



GINNINDERRA CATCHMENT GROUP INC. - WATERWATCH PROGRAM
Community Water Quality Monitoring Program, Ginninderra Catchment, A.C.T.
ANNUAL WATER QUALITY AND CATCHMENT HEALTH REPORT
SUMMARY

December 2001 - November 2002

pH RESULTS

pH results throughout the Ginninderra catchment have been good, with the median values generally ranging between 7.0 to 8.0. Exceptions to this were found at Yerrabi Pond (GIN003) and in the upper reaches of Ginninderra Creek at Amaroo Hills. At both of these sites, the median pH was 8.1, indicating a slightly alkaline environment. The median pH result for the upper reaches of Halls Creek (HAL001) was 5.6, indicating an acidic influence in this area.

The Waterwatch Australia technical Manual (2002) suggests that "changes of more than 0.5 pH units from the natural seasonal maximum or minimum in fresh water should be investigated". Here, the median pH for December 2001 to November 2002 is compared with the overall median pH for each site. Sites which have a median that differs by >0.5 pH units include: GIN002 (differs by 0.6), GIN005 (0.6), MCW001 (1.5), GIN020 (0.8) and GIN024 (0.6).

The most significant change in pH was observed at Mackellar wetland (MCW001), where pH differed by 1.5 units from the overall median. Inspection of the data for this site shows a gradual decline in pH from extremely alkaline values (approximately 9.0) recorded mid - late last year to more acceptable levels of around 7.0 since March 2002.

ELECTRICAL CONDUCTIVITY (EC) RESULTS

Electrical Conductivity (EC) results varied widely across the catchment, with median values ranging from 105 ppm in Dunlop Pond 1 (STW005) to 864 ppm in Gooromon Ponds Creek (GOO007). At most monitoring sites, an increase in EC was apparent. This short term trend is most likely due to the extremely dry weather conditions of the past 12 months, causing a concentration of dissolved solids in reduced flows.

Extremely high EC values are consistently found at the Gooromon Ponds creek site along Wallaroo Rd (GOO007). This is most likely due to the

predominance of low flows in the area, coupled with soil disturbances caused by stock access and erosion.

High EC results downstream of this site, just upstream of the confluence of Gooromon Ponds Creek and Ginninderra Creek (GOO009) are likely to be a result of downstream flow of dissolved solids, and perhaps also from soil disturbances in the newly developing Dunlop and West Belconnen residential areas. Longer term data (since August 2000) shows an increasing trend in stream EC at this site, and recent figures show a significant increase in EC levels, when compared with the overall median.

Poor EC results were also observed at Yerrabi Pond (GIN003), and Florey Stormwater Drain (STW003).

TURBIDITY RESULTS

Median turbidity results along Ginninderra Creek were generally Fair to Very Good, with values ranging from 9 NTU to 20 NTU. Results along Gooromon Ponds Creek were more variable, with median results ranging from 40 NTU at GOO001 to 9 NTU at GOO007 and GOO009.

Turbidity values were Very Poor in the upper reaches of Gooromon Ponds Creek (GOO001) and Halls Creek (HAL001); Dunlop Pond 2 (STW007) showed a Poor turbidity rating.

Median turbidity results increased at a number of sites throughout the catchment, when compared to the overall median. This was apparent at Yerrabi Pond (GIN003), upstream of Gungahlin Pond (GIN002), downstream of the Barton Highway at Giralang (GIN007), Giralang stormwater drain (STW001), the downstream reach of Ginninderra Creek (GIN011), and in the upper reaches of Gooromon Ponds Creek and Halls Creek (GOO001 and HAL001).

It should be noted that while median turbidity results were generally good, turbidity 'spikes' of between 20 - 200 NTU were apparent at all sites. These can be seen by examining the charts in Appendix 1. An attempt to monitor the occurrence and extent of these

turbidity spikes is being made through the establishment of storm event monitoring - see next section.

STORM EVENT SAMPLING RESULTS

A significant amount of suspended solids and other pollutants are washed through the stormwater and creek systems during storm and rainfall events. Monitoring during these times is designed to take account of these flows, and in future (as more SAS sites are established) these data will be used to identify sources of sediment and other pollution in the catchment.

Storm event sampling of turbidity and relative water level has been undertaken at three sites in the lower reaches of Ginninderra Creek. Due to the lack of rain and storm activity since the establishment of the Storm Action Squad, results have been limited to 3 events.

A significant event at Harper St, Macgregor (SAS720 and SAS721) in February 2002 resulted in maximum turbidity readings of 50 NTU. A relationship between turbidity and water levels was also observed during this event.

Results from two smaller rainfall events at Latham (SAS710) are also available.

DISSOLVED OXYGEN RESULTS

Dissolved oxygen (DO) measurements were taken at three sites along Ginninderra Creek: Florey stormwater drain (STW003), Umbagog Park (GIN020) and Kippax Creek (KIP001). Results from these observations ranged from 0.01 mg/L at STW003 to > 13.0 mg/L at all three sites. More detailed charts of dissolved oxygen levels are also available.

The Waterwatch Australia Technical Manual states that, "A dissolved oxygen concentration of 2 mg/L will not support fish, and dissolved oxygen concentrations below 3 mg/L are stressful to most aquatic animals. At least 5 - 6 mg/L are required for fish growth and activity. Daytime concentrations of 6 mg/L are cause for concern as dissolved oxygen levels will decrease overnight."

On a number of occasions since 1999, daytime dissolved oxygen levels at all three sites were found to be below 6 mg/L. At STW003 and GIN020, levels were found to be less than 2 mg/L on a number of occasions.

ORTHO-PHOSPHATE RESULTS

Ortho-phosphate concentrations were also measured at these three sites. The median results for these sites

showed that phosphorous levels at Florey stormwater drain (STW003) are extremely high. Inspection of the chart for this site shows that P levels are regularly Poor to Very Poor.

P concentrations at the other two sites were usually satisfactory. However, the detailed charts for both of these sites show 'peaks' of P concentration when levels are greater than 0.1 mg/L

PRESENCE OF ALGAE

The presence or absence of algae has been included as a site observation when taking 3-weekly water quality data since approximately June 2002. Algae - generally the large filamentous (non-toxic) species - were apparent at most sites, with the exception of four.

The presence of excessive amounts of algae can indicate nutrient enrichment of a waterway. Sites where algal growth was observed for greater than 50% of sampling dates are concentrated in Gungahlin and in the middle reaches of Ginninderra Creek, downstream of (and including) Lake Ginninderra.

PRESENCE OF RUBBISH

The presence or absence of rubbish, and the type of rubbish has been included as a site observation when taking 3-weekly water quality data since approximately June 2002. Rubbish has been observed at all sites, except for at Gungahlin gauging station (GIN005) and the upper reaches of Gooromon Creek (GOO001). Extremely large amounts of rubbish have been consistently observed at Florey stormwater drain (STW003) and the lower end of Gooromon Ponds Creek (GOO009).

At some sites, rubbish was found to be associated with particular events. For example, most of the rubbish found in the upper reaches of Halls Creek (HAL001), was attributed to markets that are regularly held in the vicinity.

The rubbish found along the creek corridor was predominantly composed of plastic (56%) - mainly plastic bags and plastic drink bottles. Approximately 30% of the rubbish was paper, and the remaining 14% was composed of cans, cigarette butts, glass and miscellaneous items.

MACRO-INVERTEBRATE RESULTS

The results of macro-invertebrate snapshots show a relatively poor degree of diversity and abundance at the sites sampled. Interpretation using the Chessman SIGNAL system, suggests polluted habitats along Ginninderra Creek at Giralang and Melba, and at the dam at Burgmann Anglican School. At Ginninderra Creek, Palmerville Heritage Village, where sampling was undertaken in both Autumn and Spring of 2002,

results consistently suggested high salinity or nutrient levels.

FROGWATCH RESULTS

During the Autumn 2002 survey period, only one frog species was observed - *Limnodynastes tasmaniensis* (Spotted Grass Frog). One to five individuals were observed at both John Knight Park in Belconnen (FW005) and at Dunlop Pond 1 (FW009).

During the Spring 2002 survey period, 5 species were detected overall. This compares poorly with the 8 species that were detected last spring (2001), and despite the addition of extra Frogwatch sites. Species that were present last spring, but were not apparent this spring include: *Limnodynastes peronii*, *Litoria peronii*, and *Uperoleia laevis*.

The extremely dry conditions during spring 2002 may have contributed to the reduction in calls observed.

CONCLUSIONS

CHI ANALYSIS

As shown in the Table below, catchment health, as indicated by the CHI analysis generally varies from Fair to Good in most sub-catchments. The exception to this was identified in sub-catchment 11 (the upper reaches of Halls Creek), where the information collected at HAL001 indicated a Poor level of catchment health. During the past 12 months, water quality results have shown low pH levels high levels of turbidity and a large amount of litter at the site. Other areas of concern have been highlighted in section 2 of this report.

IMPACTS OF WILLOW REMOVAL

One aim of the Waterwatch monitoring program is to identify the impacts of Ginninderra Catchment Group's willow removal program. Since the removal of pest willow species along the creek, anecdotal reports have identified a return of birds and other wildlife to the creek. Water levels have also been maintained in areas where the creek has previously been very low or dry.

At Ginninderra Drive in Latham (GIN020), where dissolved oxygen has been measured prior to and after the willow removal, there does appear to be some stabilisation of dissolved oxygen levels. However, DO levels are still often found to be below the recommended levels for the survival of aquatic life (see complete report for more detailed information).

Turbidity levels have been measured at five sites impacted by willow removal. Inspection of data presented for these sites does not show any significant change in turbidity levels after the willow removal had taken place. However, rain event data is not

available for this period, when any significant changes in turbidity is likely to be apparent.

Unfortunately the Waterwatch macro-invertebrate data that is available is not able to be compared year - to - year. However, AUSRIVAS results taken from the ACT Water Report (2001 - 2002) suggests a significant impairment of biological health along Ginninderra Creek for Spring 2001, and states, "It will be some time before the effect of the willow removal program ... is realised through improved biological health. However, the Autumn sampling suggested some improvement. Slow but continued improvement as native vegetation establishes along the creek is expected."

The number and diversity of frog species along the willow-affected corridor has shown no significant improvement since the removal. However, this may be more likely due to other factors than any impact of the willow control program.

MAJOR SOURCES OF SEDIMENT

Turbidity and the input of sediment loads is a problem across the whole catchment. In urban areas, sediment sources are likely to be found in newly developing areas around Gungahlin and West Belconnen, and anywhere where the ground is unprotected by vegetation or other stabilising structures. These sediments are quickly delivered to the creek during rain or storm events, via the extensive stormwater system.

Turbidity 'hot spots' were identified in the upper reaches of Gooromon Ponds Creek (GOO001) and of Halls Creek (HAL001). The input of sediment in these areas are most likely due to problems of stock access to the creek, eroding the banks.

Continuation and expansion of the storm event monitoring in the future will allow more precise identification of sediment sources.

MAJOR SOURCES OF LITTER

Litter appeared to be a problem at almost all of the sampling sites around the catchment. Most rubbish appears to be coming from diffuse sources, possibly dropped on-site or blown or washed to the creek from over-full bins or carelessness.

One of the worst affected sites are at Florey stormwater drain (STW003), which receives runoff from the suburban area of Florey. The high school, located just near the site may be a source of some of this litter.

A proportion of the rubbish observed at the downstream end of Gooromon Pond Creek (GOO009) appears to have been dumped. This site and the area

surrounding seems to be a popular place to dump refuse.

The Hall markets were also observed to be a major source of rubbish found at HAL001

Water Quality and Ranking for each indicator, sampling site, and sub-catchment.

		WATER QUALITY INDICATORS: SITE RATINGS						
Sub-Catchment	Site Code	pH	Electrical Conductivity	Turbidity	Presence of Rubbish	Average Rating for Each Site	Average Rating for Each Sub-Catchment	Average Ranking for Each Sub-Catchment
2	GIN003	Fair (3)	Poor (4)	Good (2)	Good (2)	Fair (2.8)	2.8	Fair
3	GIN004	-	-	-	Good (2)	Good (2)		
	GIN006	-	-	-	Good (2)	Good (2)		
	GIN002	Good (2)	Fair (3)	Fair (3)	Fair (3)	Fair (2.8)		
	GUN001	Good (2)	Good (2)	Fair (3)	Fair (3)	Fair - Good (2.5)	2.3	Good
4	GIN005	Good (2)	Good (2)	Good (2)	Very Good (1)	Good (1.8)		
	GIN007	Very Good (1)	Good (2)	Good (2)	Good (2)	Good (1.8)		
	MCW001	Good (2)	Fair (3)	Very Good (1)	Good (2)	Good (2.0)	1.9	Good
5	STW001	Good (2)	Fair (3)	Good (2)	Fair (3)	Fair - Good (2.5)	2.5	Fair - Good
6	GIN010	Very Good (1)	Good (2)	Very Good (1)	Poor (4)	Good (2.0)	2.0	Good
7	GIN009	Very Good (1)	Good (2)	Very Good (1)	-	Very Good (1.3)		
	GIN017	Poor (4)	Good (2)	Very Good (1)	-	Good (2.3)		
	STW003	Good (2)	Poor (4)	Very Good (1)	Very Poor (5)	Fair (3.0)		
	GIN020	Good (2)	Good (2)	Very Good (1)	Poor (4)	Good (2.3)		
	GIN024	Good (2)	Good (2)	Very Good (1)	Fair (3)	Good (2.0)		
	KIP001	Good (2)	Fair (3)	Very Good (1)	Fair (3)	Good (2.3)		
	GIN011	Good (2)	Good (2)	Good (2)	Good (2)	Good (2.0)	2.2	Good
9	GOO001	Good (2)	Good (2)	Very Poor (5)	Very Good (1)	Fair - Good (2.5)	2.5	Fair - Good
10	GOO007	Very Good (1)	Very Poor (5)	Very Good (1)	Fair (3)	Fair - Good (2.5)	2.5	Fair - Good
11	HAL001	Poor (4)	Fair (3)	Very Poor (5)	Poor (4)	Poor (4.0)	4.0	Poor
12	STW005	Good (2)	Good (2)	Very Good (1)	Good (2)	Good (1.8)		
	STW007	Good (2)	Good (2)	Poor (4)	Good (2)	Fair - Good (2.5)		
	GOO009	Good (2)	Very Poor (5)	Very Good (1)	Very Poor (5)	Fair (3.3)	2.5	Fair - Good
OVERALL CATCHMENT WATER QUALITY - AVERAGE RANKING							2.5	Fair - Good