

# RIBBONS OF BLUE: MACROINVERTEBRATE SNAPSHOT 2008 REPORT FOR SCHOOLS



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South West Catchments Council

Baldivis Primary School

Calista Primary School

Falcon Primary School

Jarrahdale Primary School

Maranatha Christian College

North Dandalup Primary School

St Joseph's Catholic Primary School, Pinjarra

Singleton Primary School

Department of Water



## INTRODUCTION

In 2008 Ribbons of Blue held its 14<sup>th</sup> annual Macroinvertebrate Snapshot event. Aquatic macroinvertebrates are creatures with a backbone that can be seen with the naked eye (that is, you don't need a microscope) and spend all or part of their life in water. Major groups include insects, crustaceans, spiders, molluscs and worms. Macros are the 'living' side of water quality in that the different types and amounts found can tell us something about the quality of the waterbody they live in – for example, if only the most tolerant species are found there may be a pollution problem that needs to be looked into.

As with all Ribbons of Blue programs, data for the Macroinvertebrate Snapshot is collected by schools and community groups. This is part of people in the area taking special ownership and care of 'our patch'. This year schools from around the Peel-Harvey catchment again joined in to look at macros in their local area. Many different types of waterbodies were investigated, including Alcoa Wetland (Pinjarra), Folly Pool (Baldivis), Harmony Lake (Singleton), Lake Richmond (Rockingham), Mandurah Quay Lake (Erskine), Peel Main Drain (Bertram) and the Serpentine River (Jarrahdale).

## PARTICIPANTS

**Baldivis Primary School** has many environmental activities, both at the school and in the nearby award-winning Baldivis Children's Forest. At the forest, people can learn about both the environment and about Aboriginal culture. Years 5/6 students and teachers again visited Folly Pool to have another look at macros. The results are especially important now because of the building of the new Perth-Bunbury Highway nearby.

*"During our excursion to Folly Pool I found the non-biting midge larvae interesting because it was all red and it looked dead for a while." Imogen, Year 5.*

**Calista Primary School** students have been testing the water quality of waterways in their area (e.g. the Peel Main Drain and The Spectacles wetlands) for many years. Their monitoring is very important because of high nutrients (phosphate and nitrate) levels. They have also replanted in areas where it's needed. This year was the school's 12<sup>th</sup> year of participation in the annual Macro Snapshot, although they've been monitoring the Peel Main Drain at Bertram Road for over thirty years!

*"It was great fun getting the macros and then seeing what we'd caught – my favourite was the big bug, the water scorpion." Tiana, Year 5.*

**Falcon Primary School** years 5-7 students have been learning about the different ways to monitor water quality this year. Students used 'scientific process' to test the water quality of many local waterways for electrical conductivity (salt) and pH levels. They learnt another way of finding out about water quality when they looked at the types and numbers of macros from a lake at Mandurah Quay, Erskine.

*"We learnt many things, from knowing how to handle bugs to knowing how to recognise them."  
Room 14, Years 5/6.*

**Jarrahdale Primary School** has been monitoring the Serpentine River near the school for many years. Like many schools in the region, they regularly test for the 'fabulous four' aspects of water quality - pH, salinity, temperature and turbidity. Plus, they sample the macroinvertebrates found in the river whilst they're there. This means students get to see first-hand the changes in the types and numbers of macros found at different seasons.

**Maranatha Christian College** is looking after the Lake Richmond, which has very special environmental value – for example, it has a thrombolite community there. The lake is being affected by nearby housing and by stormwater coming into it. Year 8s learnt about water quality testing so they can monitor the lake with their own equipment. Looking at the macros living there showed them a new world within the lake and gave them another way to help understand its water quality.

*"It was so great to be there. I learnt so much that I just wanted to stay there and learn more!"  
Ronald, Year 8.*

**North Dandalup Primary School** has been monitoring the nearby North Dandalup River every week for many years. This year, though, they took a look at macros found at the Alcoa Wetland in Pinjarra where there has been lots of work done recently to improve the wetland. The results will be of special interest to the Peel-Harvey Catchment Council, which is managing the site.

*"I really enjoyed it. I didn't realise the differences during the life cycles." Jordana, Year 5.*

**St Joseph's Catholic Primary School, Pinjarra** had students, teachers *and* parents take part in this year's Macros Snapshot! They too visited the nearby Alcoa Wetland and learnt about the different macroinvertebrates found there. Their data is also very important in helping to give an idea of water quality at the site.

*"When I was searching for macroinvertebrates I liked finding the ones that we didn't know what they were. We had to find out." Jarad, Year 4.*

**Singleton Primary School** students from Years 4 to 7 again visited Harmony Lake, which is next to their school. Earlier in the year students tested the lake for the ‘fabulous four’ parameters, whilst junior primary students learnt about how stormwater affects the lake. This time they looked at all the different macros living there.

*“It was really interesting because I didn’t realise that we could find so many things in our water sample – I never knew that all these bugs were in the water!” Molly, Year 7.*

## METHODOLOGY

All students used the same scientific method for sorting, identifying and recording their results. Students worked in groups to identify their macros using a special flipchart book and a colour ID chart. They used magnifying glasses to help them work out what their macros were. If they still weren’t sure, they got help from the Ribbons of Blue Coordinator. When they worked out what they had in their sample they recorded it on their special datasheet.

Students filled in their datasheet as shown below:

- i) recorded a  $\surd$  to show that they’d found a type of macro in their sample
- ii) kept a tally of the number of each type of macroinvertebrate found
- iii) wrote down the SIGNAL rating (how tolerant or sensitive to pollution) of the macroinvertebrates they identified

The Ribbons of Blue Coordinator used their results to get an idea of biodiversity and ecological health of the waterway<sup>1</sup>. This was based upon the different types of macros found and the pollution tolerances of the critters.

## RESULTS

### **Alcoa Wetland, Pinjarra**

This wetland was investigated by both North Dandalup Primary School and St Joseph’s Catholic Primary School. Students from both schools found the same kind of macros there. Many macros from the insect group were found – for example, damselfly and dragonfly nymphs and a different beetles and beetle larvae. There were also many leeches, freshwater snails and water fleas.

The main pollution tolerance of macros found at the wetland was *very tolerant*, with only two more sensitive species found. This may be because of natural reasons such as the water temperature, the life-cycle stage of a critter and the small amount of August rainfall. Plus, vegetation along the bank that is not native to the wetland has been removed recently to help restore the site. Even so, students noticed a red slick on the water that was concerning. This was

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<sup>1</sup> Only as a very general guide – much more testing would be needed to get a very good understanding of the water quality of a site.

an algal bloom, which is unhelpful for water quality and for the macros that live there. So it will be important to keep testing the wetland to monitor water quality over time.

**Results: Alcoa Wetland, Pinjarra**

<b>TYPE FOUND</b>	<b>Tolerance</b>	<b>SIGNAL Grade</b>
<i>PHYLUM ARTHROPODA – CLASS INSECTA</i>		
Caddisfly larvae	Very sensitive	8
Dragonfly larvae	Very tolerant	3
Damselfly larvae	Very tolerant	3
Water boatmen	Very tolerant	2
Backswimmers	Very tolerant	1
Predacious diving beetle adult/larvae	Very tolerant	2
Whirligig beetle adult/larvae	Tolerant	4
Water scavenger beetle adult/larvae	Very tolerant	2
Soldier fly larvae	Very tolerant	2
Mosquito larvae/pupae	Very tolerant	1
Biting midge larvae	Very tolerant	4
Non-biting midge larvae	Very tolerant	3
<i>PHYLUM ARTHROPODA - CLASS CRUSTACEA</i>		
Water flea	Not rated	not rated
<i>PHYLUM ARTHROPODA - CLASS ARACHNIDA</i>		
Water mite	Sensitive	7
Water spider	Very tolerant	2
<i>PHYLUM MOLLUSCA</i>		
Freshwater snail	Very tolerant	1
<i>PHYLUM ANNELIDA</i>		
Leeches	Very tolerant	1
<b>BIODIVERSITY</b>		
	Total number of types	<b>17</b>
	Rating	<b>Very good</b>
<b>ECOLOGICAL HEALTH</b>		
	Dominant tolerance group	<b>Very tolerant</b>
	SIGNAL total	<b>46</b>
	Rating	<b>Fair- Good*</b>

\* Guide only – further monitoring is recommended.

## Folly Pool, Baldivis

Baldivis Primary School students found many different types of macroinvertebrates, from the most sensitive to the most tolerant. As well as dragonfly and damselfly nymphs, larvae of stoneflies, mayflies and caddisflies were identified. Different types of crustaceans were also found, especially lots of freshwater shrimp. The main pollution tolerance of macros found was *very tolerant* but it was good to see several types of very sensitive species. It will be important to keep monitoring this site with the Perth-Bunbury highway being built nearby.

### Results: Folly Pool, Baldivis

TYPE FOUND	Tolerance	SIGNAL Grade
<i>PHYLUM ARTHROPODA – CLASS INSECTA</i>		
Stonefly larvae	Very sensitive	10
Mayfly nymph	Very sensitive	9
Caddisfly larvae	Very sensitive	8
Dragonfly larvae	Very tolerant	3
Damselfly larvae	Very tolerant	3
Water boatmen	Very tolerant	2
Backswimmers	Very tolerant	1
Predacious diving beetle adult/larvae	Very tolerant	2
Water scavenger beetle adult/larvae	Very tolerant	2
<i>PHYLUM ARTHROPODA - CLASS CRUSTACEA</i>		
Freshwater crayfish/gilgie	Tolerant	4
Freshwater prawn/shrimp	Tolerant	3
Water flea	Not rated	not rated
Fairy shrimp	Tolerant	1
<i>PHYLUM ARTHROPODA - CLASS ARACHNIDA</i>		
Water mite	Sensitive	7
Water spider	Very tolerant	2
<i>PHYLUM MOLLUSCA</i>		
Freshwater snail	Very tolerant	1
<i>PHYLUM ANNELIDA</i>		
Leeches	Very tolerant	1
<b>BIODIVERSITY</b>		
	Total number of types	<b>17</b>
	Rating	<b>Very good</b>
<b>ECOLOGICAL HEALTH</b>		
	Dominant tolerance group	<b>Very tolerant</b>
	SIGNAL total	<b>59</b>
	Rating	<b>Very good*</b>

\* Guide only – further monitoring is recommended.

## Harmony Lake, Singleton

Singleton Primary School students enjoyed their macroinvertebrate sampling and found many different insects, as well as crustaceans, molluscs and worms. Most species identified were of the *very tolerant* category but several caddisfly larvae (which are pollution sensitive) were also found. Freshwater snails, damselfly nymphs, non-biting midge larvae and water fleas were the main type of macros found. It may be normal not to find many pollution sensitive macros in the lake in early September, especially as there was not as much rain as usual. Yet, there could be a pollution problem because of all rubbish and ducks there, and with a stormwater drain in the lake.

## Results: Harmony Lake, Singleton

TYPE FOUND	Tolerance	SIGNAL Grade
<i>PHYLUM ARTHROPODA – CLASS INSECTA</i>		
Caddisfly larvae	Very sensitive	8
Dragonfly larvae	Very tolerant	3
Damselfly larvae	Very tolerant	3
Water boatmen	Very tolerant	2
Backswimmers	Very tolerant	1
Predacious diving beetle adult/larvae	Very tolerant	2
Mosquito larvae/pupae	Very tolerant	1
Soldier fly larvae	Very tolerant	2
Non-biting midge larvae	Very tolerant	3
<i>PHYLUM ARTHROPODA - CLASS CRUSTACEA</i>		
Water flea	Not rated	not rated
Isopod	Very tolerant	2
<i>PHYLUM MOLLUSCA</i>		
Freshwater snail	Very tolerant	1
<i>PHYLUM ANNELIDA</i>		
Segmented worm	Very tolerant	2
Leeches	Very tolerant	1
<b>BIODIVERSITY</b>		
	Total number of types	<b>14</b>
	Rating	<b>Good</b>
<b>ECOLOGICAL HEALTH</b>		
	Dominant tolerance group	<b>Very tolerant</b>
	SIGNAL total	<b>31</b>
	Rating	<b>Poor*</b>

\* Guide only – further monitoring is recommended.

## Lake Richmond, Rockingham

Year 8s at Maranatha Christian College found twelve different types of macroinvertebrates, nearly all in the *very tolerant* category. Most macros found were damselfly nymphs, water boatman and freshwater shrimp. Because of water temperature, rainfall and lifecycle stages it may be normal not to find many sensitive critters at this time of year. However, students noted that there was a lot more algae and weed in the drains than when they came before. This could create problems with the water quality there and their monitoring of the lake will be very important to explore further.

## Results: Lake Richmond, Rockingham

TYPE FOUND	Tolerance	SIGNAL Grade
<i>PHYLUM ARTHROPODA – CLASS INSECTA</i>		
Dragonfly larvae	Very tolerant	3
Damselfly larvae	Very tolerant	3
Water boatmen	Very tolerant	2
Soldier fly larvae	Very tolerant	2
Biting midge larvae	Very tolerant	4
Non-biting midge larvae	Very tolerant	3
<i>PHYLUM ARTHROPODA - CLASS CRUSTACEA</i>		
Freshwater prawn/shrimp	Tolerant	4
Water flea	Not rated	not rated
<i>PHYLUM ARTHROPODA - CLASS ARACHNIDA</i>		
Water mite	Sensitive	7
Water spider	Very tolerant	2
<i>PHYLUM MOLLUSCA</i>		
Freshwater snail	Very tolerant	1
<i>PHYLUM ANNELIDA</i>		
Leeches	Very tolerant	1
<b>BIODIVERSITY</b>		
	Total number of types	<b>12</b>
	Rating	<b>Good</b>
<b>ECOLOGICAL HEALTH</b>		
	Dominant tolerance group	<b>Very tolerant</b>
	SIGNAL total	<b>32</b>
	Rating	<b>Poor*</b>

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\* Guide only – further monitoring is recommended.

## Mandurah Quay Lake, Erskine

Students from Falcon Primary School looked at the macros found in a lake off Sticks Boulevard, Erskine. The main type of critters found were freshwater shrimp and non-biting midge larvae. Other species there were caddisfly larvae, damselfly and dragonfly nymphs and freshwater snails. Most macros were *very tolerant* to pollution. There are many dogs and ducks at the lake and algae was present on the water. This means that there could be a pollution problem so more testing would be helpful.

## Results: Mandurah Quay, Erskine

TYPE FOUND	Tolerance	SIGNAL Grade
<i>PHYLUM ARTHROPODA – CLASS INSECTA</i>		
Caddisfly larvae	Very sensitive	8
Dragonfly larvae	Very tolerant	3
Damselfly larvae	Very tolerant	3
Water boatmen	Very tolerant	2
Water measurer	Very tolerant	3
Mosquito larvae/pupae	Very tolerant	1
Blackfly larvae	Tolerant	5
Biting midge larvae	Very tolerant	4
Non-biting midge larvae	Very tolerant	3
<i>PHYLUM ARTHROPODA - CLASS CRUSTACEA</i>		
Freshwater prawn/shrimp	Tolerant	3
Water flea	Not rated	Not rated
Copepod	Not rated	Not rated
<i>PHYLUM ARTHROPODA - CLASS ARACHNIDA</i>		
Water spider	Very tolerant	2
<i>PHYLUM MOLLUSCA</i>		
Freshwater snail	Very tolerant	1
<i>PHYLUM ANNELIDA</i>		
Segmented worm	Very tolerant	2
<b>BIODIVERSITY</b>		
	Total number of types	<b>15</b>
	Rating	<b>Good</b>
<b>ECOLOGICAL HEALTH</b>		
	Dominant tolerance group	<b>Very tolerant</b>
	SIGNAL total	<b>40</b>
	Rating	<b>Fair*</b>

\* Guide only – further monitoring is recommended.

## Peel Main Drain, Bertram

Year 5 and 6 students from Calista Primary School braved a rainy day to sample macros at the Peel Main Drain – Mr Ballard has been bringing students to the site since the 1970s! The main macros found were gilgies, shrimp and isopods. Some very impressive water scorpions were also found. These are the same kind of critters that were found in the past, although no caddisfly larvae were seen this year.

The major tolerance group of macros was *very tolerant*. This could be because of the weather conditions but the Peel Main Drain is also known to have a high pollution risk. The school's ongoing monitoring of this site is extremely valuable for keeping an eye on this waterway in our region.

## Results: Peel Main Drain, Bertram Road

TYPE FOUND	Tolerance	SIGNAL Grade
<i>PHYLUM ARTHROPODA – CLASS INSECTA</i>		
Dragonfly larvae	Very tolerant	3
Damselfly larvae	Very tolerant	3
Water scorpion	Very tolerant	3
Predacious diving beetle adult/larvae	Very tolerant	2
Whirligig beetle adult/larvae	Tolerant	4
Biting midge larvae	Very tolerant	4
<i>PHYLUM ARTHROPODA - CLASS CRUSTACEA</i>		
Freshwater gilgie	Tolerant	4
Freshwater prawn/shrimp	Tolerant	3
Isopod	Very tolerant	2
<i>PHYLUM ARTHROPODA - CLASS ARACHNIDA</i>		
Water spider	Very tolerant	2
<i>PHYLUM MOLLUSCA</i>		
Freshwater snail	Very tolerant	1
<i>PHYLUM ANNELIDA</i>		
Segmented worm	Very tolerant	2
Leeches	Very Tolerant	1
<b>BIODIVERSITY</b>		
	Total number of types	<b>13</b>
	Rating	<b>Good</b>
<b>ECOLOGICAL HEALTH</b>		
	Dominant tolerance group	<b>Very tolerant</b>
	SIGNAL total	<b>34</b>
	Rating	<b>Poor*</b>

\* Guide only – further monitoring is recommended.

## Serpentine River, Jarrahdale

Students and teachers from Jarrahdale Primary School sampled twice in September and mostly found the same types of critters each time. Many tolerant species were found but there were also several very sensitive species present – stonefly larvae and mayfly and caddisfly nymphs. This is good to see as they were not there at the same time in the last two years. Over ten species were found in the spring sampling, whereas in winter only five species at most were present.

The ongoing testing done by this school gives us a really important picture of water quality in the upper parts of the Serpentine River in our catchment. It also allows us to compare the water quality there with the Serpentine River in lower areas near Mandurah where the river can be less healthy.

## Results: Serpentine River, Jarrahdale

TYPE FOUND	Tolerance	SIGNAL Grade
<i>PHYLUM ARTHROPODA – CLASS INSECTA</i>		
Stonefly larvae	Very sensitive	10
Mayfly nymph	Very sensitive	9
Caddisfly larvae	Very sensitive	8
Dragonfly larvae	Very tolerant	3
Damselfly larvae	Very tolerant	3
Water boatmen	Very tolerant	2
Mosquito larvae/pupae	Very tolerant	1
Blackfly larvae	Tolerant	5
Biting midge larvae	Very tolerant	4
Non-biting midge larvae	Very tolerant	3
<i>PHYLUM ARTHROPODA - CLASS CRUSTACEA</i>		
Amphipod	Very tolerant	2
<b>BIODIVERSITY</b>		
	Total number of types	<b>11</b>
	Rating	<b>Good</b>
<b>ECOLOGICAL HEALTH</b>		
	Dominant tolerance group	<b>Very tolerant</b>
	SIGNAL total	<b>50</b>
	Rating	<b>Fair- Good*</b>

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\* Guide only – further monitoring is recommended.

## CONCLUSION

Many different types of macroinvertebrates were found at all the local waterways monitored for the 2008 Macroinvertebrate Snapshot. This is a good sign for biodiversity (the variety of macros). It was also good to see some very pollution-sensitive species found (e.g. stonefly larvae and mayfly nymph species) at Folly Pool, Baldivis and the Serpentine River, Jarrahdale. In all other sites sampled, though, most macros found were the type that is very tolerant to pollution. It could be normal not to find many sensitive species at these waterbodies because of natural factors such as temperature, rainfall and lifecycle stage. Yet, all of these sites had a risk of pollution and some had algal blooms that could play a part in poor water quality.

This year's Macroinvertebrate Snapshot again shows us how important it is for us to keep an eye on the water quality of waterbodies in our region. It also reminds us how valuable the monitoring is that's done by local schools and community groups. Knowing about the water quality of a waterbody means we can take action if it's needed. This is important for the water critters that live in our waterways but is ALSO important for another kind of living creature dependent on our waterways – US!