants and animals. Excess amounts of nitrogen in waterways may lead to low levels of dissolved oxygen and can negatively impact aquatic species.

PROUDLY SUPPORTED BY:



FOR THE FULL CATCHMENT CRAWL REPORT:



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Cover photo: Mary River, looking downstream towards Gympie Weir

*Department of Environment and Resource Management (2010). Environmental Protection (Water) Policy, Mary River environmental values and water quality objectives Basin No.138, including all tributaries of the Mary River. Department of Environment and Resource Management Water Quality.

**Australian and New Zealand Environment and Conservation Council (ANZECC) & Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) (2000). Australian and New Zealand guidelines for fresh and marine water quality. Volume 1, The guidelines. Canberra.