WILLOUGHBY CITY COUNCIL

2020/21 WILLOUGHBY WATERWAY HEALTH REPORT CARD

Willoughby City Council monitors the health of its waterways using chemical and biological testing through its Water Quality Monitoring (WQM) program.

This report card has been developed to grade different components of water quality in Willoughby's creeks and streams. The report card is an easy way for everyone to understand the information gathered about our waterways from the test sites, and how they have been performing over the previous year.

The physical/chemical grading ranges from 'A', for those sites complying with recommended Australian and New Zealand Environment and Conservation Council (ANZECC) Guidelines, to 'F' indicating parameters tested did not comply with guidelines on any sampling occasion.

The ecological grading ranges from A, indicating macroinvertebrate communities matching those living in clean water, to D, where the bugs that are present can tolerate severely polluted water.

Bad water quality scores can be quite discouraging with the majority of these scores in our local government area influenced by sewer overflows. However, it is reassuring to note that there are good news stories for our streams and creeks. From time to time more sensitive macroinvertebrate species get discovered which indicates a positive response to the prevailing environmental conditions.

Water Quality

Each monitoring site was ranked according to the percentage of times sampling results met the recommended ANZECC 2000 Guidelines for Water Quality Monitoring & Reporting (% compliance).

If the result for each key parameter doesn't meet the minimum guidelines it means it gets a lower ranking.

An entire years' worth of dry weather sampling information is then made into a percentage and calculated by the number of times that sites results has agreed with the total number of times samples were taken when it was dry.

Different chemical parameters are included in the testing including; 1 - 3 as shown below:

1. **Microbiological** compliance is based on Faecal Coliform and Enterococci results.
2. **Nutrient** compliance is based on total nitrogen and total phosphorus results
3. **Physical** compliance is based on conductivity, dissolved oxygen, pH and turbidity results. **Metals** compliance is based on total copper, total zinc and total lead results.

These have been summarised into four overall categories.

1. Bacterial Contamination
2. Nutrients
3. Water Bugs
4. Physical/Chemical/Metals

Compliance	Rank	Score	Detail
>85%	A	1	Meets selected criteria in over 85% of samples
75 - 85%	B	2	Meets selected criteria in 75%-85% of samples
50 - 74%	C	3	Meets selected criteria in 50%-74% of samples
26 - 49%	D	4	Meets selected criteria in 26%-49% of samples
15-25%	E	5	Meets selected criteria in less than 15-25% of samples
<15%	F	6	Meets selected criteria in less than 15% of samples

Macro-invertebrates

SIGNAL-SG compliance is based on Chessman et al (2007) using the individual sensitivity scores of one to ten for each taxa to derive an average SIGNAL-SG score for each site. Animals scoring closer to 10 indicate high sensitivity to pollution, and animals scoring lower indicate high tolerance. A site average is based on the animal present at the time of sampling and four bands covering the range of scores are included below:

SIGNAL Score	Rank	Detail
>6.5	A	Clean Water
5.2 - 6.5	B	Possible mild organic pollution
3.8 - 5.1	C	Probable moderate organic pollution
<3.8	D	Probable severe organic pollution

Combined Score

Overall, scores were combined for all four water quality analyses, macroinvertebrate* and vegetation to give an overall rank/score for a site.

Combined Score		
A	= or <	1.5
B	=	1.6-2.5
C	=	2.6-3.5
D	=	3.6-4.5
E	=	4.6-5.5
F	= or >	5.6

*Where tested for, Macro-invertebrates also contribute to the combined score.

REFERENCES

ANZECC (2000). Australian and New Zealand Water Quality Guidelines for Fresh and Marine Waters. Australian and New Zealand Environment and Conservation Council.

Chessman B.C., Williams S.A. & Besley C.H. (2007) Bioassessment of streams with macroinvertebrates: effect of sampled habitat and taxonomic resolution. Journal of the North American Benthological Society. 26 (3), (546-563).

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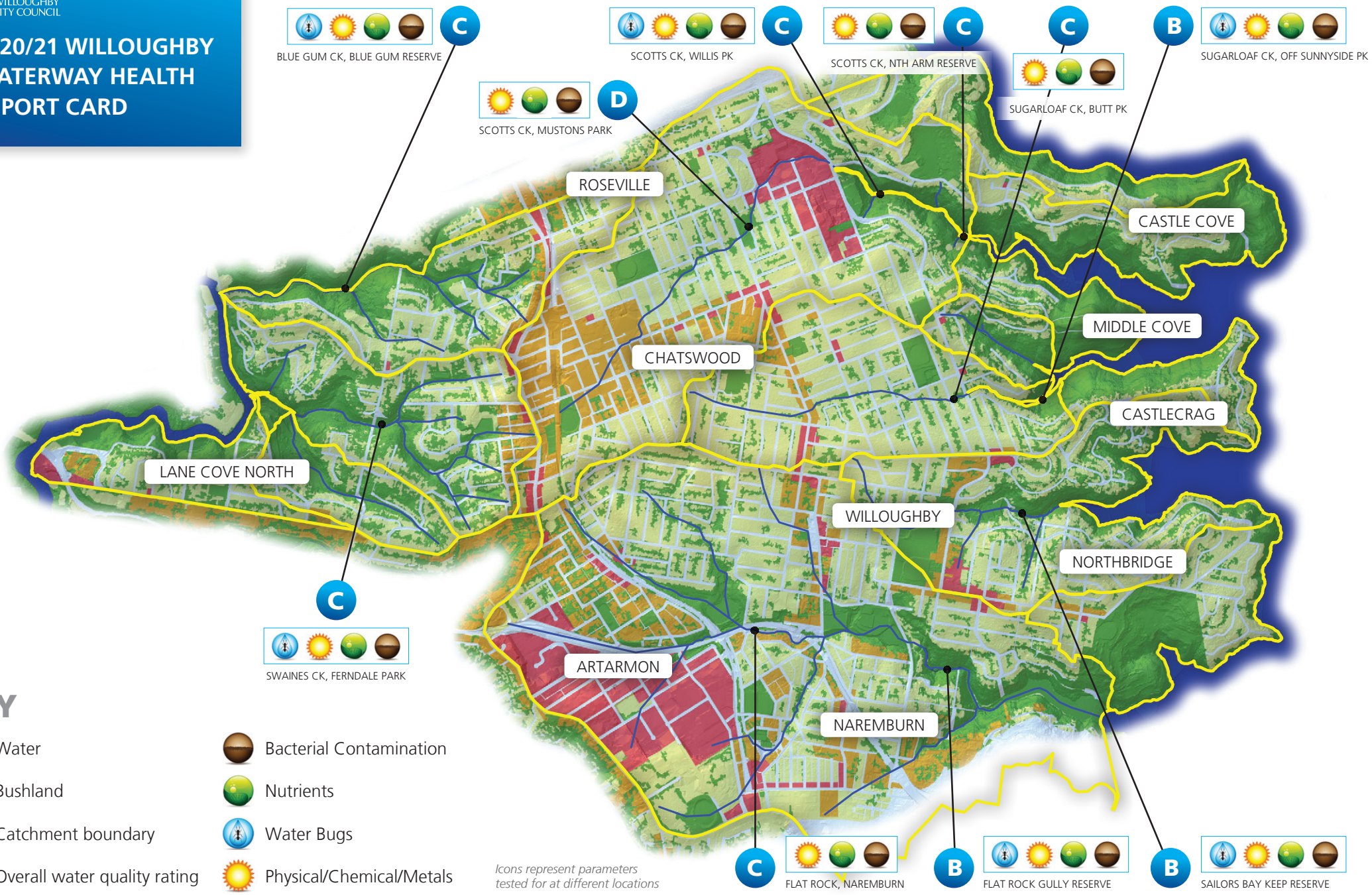

KEY

- Water
- Bushland
- Catchment boundary
- Overall water quality rating
- Bacterial Contamination
- Nutrients
- Water Bugs
- Physical/Chemical/Metals

Icons represent parameters tested for at different locations