NRM North

Tamar Estuary and Esk Rivers

Natural Resource Management in Northern Tasmania

PATHOGEN FACT SHEET

TAMAR ESTUARY PATHOGEN 2018 FACT SHEET

WHAT ARE PATHOGENS?

The term 'pathogen' refers to bacteria, viruses and parasites that have the potential to cause disease. Recreational waters may contain a mixture of faecally derived pathogens. These typically come from human sewage, urban run-off, livestock (eg. sheep and cattle), industrial processes, wildlife, domestic animals and stormwater.

In Tasmania, indicator bacteria in recreational waterways are monitored by local councils during the summer months (December – March). The community is notified through signage when levels exceed the national guidelines. Enterococci are bacteria used as an indicator of faecal contamination which is measured and assessed against national guidelines to determine the public health risk for primary contact recreation (e.g. swimming).

WHERE DO PATHOGENS IN THE TAMAR RIVER ESTUARY COME FROM?

It is estimated that diffuse catchment sources of bacteria account for more than 85% of enterococci loads generated across the greater Tamar catchment drainage area, with combined sewage and stormwater overflows contributing approximately 12%. The impact of loads on concentrations depends on how directly contaminants are delivered to the estuary.

Concentrations of enterococci in zone 1 of the estuary (from Launceston to Legana) frequently exceed limits set by recreational guidelines. Modelling shows the greatest contributor of enterococci concentrations in this zone is from combined sewage and stormwater overflows (50%), with Sewage Treatment Plants (STPs) and diffuse sources accounting for 20% and 30% respectively. For diffuse sources, those originating in the North Esk and Tamar foreshore areas have the greatest impact on zone 1 concentrations.

HOW HAVE PATHOGEN LEVELS CHANGED OVER TIME?

Historical data (mid 1970s) shows extremely high levels of bacteria in the upper estuary. Significant improvements in water quality have occurred in recent times (Figure 1). Data shows that in the 1970s and 1980s, thermotolerant coliforms (indicator of recent faecal contamination) were generally >10 000, peaking into the millions.

From the early 1990s through to 2000s, levels of bacteria were greatly reduced. Improvements in water quality in the upper estuary occurred as a result of improved treatment at STPs, redirection of trade-waste to STPs and upgrades to the combined sewage and stormwater system which reduced overflows from Margaret Street.

Recent levels of bacteria in the Tamar estuary have all been <500 showing a large improvement from years gone by. The last large spikes in bacterial concentrations occurred just before Killafaddy sale yards and abattoir were connected to the Hoblers Bridge STP.

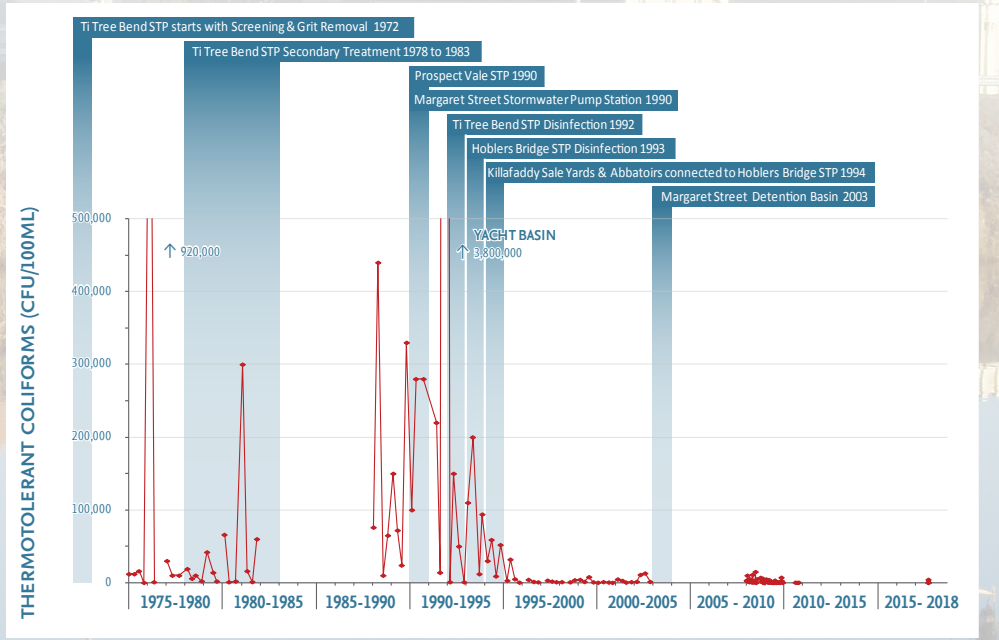

FIGURE 1. HISTORICAL PATHOGEN CONCENTRATIONS IN THE UPPER TAMAR (COLONY FORMING UNITS PER 100ML) (SOURCE: CITY OF LAUNCESTON PROVIDED TO THE TEMT FOR THE RIVER HEALTH ACTION PLAN)

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WHAT IS BEING DONE TO REDUCE PATHOGEN LEVELS?

The TEER Program has been actively working to understand the sources of bacteria in the estuary and to reduce pathogen contamination in waterways. TEER monitors bacteria levels (enterococci) monthly at 16 sites in the Tamar River estuary and uses this data to report on trends in the Tamar Estuary Report Cards.

TEER PROGRAM - FAECAL SOURCE TRACKING

Faecal source tracking is a method of identifying the source of bacteria in a water body through the unique strains of bacteria known to be associated with different human and animal sources. Throughout 2017, water samples were tested for the main contributing sources of bacteria at 10 sites in zones 1, 2 and 3. Levels of bacteria were too low to give an indication of sources beyond mid zone 2. Data showed that the main contributors (20-40%) of the bacteria identified in zones 1 and 2 are livestock (sheep, cattle and horses) and to a lesser extent, humans (sewage treatment plants and septic tanks). The area from Kings Bridge to the ship lift at Kings Wharf tended to be dominated by bacteria from sewage treatment plants (20-30%). This transitions to being dominated by livestock bacteria nearer Riverside, peaking near Legana with livestock dominating at 30-40% of identified bacteria.

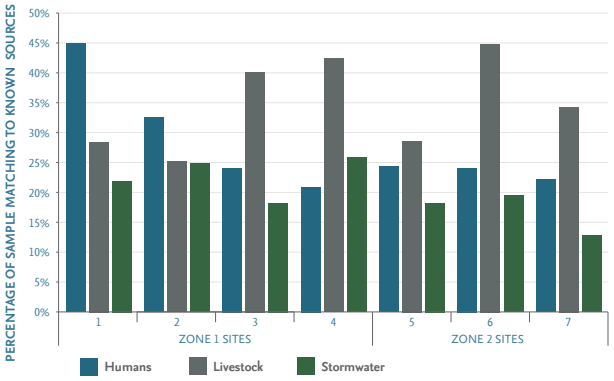

FIGURE 2: THE PERCENTAGE OF BACTERIA IDENTIFIED FROM KNOWN SOURCES: HUMANS (SEPTIC SYSTEMS AND SEWAGE TREATMENT PLANTS), LIVESTOCK (SHEEP, CATTLE AND HORSES) AND STORMWATER IN ZONES 1 AND 2 DURING 2017.

NRM NORTH AND TEER CATCHMENT WORKS PROGRAM

NRM North and TEER continue to invest in the implementation of the TEER Water Quality Improvement Plan (WQIP) and are working with land managers and farmers to adopt best land management practices.

A focus has been working with the dairy industry to manage dairy effluent and restricting stock access to streams on dairy and grazing properties where stock defecate in streams delivering high loads of bacteria. Working with landholders to rehabilitate riparian areas and plant vegetative buffers also provides filtering of overland flow into rivers to reduce bacteria loads.

Activities NRM North has focused on to reduce pathogen levels entering waterways includes projects to:

- Fence stock out of streams;
- Revegetate riparian zones;
- Improve dairy effluent management; and
- Maintain and improve groundcover in grazing and cropping areas.

CITY OF LAUNCESTON - STORMWATER-SEWAGE INTRUSION MONITORING AND MAINTENANCE PROGRAM

As part of its ongoing monitoring and maintenance program, the City of Launceston has conducted 12 months of investigations into pathogen contamination in waterways in the Launceston area. These investigations identified high bacteria levels in a number of urban waterways in the Launceston area.

Following identification of problem areas, council staff prioritised inspections of affected areas to identify the source of pathogen contamination. Kings Meadows Rivulet had high bacteria concentrations even during periods with no rain, indicating a point source contribution of bacterial contaminants. Further investigation identified a number of illegal connections of sewage pipes and direct contributions of animal waste to the stormwater system.

Since resolving these issues, monitoring data from Kings Meadows Rivulet shows a marked improvement in bacteria levels which modelling suggests will have benefits to water quality in zone 1 of the estuary. Figure 3 shows the average concentration of enterococci for days with and without rain, before and after works, to address pathogen contamination. This figure shows that average concentrations for days both with and without rain decreased by more than 70% after works were complete.

This works program is ongoing and can be expected to achieve further reductions in pathogen pollution levels as sources are addressed in other urban waterways.

FURTHER INFORMATION

TEER Program

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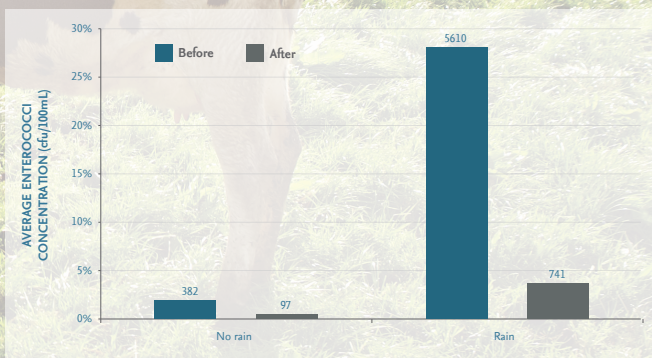

FIGURE 3: AVERAGE ENTEROCOCCI CONCENTRATION (CFU/100ML) FOR DAYS WITH AND WITHOUT RAIN DURING THE PERIOD BEFORE AND AFTER WORKS TO ADDRESS PATHOGEN LEVELS.