



Water Quality Report

for

New Town Rivulet Catchment

March 1998 – December 2002

prepared by:

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Scope

This report has been prepared to summarise the water quality data collected for New Town Rivulet and its tributaries during the period March 1998 to December 2002. This is the period of time that the New Town Rivulet Catchment Care Group Inc. employed a part-time Waterwatch Coordinator through funding received from the Natural Heritage Trust.

New Town Rivulet Catchment

New Town Rivulet is a permanently flowing creek which has its headwaters on Mt Wellington, Hobart Tasmania. It's length is approximately 9.5 kilometres. It flows through a bushland reserve (Wellington Park) before entering increasingly more urban areas in the suburbs of Lenah Valley and New Town. There are approximately 3000 households in the catchment as well as schools, recreation facilities, a milk processing factory and a number of small businesses and industries. The Rivulet flows into the River Derwent in New Town Bay.

The catchment is managed by both Hobart and Glenorchy City Councils.

A map of the catchment can be found in Appendix 1.

Major activities in the catchment which impact negatively on the water quality in the Rivulet are stormwater inputs (road run-off, dog droppings, litter, detergents from car washing) and weed infestation especially by willows, montpelier broom, blackberries and other garden escapees.

During the four and a half years that this project has operated it has involved community members and more than 2550 students from 22 different schools. 'Involvement' has included; water quality monitoring, planting, weeding, collecting rubbish and stencilling stormwater drains.

Data confidence

In 1999 a Monitoring Plan, based on the model outlined in the Waterwatch Tasmania Technical Reference Manual was developed for the New Town Rivulet Catchment. It has been reviewed during the life of the project.

The aim of the Group's water quality monitoring is to collect precise data (ie data which is consistent and repeatable) that is indicative of water quality in the Rivulet. We are not aiming to collect extremely high quality scientific data. Where the data has indicated water quality problems we have followed this up

with the appropriate authorities. Data collection is also used as an education and awareness-raising tool.

Throughout the period covered by this report the Waterwatch Coordinator attended regular water quality monitoring training workshops with the State Waterwatch Facilitator. These workshops covered sampling technique, equipment use, calibration, maintenance, data management and interpretation.

Water quality monitoring was conducted according to the methods contained in the Waterwatch Field Handbook

Equipment was regularly maintained and calibrated using the calibration solutions provided every six months by the State Waterwatch Facilitator.

Most of the water quality monitoring data contained in this report was collected by school students. All of the results entered on the Waterwatch Database have been from monitoring occasions when the Coordinator was present (95% of data on database) or when a fully trained teacher or other individual was present (5% of data on database).

When the Coordinator was present all groups conducted two to four replicates as classes were split into smaller groups and each group conducted all of the tests. The median of these results is then entered onto the database for that one monitoring event.

Not all data collected during monitoring events has been entered on the Waterwatch database. Data collected by groups who were considered by the Coordinator to be inexperienced has not been included.

Monitoring sites

The Group's Monitoring Plan has identified 16 sites along the length of New Town Rivulet and its three tributaries.

Consistent with National Waterwatch standards each monitoring site is allocated a site code comprising three letters and three numbers. The letters represent the catchment ie NTR for New Town Rivulet, NTP for Pottery Creek etc. The numbers represent the location in the catchment ie from 010 at the top of the catchment to 100 at the bottom. Site numbers are initially allocated in jumps of 10 ie 010, 020, 030 etc so that additional sites can be added in between later if needed.

A list of monitoring site codes and locations for the New Town Rivulet catchment is given in Appendix 2. Monitoring site locations are shown on the map in Appendix 1.

Monitoring equipment

A list of the monitoring equipment used to collect the data is given below.

Parameter	Reporting units	Equipment	Sensitivity (minimum detection level)
Turbidity	NTU	Waterwatch turbidity tube	variable
Temperature	C	Enviro-safe armoured glass thermometer	0.5° C
pH	pH units	Lo Ion pH kit	0.5 pH units
Dissolved oxygen	mg/L	LaMotte kit (modified winkler method)	0.2 mg/L
Reactive phosphorous	mg/L	Merk Aquaquant Kit Lo range	0.015 mg/L
Conductivity	uS	TD Scan 3	10 uS
faecal coliforms	colonies/100 ml	Coliscan Easygel	

Monitoring results

130 monitoring events are included on the Waterwatch Database (the tool for storing and manipulating data), as at 15 December 2002. The number of monitoring events on the database for each site varies from none to 34. This variation largely reflects the ease of access to sites by school groups.

The raw data for the physical/chemical monitoring is included as Appendix 3.

Physical/chemical monitoring

A summary of the results for each parameter measured is given below.

The ratings used are from the Waterwatch Field Handbook. These ratings have been developed on the basis of levels required to protect freshwater ecosystems.

Turbidity

Low levels (< 7 NTU's) were recorded for 123 of the 130 monitoring events in the data set. Due to the involvement of school groups, most monitoring occurred during fine weather rather than during storm events, hence storm event monitoring data (when turbidity levels would be expected to be elevated) is not well represented in the data set.

Turbidity levels above 7NTUs ranged from 12 – 300 NTUs with a median of 45 NTUs (n=7). These were probably due to either storm events or stormwater inputs.

Turbidity levels of < 7 NTUs are rated as excellent or good depending on the location in the catchment when the monitoring occurred, ie upper, mid or lower catchment.

Electrical conductivity

The range in the Rivulet itself for the period was 20 – 650 micro siemens (uS).

Data from three locations in the catchment - upper, middle and lower are given below.

Site	NTR020 upper catchment n=35	NTR060 mid catchment n=34	NTR100 lower catchment n=16
range uS	20 - 80	60 - 370	110 - 650
median uS	40	140	240
Waterwatch rating for median	good	good	good

Elevated conductivity levels were noted at lower sites in the Rivulet at times of low flow after periods of little or no rain. This would be expected as the dissolved inorganic salts became more concentrated at times of lower flow.

Conductivity levels in Brushy and Pottery Creeks were usually elevated compared to New Town Rivulet. Across both tributaries for a total of 18 records the range in conductivity was 110 – > 1990 uS and the median was 700 uS which rates as degraded. The reason for these higher levels is not known. It could be a function of geology, lower flows, some type of input or a combination of these factors.

Temperature

As would be expected, water temperatures varied at different sites in the catchment, throughout the seasons and throughout the day. The lowest temperature recorded was 6.0° C in the upper catchment at NTR020. The highest temperature recorded was 18° C at the mid-catchment site NTR060.

pH

The range in the Rivulet itself for the period was 5.0 – 8.5 units.

Data from three locations in the catchment - upper, middle and lower are given below.

Site	NTR020 upper catchment n=35	NTR060 mid catchment n=34	NTR100 lower catchment n=16
range	5.0 - 7.0*	6.0 - 7.5**	7 - 8.5
median	6.0	6.5	8
Waterwatch rating for median	excellent	excellent	fair

*A value of 9.7 has been ignored because this was taken by a group using a pH meter.

** A value of 8.1 has been ignored because this was taken by a group using a pH meter. Unless calibrated regularly pH meters are prone to incorrect readings.

Orthophosphorus

The range in the Rivulet itself for the period was 0 – 0.08 mg/L reactive orthophosphorus.

Data from three locations in the catchment - upper, middle and lower are given below.

Site	NTR020 upper catchment n=13	NTR060 mid catchment n=12	NTR100 lower catchment n=14
range mg/L	0 - 0.015	0 - 0.015	0 - 0.03
median mg/L	0	0.015	0.015
Waterwatch rating for median	excellent	good	good

An urban creek could be expected to have elevated levels of phosphorus due to stormwater inputs (dog faeces, fertilisers, detergents, sewage leaks/cross-connections). Data for New Town Rivulet do not show this trend however it must be remembered that the data set does not adequately represent storm events, when phosphorus levels would be expected to be elevated from the 'first flush'.

It should also be noted that our equipment measures reactive phosphorus not total phosphorus. As phosphorus is a limiting nutrient in freshwater systems any available phosphorus will be taken up very quickly, in turn giving low reactive phosphorus readings.

The amount of algal growth in some sections of the Rivulet would suggest that nutrient levels such as phosphorus are higher than for a natural system.

Dissolved oxygen

There are not enough results to comment on trends for this parameter.

Macroinvertebrate monitoring

The abundance and diversity of macroinvertebrates can be used as an indicator of the health of a creek.

The following trends emerged from macroinvertebrate monitoring for New Town Rivulet over the report period.

Site	NTR020 upper catchment	NTR060 mid catchment	NTR100 lower catchment
Macroinvertebrates typically found at these sites	Stoneflies, mayflies, caddisflies (several different species of each) plus dragonflies, side swimmers, beetle larvae, blackfly larvae.	large numbers of segmented worms, snails, and flat worms. Smaller numbers of chironomid worms and a species of 'tolerant' stonefly	large numbers of segmented worms, snails, and flat worms. Smaller numbers of chironomid worms and a species of 'tolerant' stonefly

The diversity, abundance and presence of macroinvertebrates which are known to be sensitive to water pollution at the upper catchment site indicates that the water quality here is good. Conversely the lower diversity of species and

absence of those which are sensitive to pollution at the mid and lower sites indicate that the water quality here is not so good.

Habitat monitoring

The amount and quality of riparian (creek edge) vegetation also influences water quality.

Upstream of 354 Lenah Valley Road (near the small park where the Rivulet flows down a series of cascades before going under the road) the riparian vegetation beside the Rivulet is reasonably weed free and intact. Below this point weed density and diversity increases as you travel downstream.

Some sections below this point are completely weed infested, others are managed as extensions of peoples gardens and others are being revegetated through the efforts of both Councils and community members.

Conclusions

Water quality monitoring in the New Town Rivulet Catchment during the course of this project has shown that:

- Water quality in the upper catchment is very good.
- Mid and lower catchment sites show a decline in water quality compared with the upper catchment. Whilst the physical and chemical results for these sites are reasonably good, the macroinvertebrate monitoring indicates that water quality at these sites is not good.
- Brushy Creek and Pottery Creek have elevated conductivity levels.

New Town Rivulet is a special place. We are lucky to have an area like this as part of our local environment and we all need to help care for it.