

MERTON AND BRANKEET CREEKS

AQUATIC INVERTEBRATE SURVEY RESULTS 2017



**FRONT COVER : MERTON CREEK UPSTREAM OF EUROA-MANSFIELD ROAD, MERTON
(GB_MER004) - LOOKING UPSTREAM – SPRING 2016 (PHOTO: DANIELLE J BEISCHER)**

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Introduction

Sites and habitat within Merton Creek and Brankeet Creek Catchments were assessed against the SEPP WoV biological objectives (State Environmental Protection Policy – Waters of Victoria), outlined in Table 1 below. The biological region from the SEPP (WoV) is as follows:

- **Cleared Hills and Coastal Plains (B4)** – lowland region with low rainfall, gradients and altitude. Substantial clearing for intensive agriculture has resulted in poor riparian vegetation. Warm water streams with high alkalinity and low to moderate turbidity and salinity. Stream substrate is predominately moderate to fine grained particles.

Sampling, identification and data collation

Sampling was conducted in accordance with the Victorian Rapid Bio-assessment (VRBA) sampling protocol (Victorian EPA). This involved collecting water quality data and sampling aquatic invertebrates from available stream habitats. Samples were collected from ‘riffle’ habitat i.e. slow to fast areas where the water breaks over the substrate and ‘edge’ habitat i.e. slow to no flow areas which can include pool, undercut banks and backwaters. Riffle samples (also known as kick samples) were collected using a fine mesh net held downstream and kicking the substrate for a total of ten metres at each site. Edge samples (also known as sweep samples) were taken by sweeping a fine mesh net through the water as well as in amongst the vegetation in the edge and pool sections of the stream for approximately ten metres. Both habitats were sampled where present. Each sample was sorted in a white tray and aquatic invertebrates were picked from the sample for 30 minutes and placed in 70% ethanol for preservation and later identification in the laboratory.

Aquatic invertebrates were identified to Family level with the exception of Acarina (mites), identified to Order level, Oligochaeta (worms), identified to Class level, and Chironomidae (midges) identified to Sub Family.

The Waterwatch sites for 2016 and 2017 were:

- | | |
|---|-----------------------------|
| 1. Brankeet Creek at Lonergans Road, Ancona | – Waterwatch code GB_BKT006 |
| 2. Brankeet Creek at Mitchells Road, Ancona | – Waterwatch code GB_BKT010 |
| 3. Brankeet Creek at Cochrane Lane, Ancona | – Waterwatch code GB_BKT015 |
| 4. Merton Creek at Euroa-Mansfield Road, Merton | – Waterwatch code GB_MER004 |
| 5. Merton Creek at Strathbogie Road, Merton | – Waterwatch code GB_MER008 |

The objectives for biological indicators of environmental quality given below for the biological regions and habitats covered by this report are from the SEPP WoV (Victorian Environment Protection Authority 2003).

To meet objectives, sites assessed must return values equal to or greater than the values given in Table 1. In Region B4 where only three objectives are available, all three biological objectives should be met for SEPP compliance. EPT index score is not applicable for this region.

Table 1 Objectives for biological indicators of environmental quality as listed in the SEPP WoV (Victorian Environmental Protection Authority 2003)

Indicators Region & Habitat	No of Families	SIGNAL index score	EPT index score	Key families combined habitat
B4 riffle	23	5.5	N/A	22
B4 edge	26	5.5	N/A	22

N/A Not applicable this region

Results

Table 2. Biotic indices results for two sites in the Goulburn Broken Waterwatch Program assessed against SEPP WoV objectives for biological indicators of environmental quality.

Site code/ year	Site location	Biological Region	Habitat	Number of families score	SIGNAL index score	EPT	Key families Combined Habitat score	Site Pass Fail
GB_BKT006 2016/17	Brankeet Creek at Lonergans Road, Ancona	B4	Riffle	24	5.3	N/O	30	Fail
GB_BKT006 2016/17	Brankeet Creek at Lonergans Road, Ancona	B4	Edge	28	5.6	N/O	30	Pass
GB_BKT010 2016/17	Brankeet Creek at Mitchells Road, Ancona	B4	Riffle	22	5.5	N/O	31	Fail
GB_BKT010 2016/17	Brankeet Creek at Mitchells Road, Ancona	B4	Edge	32	5.7	N/O	31	Pass
GB_BKT015 2016/17	Brankeet Creek at Cochrane Lane, Ancona	B4	Riffle	24	5.3	N/O	31	Fail
GB_BKT015 2016/17	Brankeet Creek at Cochrane Lane, Ancona	B4	Edge	32	5.6	N/O	31	Pass
GB_MER004 2016/17	Merton Creek at Euroa- Mansfield Road, Merton	B4	Riffle	28	5.7	N/O	31	Pass
GB_MER004 2016/17	Merton Creek at Euroa- Mansfield Road, Merton	B4	Edge	36	5.3	N/O	31	Fail
GB_MER008 2016/17	Merton Creek at Strathbogie Road, Merton	B4	Riffle	32	5.5	N/O	32	Pass
GB_MER008 2016/17	Merton Creek at Strathbogie Road, Merton	B4	Edge	31	5.2	N/O	32	Fail

Marginal

Fail

N/O No objective set for this indicator in this SEPP (WoV) region

Discussion of Brankeet Creek sites

Brankeet Creek at Lonergans Road (GB_BKT006) was surveyed in November 2016, and again in April 2017. This site is currently meeting the SEPP guidelines in all three biological indices for the edge sample, therefore the edge sample passes, but the riffle sample fails to meet the SIGNAL index score, meaning the riffle sample fails.

The Riffle habitat in 2016/17 had 24 Families (objective 23), a SIGNAL score of 5.3 (objective 5.5), and a Key Family total of 30 (objective 22).

The Edge habitat in 2016/17 had 28 Families (objective 26), a SIGNAL score of 5.6 (objective 5.5), and a Key Family total of 30 (objective 22).

This site is grazed with no fencing and there are pools and runs with stands of willows. The area around the riffle/run was quite slippery with a deep drop off, and was not easy to sample.

Brankeet Creek at Mitchells Road (GB_BKT010) was surveyed in November 2016, and again in April 2017. This site is just failing to meet the SEPP guidelines for number of families for the riffle sample, resulting in a fail. The edge sample meets all objectives, therefore passes.

In 2016/17 the Riffle habitat had 22 Families (objective 23), a SIGNAL score of 5.5 (objective 5.5), and a Key Family total of 31 (objective 22).

In 2016/17 the Edge habitat had 32 Families (objective 26), a SIGNAL score of 5.7 (objective 5.5), and a Key Family total of 31 (objective 22).

In November there was access to the creek for stock on the western side, however on return in April 2017, the creek had been fenced off excluding stock from this site. This site has a mix of native and exotic tree species with no understorey. Site has pools and runs with good riffle area, although it is immediately downstream of the road crossing.

Brankeet Creek at Cochrane Lane (GB_BKT015) was surveyed in November 2016, and April 2017. The edge sample meets all objectives, therefore passes, but the riffle sample is failing to meet the SEPP guidelines for SIGNAL index score, resulting in a fail.

In 2016/17 the Riffle habitat had 24 Families (objective 23), a SIGNAL score of 5.3 (objective 5.5), and a Key Family total of 31 (objective 22).

In 2016/17 the Edge habitat had 32 Families (objective 26), a SIGNAL score of 5.6 (objective 5.5), and a Key Family total of 31 (objective 22).

Brankeet Creek at Cochrane Lane is fenced with limited grazing. There are pools and runs and instream willows and this site is accessible to the public.

Brankeet Creek at Lonergans Road (GB_BKT006) and Cochrane Lane (BKT015) both fail to meet the SIGNAL index score guideline for the riffle samples. When looking at their corresponding tables in the appendices it can be seen that there are few of the sensitive high scoring families present at these sites. This in turn affects the SIGNAL index score.

Discussion of Merton Creek sites

Merton Creek at Euroa-Mansfield Road (GB_MER004) was surveyed in November 2016, as well as in April 2017. This site is currently meeting the SEPP guidelines in all three biological indices for the riffle sample, but is not meeting the Signal Index Score objective for the edge sample resulting in a fail.

The Riffle habitat in 2016/17 had 28 Families (objective 23), a SIGNAL score of 5.7 (objective 5.5), and a Key Family total of 31 (objective 22).

The Edge habitat in 2016/17 had 36 Families (objective 26), a SIGNAL score of 5.3 (objective 5.5), and a Key Family total of 31 (objective 22).

Merton Creek at Strathbogie Road (GB_MER008) was surveyed in November 2016, and again in April 2017. Currently this site is failing to meet the SEPP guideline for SIGNAL Index Score for the edge sample.

In 2016/17 the Riffle habitat had 32 Families (objective 23), a SIGNAL score of 5.5 (objective 5.5), and a Key Family total of 32 (objective 22).

In 2016/17 the Edge habitat had 31 Families (objective 26), a SIGNAL score of 5.2 (objective 5.5), and a Key Family total of 32 (objective 22).

Merton Creek at Euroa-Mansfield Road (GB_MER004) has been completely fenced from stock. Tree planting is evident and Southern Pygmy perch have been identified at this site. Merton Creek at Strathbogie Road (GB_MER008) was sampled upstream of the road and weir structure. There is native overstorey at this site, but also stock access and eroded banks.

Merton Creek appears to have a large diversity of families, indicated by the scores for the number of families and the key families combined, with both sites exceeding the SEPP guidelines for both the riffle and edge samples. Despite the high number of individual families, both edge samples fail to meet the SEPP guideline for SIGNAL index score. It is possible to have a large number of families, but many of the individual families may have low SIGNAL scores resulting in low overall SIGNAL Index scores. This appears to be the case when looking at results in appendices for these two edge samples (Tables A1.7 and A1.9) compared with Brankeet Creek at Mitchells Road (Table A1.3) for example.

Conclusion

Key families combined habitat scores exceed the SEPP guideline by eight or more families for each of the five sites surveyed. This is a pleasing result.

All but one site meet the guideline for the Number of Families. Brankeet Creek at Mitchell Road was sampled downstream from the ford road crossing, with the riffle immediately downstream from the road. When the spring sample was collected, stock also had access to this site, and it is unknown if either of these factors played a part in this low result. The site was fenced before the autumn sample was collected.

Families that are sensitive to their environment are not as prevalent at all the sites that are not meeting the SEPP guideline for SIGNAL Index Score as they are at those sites that are meeting this guideline. These sensitive families have higher individual scores, and their absence can therefore result in a lower SIGNAL Index score for a site.

Sites surveyed on Brankeet Creek at Lonergans Road and Mitchells Road, and Merton Creek at Strathbogie Road may have been impacted by stock access. It would be interesting to see if there is any improvement in future surveys at the Mitchells Road site post the fencing being installed on the western boundary.

Site Photos



Brankeet Creek looking upstream at Lonergans Road, Ancona (GB_BKT006) - November 2016
(D.J.Beischer)



Brankeet Creek looking upstream at Lonergans Road, Ancona (GB_BKT006) - April 2017 (D.J.Beischer)



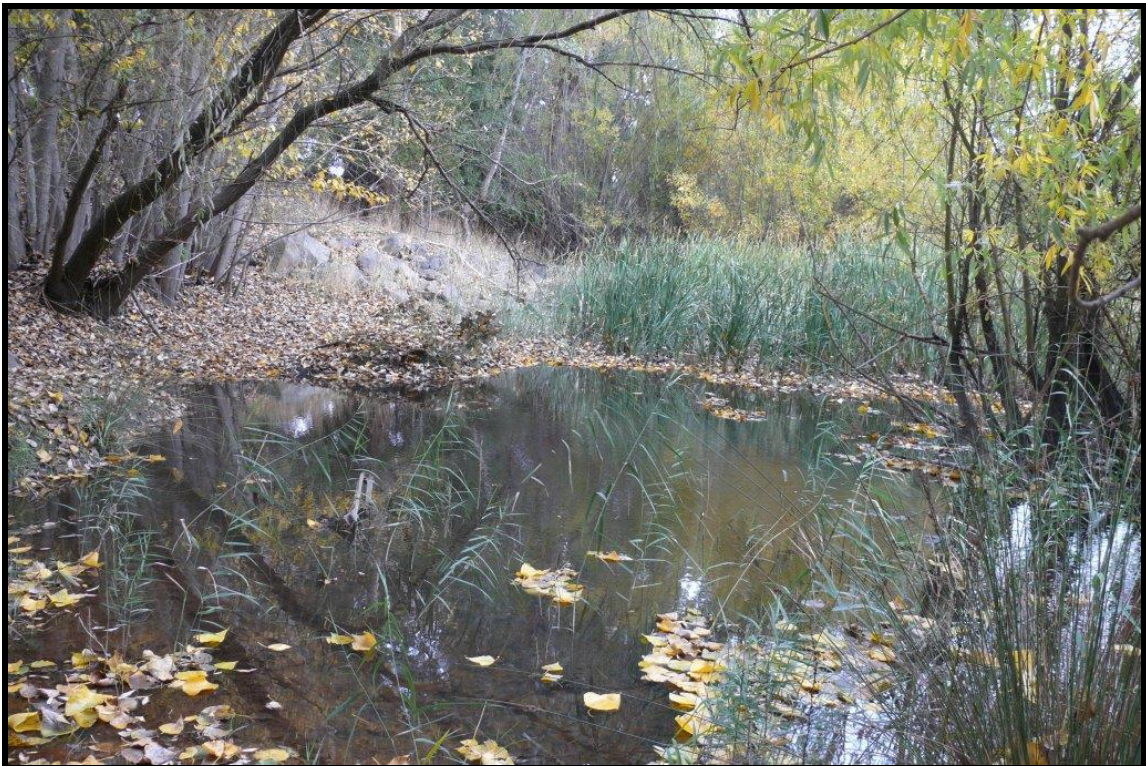
Brankeet Creek looking upstream at Mitchells Road, Ancona (GB_BKT010) - November 2016
(D.J.Beischer)



Brankeet Creek looking upstream at Mitchells Road, Ancona (GB_BKT010) - April 2017 (D.J.Beischer)



Brankeet Creek looking downstream at Cochrane Lane, Ancona (GB_BKT015) - November 2016
(D.J.Beischer)



Brankeet Creek looking downstream at Cochrane Lane, Ancona (GB_BKT015) - April 2017 (D.J.Beischer)



Merton Creek looking downstream at Euroa-Mansfield Road, Merton (GB_MER004) - November 2016
(D.J.Beischer)



Merton Creek looking downstream at Euroa-Mansfield Road, Merton (GB_MER004) - April 2017
(D.J.Beischer)



Merton Creek looking upstream at Strathbogie Road, Merton (GB_MER008) - November 2016
(D.J.Beischer)



Merton Creek looking upstream at Strathbogie Road, Merton (MER008) - April 2017 (D.J.Beischer)

This report may be cited as:

Hogan, K. & Beischer, D. (2017). Brankeet and Merton Creeks - Aquatic Invertebrate Survey Results 2017. Goulburn Broken Waterwatch report prepared for the Goulburn Broken Catchment Management Authority, Shepparton.

References

EPA (2003) Goulburn Broken Catchment Management Authority SEPP (WoV) Segments and environmental quality objectives. Environment Protection Authority, Macleod.

Glossary

EPA	Environment Protection Authority
EPT	Ephemeroptera, Plecoptera and Trichoptera
GBCMA	Goulburn Broken Catchment Management Authority
SEPP	State Environment Protection Policy
SIGNAL	Stream Invertebrate Grade Number - Average Level

APPENDIX

TABLE A1.1 Families present in combined Spring 2016 and Autumn 2017 surveys for GB_BKT006–Brankeet Creek at Lonergans Road Ancona - Edge

Biological region B4 – Cleared Hills and Coastal Plains

Shaded boxes represent Key Families for Key Families Combined Habitat score.

Order	Family	SIGNAL Grade No	Common name
Ephemeroptera	Leptophlebiidae	10	Mayfly nymph
Ephemeroptera	Oniscigastridae	10	Mayfly nymph
Diptera	Dixidae	8	U Bent midge
Trichoptera	Limnephilidae	8	Caddis fly larva
Odonata S.O. Zygoptera	Coenagrionidae	7	Damselfly nymph
Odonata S.O. Zygoptera	Megapodagrionidae	7	Damselfly nymph
Trichoptera	Leptoceridae	7	Stick caddis larva
Ephemeroptera	Caenidae	7	Mayfly nymph
Plecoptera	Gripopterygidae	7	Stonefly nymph
Trichoptera	Hydrobiosidae	7	Hunter Caddis fly larva
Trichoptera	Hydroptilidae	6	Caddis fly larva
Diptera	S.F. Tanypodinae	6	Non biting midge larva
Diptera	S.F. Chironominae	6	Non biting midge larva
Diptera	S.F. Orthoclaadiinae	5	Non biting midge larva
Ephemeroptera	Baetidae	5	Mayfly nymph
Coleoptera	Hydrophilidae	5	Scavenger beetle adult
Diptera	Tipulidae	5	Crane fly larva
Hemiptera	Corixidae	5	Water boatman
Coleoptera	Dytiscidae	5	Diving beetle
Diptera	Simuliidae	5	Black fly larva
Hemiptera	Notonectidae	4	Backswimmer
Trichoptera	Ecnomidae	4	Caddis fly larva - Bandit
Hemiptera	Veliidae	4	Small water strider
P.Mollusca C. Gastropoda	Physidae	3	Freshwater snail
C. Turbellaria S.O. Tricladida	Dugesidae	3	Flatworm
Diptera	Culicidae	2	Mosquito Larva
C. Oligochaeta	-	1	Segmented worm

TABLE A1.1 continued Families present in combined Spring 2016 and Autumn 2017 surveys for GB_BKT006– Brankeet Creek at Lonergans Road Ancona - Edge

Biological region B4 – Cleared Hills and Coastal Plains

Shaded boxes represent Key Families for Key Families Combined Habitat score.

Order	Family	SIGNAL Grade No	Common name
O.Acarina	-	N/A	Freshwater mite
O. Cladocera	-	N/A	Water flea
C. Ostracoda	-	N/A	Seed shrimp
C. Collembola	-	N/A	Springtail
	Pupa		
	No of families = 28 (27 for signal)	152	
Cleared Hills and Coastal Plains - other areas	Signal score by average = score divided by families with score	5.63	

**TABLE A1.2 Families present in combined Spring 2016 and Autumn 2017 surveys for GB_BKT006–
Brankeet Creek at Lonergans Road Ancona - Riffle**

Biological region B4 – Cleared Hills and Coastal Plains

Shaded boxes represent Key Families for Key Families Combined Habitat score.

Order	Family	SIGNAL Grade No	Common name
Ephemeroptera	Leptophlebiidae	10	Mayfly nymph
Odonata S.O. Epiproctophora	Corduliidae	7	Dragonfly nymph
Coleoptera	Elmidae	7	Riffle beetle
Trichoptera	Hydrobiosidae	7	Caddis fly larva - Hunter
Plecoptera	Gripopterygidae	7	Stonefly nymph
Decapoda	Atyidae	6	Freshwater shrimp
P.Mollusca C. Gastropoda	Ancylidae	6	Freshwater limpet
Diptera	Ceratopogonidae	6	Biting midge larva
Diptera	S.F. Diamesinae	6	Non biting midge larva
Trichoptera	Hydroptilidae	6	Caddis fly larva
Diptera	S.F. Chironominae	6	Non biting midge larva
Diptera	S.F. Orthocladiinae	5	Non biting midge larva
Ephemeroptera	Baetidae	5	Mayfly nymph
Coleoptera	Psephenidae	5	Water penny beetle larva
Coleoptera	Gyrinidae	5	Whirligig beetle larva
Hemiptera	Corixidae	5	Water boatman
Diptera	Simuliidae	5	Black fly larva
Trichoptera	Ecnomidae	4	Caddis fly larva - Bandit
P.Mollusca C. Gastropoda	Physidae	3	Freshwater snail
P.Mollusca C. Gastropoda	Lymnaeidae	3	Freshwater snail
C. Turbellaria S.O. Tricladida	Dugesidae	3	Flatworm
P. Annelida C. Hirudinea	Glossiphoniidae	3	Leech

TABLE A1.2 continued Families present in combined Spring 2016 and Autumn 2017 surveys for GB_BKT006– Brankeet Creek at Lonergans Road Ancona - Riffle

Biological region B4 – Cleared Hills and Coastal Plains

Shaded boxes represent Key Families for Key Families Combined Habitat score.

Order	Family	SIGNAL Grade No	Common name
C. Oligochaeta	-	1	Segmented worm
O.Acarina	-	N/A	Freshwater mite
C. Ostracoda	-	N/A	Seed shrimp
	Pupa		
	No of families = 24 (23 for signal)	121	
Cleared Hills and Coastal Plains - other areas	Signal score by average = score divided by families with score	5.26	

**TABLE A1.3 Families present in combined Spring 2016 and Autumn 2017 surveys for GB_BKT010–
Brankeet Creek at Mitchells Road Ancona - Edge**

Biological region B4 – Cleared Hills and Coastal Plains

Shaded boxes represent Key Families for Key Families Combined Habitat score.

Order	Family	SIGNAL Grade No	Common name
Ephemeroptera	Leptophlebiidae	10	Mayfly nymph
Ephemeroptera	Oniscigastridae	10	Mayfly nymph
Trichoptera	Limnephilidae	8	Caddis fly larva
Diptera	Dixidae	8	U Bent midge
Coleoptera	Scirtidae	8	Marsh beetle larva
Decapoda	Parastacidae	7	Yabby
Ephemeroptera	Caenidae	7	Mayfly nymph
Odonata S.O. Epiproctophora	Corduliidae	7	Dragonfly nymph
Odonata S.O. Zygoptera	Coenagrionidae	7	Damselfly nymph
Plecoptera	Gripopterygidae	7	Stonefly nymph
Trichoptera	Hydrobiosidae	7	Caddis fly larva - Hunter
Trichoptera	Leptoceridae	7	Caddis fly larva - Stick
P.Mollusca C. Bivalvia	Sphaeriidae	6	Pea Shell
Decapoda	Atyidae	6	Shrimp
Diptera	Ceratopogonidae	6	Biting midge larva
Trichoptera	Hydroptilidae	6	Caddis fly larva - Micro
Diptera	S.F. Chironominae	6	Non biting midge larva
Diptera	S.F. Tanypodinae	6	Non biting midge larva
Diptera	S.F. Orthocladiinae	5	Non biting midge larva
Ephemeroptera	Baetidae	5	Mayfly nymph
Coleoptera	Dytiscidae	5	Diving beetle
Diptera	Simuliidae	5	Black fly larva
Diptera	Tipulidae	5	Crane fly larva
Hemiptera	Corixidae	5	Water boatmen
Hemiptera	Gerridae	4	Water strider
Hemiptera	Notonectidae	4	Back swimmer
Hemiptera	Veliidae	4	Small water strider
P.Mollusca C. Gastropoda	Physidae	3	Freshwater snail
P.Mollusca C. Gastropoda	Planorbidae	3	Freshwater snail

TABLE A1.3 continued Families present in combined Spring 2016 and Autumn 2017 surveys for GB_BKT010– Brankeet Creek at Mitchells Road Ancona - Edge

Biological region B4 – Cleared Hills and Coastal Plains

Shaded boxes represent Key Families for Key Families Combined Habitat score.

Order	Family	SIGNAL Grade No	Common name
Diptera	Culicidae	2	Mosquito Larva
Diptera	Stratiomyidae	2	Soldier fly larva
C. Oligochaeta	-	1	Segmented worm
C. Ostracoda	-	N/A	Seed shrimp
O. Cladocera	-	N/A	Water flea
C. Arachnida	Tetragnathidae	N/A	Long Jawed Spider
	No of families = 32 (32 for signal)	182	
Cleared Hills and Coastal Plains - other areas	Signal score by average = score divided by families with score	5.69	

TABLE A1.4 Families present in combined Spring 2016 and Autumn 2017 surveys for GB_BKT010–Brankeet Creek at Mitchells Road Ancona - Riffle

Biological region B4 – Cleared Hills and Coastal Plains

Shaded boxes represent Key Families for Key Families Combined Habitat score.

Order	Family	SIGNAL Grade No	Common name
Ephemeroptera	Leptophlebiidae	10	Mayfly nymph
Diptera	Dixidae	8	U Bent midge
Coleoptera	Elmidae	7	Riffle beetle
Decapoda	Parastacidae	7	Yabby
Plecoptera	Gripopterygidae	7	Stonefly nymph
Trichoptera	Hydrobiosidae	7	Caddis fly larva - Hunter
P.Mollusca C. Gastropoda	Ancylidae	6	Freshwater limpet
Diptera	Ceratopogonidae	6	Biting midge larva
Trichoptera	Hydroptilidae	6	Caddis fly larva - Micro
Diptera	S.F. Chironominae	6	Non biting midge larva
Diptera	S.F. Orthoclaadiinae	5	Non biting midge larva
Ephemeroptera	Baetidae	5	Mayfly nymph
Coleoptera	Psephenidae	5	Water penny beetle larva
Coleoptera	Dytiscidae	5	Diving beetle
Diptera	Simuliidae	5	Black fly larva
Trichoptera	Hydropsychidae	5	Caddis fly larva – Net spinning
Hemiptera	Veliidae	4	Small water strider
Megaloptera	Corydalidae	4	Dobsonfly larva
Trichoptera	Ecnomidae	4	Caddis fly larva - Bandit
Diptera	Stratiomyidae	2	Soldier fly larva
C. Oligochaeta		1	Segmented worm
O.Acarina		N/A	Water mite
Cladocera		N/A	Water flea
C. Ostracoda		N/A	Seed Shrimp
	Pupa		
	No of families = 22 (21 for signal)	115	
Cleared Hills and Coastal Plains - other areas	Signal score by average = score divided by families with score	5.48	

**TABLE A1.5 Families present in combined Spring 2016 and Autumn 2017 surveys for GB_BKT015–
Brankeet Creek at Cochrane Lane Ancona - Edge**

Biological region B4 – Cleared Hills and Coastal Plains

Shaded boxes represent Key Families for Key Families Combined Habitat score.

Order	Family	SIGNAL Grade No	Common name
Ephemeroptera	Leptophlebiidae	10	Mayfly nymph
Ephemeroptera	Oniscigastridae	10	Mayfly nymph
Coleoptera	Scirtidae	8	Marsh beetle larva
Diptera	Dixidae	8	U Bent midge
Coleoptera	Hydraenidae	7	Hydraenid beetle
Decapoda	Parastacidae	7	Yabby
Odonata S.O. Epiproctophora	Corduliidae	7	Dragonfly nymph
Odonata S.O. Zygoptera	Coenagrionidae	7	Damselfly nymph
Plecoptera	Gripopterygidae	7	Stonefly nymph
Trichoptera	Hydrobiosidae	7	Caddis fly larva - Hunter
Trichoptera	Leptoceridae	7	Caddis fly larva - Stick
Diptera	Ceratopogonidae	6	Biting midge larva
Trichoptera	Hydroptilidae	6	Caddis fly larva - Micro
Diptera	S.F. Chironominae	6	Non biting midge larva
Diptera	S.F. Orthocladiinae	5	Non biting midge larva
Ephemeroptera	Baetidae	5	Mayfly nymph
Diptera	Simuliidae	5	Black fly larva
Diptera	Tipulidae	5	Crane fly larva
Hemiptera	Corixidae	5	Water boatmen
Hemiptera	Nepidae	5	Water Scorpion
Coleoptera	Gyrinidae	5	Whirligig beetle adult
Coleoptera	Dytiscidae	5	Diving beetle
Coleoptera	Hydrophilidae	5	Scavenger beetle larva and adult
Trichoptera	Hydropsychidae	5	Caddis fly larva – Net spinning
Hemiptera	Veliidae	4	Small water strider
P.Mollusca C. Gastropoda	Physidae	3	Freshwater snail
P.Mollusca C. Gastropoda	Planorbidae	3	Freshwater snail
P.Mollusca C. Gastropoda	Lymnaeidae	3	Freshwater snail

TABLE A1.5 continued Families present in combined Spring 2016 and Autumn 2017 surveys for GB_BKT015– Brankeet Creek at Cochrane Lane Ancona - Edge

Biological region B4 – Cleared Hills and Coastal Plains

Shaded boxes represent Key Families for Key Families Combined Habitat score.

Order	Family	SIGNAL Grade No	Common name
C. Turbellaria S.O. Tricladida	Dugesidae	3	Flatworm
Diptera	Culicidae	2	Mosquito Larva
Diptera	Stratiomyidae	2	Soldier fly larva
O.Acarina		N/A	Water mite
Cladocera		N/A	Water flea
C. Arachnida	Tetragnathidae	N/A	Long Jawed Spider
C. Ostracoda		N/A	Seed shrimp
	Pupa		
	No of families = 32 (31 for signal)	173	
Cleared Hills and Coastal Plains - other areas	Signal score by average = score divided by families with score	5.58	

**TABLE A1.6 Families present in combined Spring 2016 and Autumn 2017 surveys for GB_BKT015–
Brankeet Creek at Cochrane Lane Ancona - Riffle**

Biological region B4 – Cleared Hills and Coastal Plains

Shaded boxes represent Key Families for Key Families Combined Habitat score.

Order	Family	SIGNAL Grade No	Common name
Ephemeroptera	Leptophlebiidae	10	Mayfly nymph
Coleoptera	Elmidae	7	Riffle beetle
Decapoda	Parastacidae	7	Yabby
Plecoptera	Gripopterygidae	7	Stonefly nymph
Trichoptera	Hydrobiosidae	7	Caddis fly larva - Hunter
Trichoptera	Leptoceridae	7	Caddis fly larva - Stick
P.Mollusca C. Gastropoda	Ancylidae	6	Freshwater limpet
Diptera	Ceratopogonidae	6	Biting midge larva
Trichoptera	Hydroptilidae	6	Caddis fly larva - Micro
Diptera	S.F. Chironominae	6	Non biting midge larva
Diptera	S.F. Orthocladiinae	5	Non biting midge larva
Ephemeroptera	Baetidae	5	Mayfly nymph
Coleoptera	Psephenidae	5	Water penny beetle larva
Diptera	Simuliidae	5	Black fly larva
Hemiptera	Corixidae	5	Water boatmen
Trichoptera	Hydropsychidae	5	Caddis fly larva – Net spinning
Diptera	Empididae	4	Fly larva
Hemiptera	Veliidae	4	Small water strider
Megaloptera	Corydalidae	4	Dobsonfly larva
Trichoptera	Ecnomidae	4	Caddis fly larva - Bandit
P.Mollusca C. Gastropoda	Physidae	3	Freshwater snail
C. Turbellaria S.O. Tricladida	Dugesidae	3	Flatworm
C. Oligochaeta		1	Segmented worm
O.Acarina		N/A	Water mite
C. Arachnida	Tetragnathidae	N/A	Long Jawed Spider
C. Ostracoda		N/A	Seed Shrimp
	Pupa		
	No of families = 24 (23 for signal)	122	
Cleared Hills and Coastal Plains - other areas	Signal score by average = score divided by families with score	5.30	

TABLE A1.7 Families present in combined Spring 2016 and Autumn 2017 surveys for GB_MER004 – Merton Creek at Euroa-Mansfield Road Merton - Edge

Biological region B4 – Cleared Hills and Coastal Plains

Shaded boxes represent Key Families for Key Families Combined Habitat score.

Order	Family	SIGNAL Grade No	Common name
Ephemeroptera	Leptophlebiidae	10	Mayfly nymph
Diptera	Dixidae	8	U Bent midge
Trichoptera	Limnephilidae	8	Caddis fly larva
Coleoptera	Curculionidae	7	Aquatic weevil adult
Odonata S.O. Zygoptera	Lestidae	7	Damselfly nymph
Odonata S.O. Zygoptera	Megapodagrionidae	7	Damselfly nymph
Odonata S.O. Zygoptera	Coenagrionidae	7	Damselfly nymph
Trichoptera	Hydrobiosidae	7	Caddis fly larva - Hunter
Trichoptera	Leptoceridae	7	Caddis fly larva - Stick
Odonata S.O. Epiproctophora	Aeshnidae	6	Dragonfly nymph
P.Mollusca C. Bivalvia	Corbiculidae	6	Little basket shell
Trichoptera	Hydroptilidae	6	Caddis fly larva - Micro
Diptera	Ceratopogonidae	6	Biting midge larva
Diptera	S.F. Tanypodinae	6	Non biting midge larva
Diptera	S.F. Chironominae	6	Non biting midge larva
Diptera	S.F. Orthoclaadiinae	5	Non biting midge larva
Amphipoda	Ceinidae	5	Scud/Side swimmer
Ephemeroptera	Baetidae	5	Mayfly nymph
Coleoptera	Hydrophilidae	5	Scavenger beetle larva and adult
Coleoptera	Gyrinidae	5	Whirligig beetle adult
Coleoptera	Dytiscidae	5	Diving beetle
Diptera	Simuliidae	5	Black fly larva
Hemiptera	Corixidae	5	Water boatman
Hemiptera	Hydrometridae	5	Water measurer
Hemiptera	Nepidae	5	Needle bug
Diptera	Tipulidae	5	Crane fly larva
Hemiptera	Gerridae	4	Water strider
Hemiptera	Notonectidae	4	Back swimmer

TABLE A1.7 continued Families present in combined Spring 2016 and Autumn 2017 surveys for GB_MER004 – Merton Creek at Euroa-Mansfield Road Merton - Edge

Biological region B4 – Cleared Hills and Coastal Plains

Shaded boxes represent Key Families for Key Families Combined Habitat score.

Order	Family	SIGNAL Grade No	Common name
Hemiptera	Veliidae	4	Small water strider
Megaloptera	Sialidae	4	Alderfly larva
P.Mollusca C. Gastropoda	Physidae	3	Freshwater snail
P.Mollusca C. Gastropoda	Planorbidae	3	Freshwater snail
P. Annelida C. Hirudinea	Glossiphoniidae	3	Leech
Diptera	Culicidae	2	Mosquito Larva
C. Oligochaeta	-	1	Segmented worm
O.Acarina		N/A	Water mite
C. Arachnida	Tetragnathidae	N/A	Long Jawed Spider
O. Cladocera	-	N/A	Water flea
C. Collembola	-	N/A	Springtail
S.C. Copepoda	-	N/A	Copepod
C. Ostracoda		N/A	Seed Shrimp
	Pupa		
	No of families = 36 (35 for signal)	187	
Cleared Hills and Coastal Plains - other areas	Signal score by average = score divided by families with score	5.34	

TABLE A1.8 Families present in combined Spring 2016 and Autumn 2017 surveys for GB_MER004 – Merton Creek at Euroa-Mansfield Road Merton - Riffle

Biological region B4 – Cleared Hills and Coastal Plains

Shaded boxes represent Key Families for Key Families Combined Habitat score.

Order	Family	SIGNAL Grade No	Common name
Ephemeroptera	Leptophlebiidae	10	Mayfly nymph
Plecoptera	Notonemouridae	8	Stonefly nymph
Diptera	Dixidae	8	U bent midge
Trichoptera	Limnephilidae	8	Caddis fly larva
Coleoptera	Elmidae	7	Riffle beetle
Decapoda	Parastacidae	7	Yabby
Ephemeroptera	Caenidae	7	Mayfly nymph
P. Odonata C. Zygoptera	Coenagrionidae	7	Damselfly nymph
Plecoptera	Gripopterygidae	7	Stonefly nymph
Trichoptera	Hydrobiosidae	7	Caddis fly larva - Hunter
Trichoptera	Leptoceridae	7	Caddis fly larva - Stick
Diptera	Ceratopogonidae	6	Biting midge larva
Trichoptera	Hydroptilidae	6	Caddis fly larva - Micro
Diptera	S.F. Chironominae	6	Non biting midge larva
Diptera	S.F. Orthoclaadiinae	5	Non biting midge larva
Amphipoda	Ceinidae	5	Scud
Ephemeroptera	Baetidae	5	Mayfly nymph
Coleoptera	Hydrophilidae	5	Scavenger beetle larva and adult
Coleoptera	Dytiscidae	5	Diving beetle
Coleoptera	Gyrinidae	5	Whirligig beetle adult
Diptera	Simuliidae	5	Black fly larva
Hemiptera	Corixidae	5	Water boatman
Hemiptera	Veliidae	4	Small water strider
P.Mollusca C. Gastropoda	Physidae	3	Freshwater snail
P.Mollusca C. Gastropoda	Planorbidae	3	Freshwater snail
C. Turbellaria S.O. Tricladida	Dugesidae	3	Flatworm
C. Oligochaeta		1	Segmented worm
Acarina		N/A	Water mite

TABLE A1.8 continued Families present in combined Spring 2016 and Autumn 2017 surveys for GB_MER004 – Merton Creek at Euroa-Mansfield Road Merton - Riffle

Biological region B4 – Cleared Hills and Coastal Plains

Shaded boxes represent Key Families for Key Families Combined Habitat score.

Order	Family	SIGNAL Grade No	Common name
C. Arachnida	Tetragnathidae	N/A	Long Jawed Spider
C. Collembola	-	N/A	Springtail
C. Ostracoda		N/A	Seed Shrimp
O. Cladocera	-	N/A	Water flea
SC. Copepoda	-	N/A	Copepod
	Pupa		
	No of families = 28 (27 for signal)	155	
Cleared Hills and Coastal Plains - other areas	Signal score by average = score divided by families with score	5.74	

TABLE A1.9 Families present in combined Spring 2016 and Autumn 2017 surveys for GB_MER008 – Merton Creek at Strathbogie Road Merton - Edge

Biological region B4 – Cleared Hills and Coastal Plains

Shaded boxes represent Key Families for Key Families Combined Habitat score.

Order	Family	SIGNAL Grade No	Common name
Ephemeroptera	Leptophlebiidae	10	Mayfly nymph
Coleoptera	Scirtidae	8	Marsh beetle larva
Coleoptera	Elmidae	7	Riffle beetle
Ephemeroptera	Caenidae	7	Mayfly nymph
Odonata S.O. Zygoptera	Megapodagrionidae	7	Damselfly nymph
Odonata S.O. Zygoptera	Coenagrionidae	7	Damselfly nymph
Plecoptera	Gripopterygidae	7	Stonefly nymph
Trichoptera	Leptoceridae	7	Caddis fly larva - Stick
Trichoptera	Hydroptilidae	6	Caddis fly larva - Micro
Diptera	S.F. Tanypodinae	6	Non biting midge larva
Diptera	S.F. Chironominae	6	Non biting midge larva
Diptera	S.F. Orthoclaadiinae	5	Non biting midge larva
Amphipoda	Ceinidae	5	Scud/Side swimmer
Ephemeroptera	Baetidae	5	Mayfly nymph
Coleoptera	Hydrophilidae	5	Scavenger beetle larva and adult
Coleoptera	Dytiscidae	5	Diving beetle
Diptera	Simuliidae	5	Black fly larva
Hemiptera	Corixidae	5	Water boatman
Hemiptera	Pleidae	5	Pygmy backswimmer
Diptera	Tabanidae	5	March fly larva
Diptera	Tipulidae	5	Crane fly larva
Hemiptera	Mesoveliidae	4	Water treader
Hemiptera	Notonectidae	4	Back swimmer
Hemiptera	Veliidae	4	Small water strider
Trichoptera	Ecnomidae	4	Caddis fly larva - Bandit
P.Mollusca C. Gastropoda	Physidae	3	Freshwater snail
P.Mollusca C. Gastropoda	Planorbidae	3	Freshwater snail
P.Mollusca C. Gastropoda	Lymnaeidae	3	Freshwater snail
Diptera	Culicidae	2	Mosquito Larva

TABLE A1.9 continued Families present in combined Spring 2016 and Autumn 2017 surveys for GB_MER008 – Merton Creek at Strathbogie Road Merton - Edge

Biological region B4 – Cleared Hills and Coastal Plains

Shaded boxes represent Key Families for Key Families Combined Habitat score.

Order	Family	SIGNAL Grade No	Common name
C. Oligochaeta		1	Segmented worm
O. Acarina		N/A	Water mite
C. Arachnida	Tetragnathidae	N/A	Long Jawed Spider
Diptera	Sciomyzidae	N/A	Marsh fly larva
O. Cladocera		N/A	Water flea
C. Collembola		N/A	Springtail
S.C. Copepoda		N/A	Copepod
C. Ostracoda		N/A	Seed Shrimp
	Pupa		
	No of families = 31 (30 for signal)	156	
Cleared Hills and Coastal Plains - other areas	Signal score by average = score divided by families with score	5.20	

TABLE A2.0 Families present in combined Spring 2016 and Autumn 2017 surveys for GB_MER008 – Merton Creek at Strathbogie Road Merton - Riffle

Biological region B4 – Cleared Hills and Coastal Plains

Shaded boxes represent Key Families for Key Families Combined Habitat score.

Order	Family	SIGNAL Grade No	Common name
Ephemeroptera	Leptophlebiidae	10	Mayfly nymph
Coleoptera	Scirtidae	8	Marsh beetle larva
Diptera	Dixidae	8	U Bent midge
Coleoptera	Elmidae	7	Riffle beetle
Decapoda	Parastacidae	7	Yabby
Ephemeroptera	Caenidae	7	Mayfly nymph
P. Odonata C. Zygoptera	Coenagrionidae	7	Damselfly nymph
P. Odonata C. Epiproctophora	Corduliidae	7	Dragonfly nymph
P. Odonata C. Epiproctophora	Gomphidae	7	Dragonfly nymph
Plecoptera	Gripopterygidae	7	Stonefly nymph
Trichoptera	Hydrobiosidae	7	Caddis fly larva - Hunter
Trichoptera	Leptoceridae	7	Caddis fly larva - Stick
Trichoptera	Hydroptilidae	6	Caddis fly larva
Diptera	Ceratopogonidae	6	Biting midge larva
Diptera	S.F. Chironominae	6	Non biting midge larva
Diptera	S.F. Orthocladinae	5	Non biting midge larva
Amphipoda	Ceinidae	5	Scud/Side swimmer
Ephemeroptera	Baetidae	5	Mayfly nymph
Coleoptera	Dytiscidae	5	Diving beetle
Coleoptera	Gyrinidae	5	Whirligig beetle adult and larva
Diptera	Simuliidae	5	Black fly larva
Diptera	Tipulidae	5	Crane fly larva
Hemiptera	Corixidae	5	Water boatman
Hemiptera	Veliidae	4	Small water strider
Trichoptera	Ecnomidae	4	Caddis fly larva - Bandit
P.Mollusca C. Gastropoda	Physidae	3	Freshwater snail
P.Mollusca C. Gastropoda	Planorbidae	3	Freshwater snail

TABLE A2.0 continued Families present in combined Spring 2016 and Autumn 2017 surveys for GB_MER008 – Merton Creek at Strathbogie Road Merton - Riffle

Biological region B4 – Cleared Hills and Coastal Plains

Shaded boxes represent Key Families for Key Families Combined Habitat score.

Order	Family	SIGNAL Grade No	Common name
P.Mollusca C. Gastropoda	Lymnaeidae	3	Freshwater snail
C. Turbellaria S.O. Tricladida	Dugesiidae	3	Flatworm
P. Annelida C. Hirudinea	Glossiphoniidae	3	Leech
C. Oligochaeta		1	Segmented worm
Acarina		N/A	Water mite
C. Collembola		N/A	Springtail
C. Ostracoda		N/A	Seed Shrimp
S.C. Copepoda		N/A	Copepod
	No of families = 32 (31 for signal)	171	
Cleared Hills and Coastal Plains - other areas	Signal score by average = score divided by families with score	5.52	

TABLE B2.1 - Rapid Bioassessment Methodology for Rivers and Streams GB_BKT006

RIVER: Brankeet Creek CATCHMENT: Goulburn River
 LOCATION: Brankeet Creek at Lonergans Road, Ancona, upstream of bridge
 DATE: 24-11-16 TIME: 10:45 am
 LOCATION CODE: GB_BKT006 PHOTOGRAPHS: Yes
 RECORDER(S) NAME(S): Kirsten Hogan and Danielle Beischer

AUSTRALIAN MAP GRID REFERENCE
 EASTING: 391862 NORTHING: 5907947

IS LOCATION DOCUMENTATION COMPLETE? Yes

LENGTH OF SURVEYED REACH: 80 m
 This is defined as 10x the average stream width, to a maximum of 150m. Minimum reach length is 50m.

Stream Habitat in surveyed reach(%) Riffle/Run 80 % Pool 20 %

Stream Width from edges of water.

Take 5 evenly spaced measurements within surveyed reach; also record maximum and minimum.

1. 11 m 2. 11 m 3. 4 m 4. 7 m 5. 6 m Max.: 11 m Min.: 4 m

Method used: tape measure [] range finder [x] estimate []

Channel width from tops of banks 1. 40 m 2. 40 m 3. 40 m 4. 38 m 5. 40 m

Method used: tape measure [] range finder [x] estimate []

WATER QUALITY MEASUREMENTS:

Instrument(s) make, model and number ...Eutech PCD 650 and Hach 2100 Q Turbidity Meter

Water temperature (°C): 14.0 **pH:** 6.3

Conductivity (ambient): N/A...µS/cm N/A mS/cm **Alkalinity (mg/L):** N/A
 Measured in lab [] or field []

Conductivity (@25°C): 83 µS/cm N/A mS/cm

Dissolved Oxygen (mg/L) 10.1 **Turbidity (NTU)** 18
 (agitate probe if flow <5cm/sec) Measured in lab [] or field [x]

% Sat. Dissolved Oxygen: 92
 (agitate probe if flow <5cm/sec)

Water samples collected for: Nutrient Analysis Yes [x] No []
 Turbidity Yes [] No [x]
 Alkalinity Yes [] No [x]

REACH: All information in this section refers to the entire reach.

SUBSTRATE DESCRIPTION (% cover): USE PARTICLE SIZE DIAGRAM.

Bedrock	[	0	]
Boulder (>256 mm)	[	10	]
Cobble (64 - 256 mm)	[	20	]
Pebble (16 - 64 mm).....	[	20	]
Gravel (2 - 16 mm).....	[	20	]
Sand (0.06 – 2 mm).....	[	20	]
Clay/Silt (<0.06 mm).....	[	10	]
Total		100%	

OTHER STREAM FEATURES

Percent of reach covered by	<1%	1-10%	10-35%	35-65%	65-90%	>90%
Willow Roots	oa	ob	1	2	3	4
Moss	oa	ob	1	2	3	4
Filamentous algae	oa	ob	1	2	3	4
Loose silt lying on substrate (organic & inorganic)	oa	ob	1	2	3	4
Total macrophytes	oa	ob	1	2	3	4

(For macrophytes, include those which are out of the water but in the active channel.)

ORGANIC MATERIAL (% cover of organic material)

Coarse Particulate Organic Material (leaves and wood < 10 cm in diameter)	1. <5%	2. 5-20%	3. >20%	[1]
Snags/Large Organic Material (wood >10 cm diameter)	1. <5%	2. 5-20%	3. >20%	[1]

CURRENT VELOCITY IN REACH: Choose one percentage category for each flow category in the reach:

	<u>0%</u>	<u>1-10%</u>	<u>11-40%</u>	<u>41-60%</u>	<u>>60%</u>
No obvious flow	0	1	2	3	4
Slow	0	1	2	3	4
Medium/moderate	0	1	2	3	4
Fast to very fast	0	1	2	3	4

VEGCAT (Landuse category for AUSRIVAS.) Land use beyond the riparian zone (30m). [3]

1. Urban
2. Intensive agriculture
3. Mostly cleared, grazing
4. Significant patches of forest remaining, some forestry/agriculture (eg. Grazing)
5. Native forest/natural vegetation

SHADING of stream channel, as at mid day (shading category for AUSRIVAS). Use % shading diagrams.

1. <5%
 2. 6 – 25%
 3. 26 – 50%
 4. 51 – 75%
 5. >76%
- [3]

RIFFLE/RUN: All information in this section refers only to the riffle/run area sampled. **N/A this site**

Invertebrates collected by: Kirsten Hogan Invertebrates picked/sorted by: Kirsten Hogan

Length of riffle/run sampled: 10 metres [] Other.....8...metres. Time taken to pick sample...40.....mins.

Approx.# of invertebrates picked: 200 [] 150 [] 100 [] 50 [] if < 150, why?

SUBSTRATE DESCRIPTION (% cover): USE PARTICLE DIAGRAM.

Bedrock.....[	0	]	
Boulder(>256 mm)	5	]	If riffle/run not sampled, why not?
Cobble (64 - 256 mm)	10	]	1. Not present []
Pebble (16 - 64 mm).....	20	]	2. Too shallow []
Gravel (2 - 16 mm).....	20	]	3. Too small []
Sand (0.06 – 2 mm).....	40	]	4. Too dangerous []
Clay/Silt (<0.06 mm).....	5	]	5. Other.....[]
Total.....	100%		

Percent of sampled area covered by	<1%	1-10%	10-35%	35-65%	65-90%	>90%
Willow Roots	oa	ob	1	2	3	4
Moss	oa	ob	1	2	3	4
Filamentous algae	oa	ob	1	2	3	4
Macrophytes	oa	ob	1	2	3	4
Loose silt lying on substrate (organic & inorganic)	oa	ob	1	2	3	4
Coarse Particulate Organic Material (leaves and wood < 10 cm in diameter)			1. <5%	2. 5-20%	3. >20%	[1]
Snags/Large Organic Material (wood >10 cm diameter)			1. <5%	2. 5-20%	3. >20%	[1]

DEPTH 1. 5 cm 2. 25 cm 3. 40 cm 4. 30 cm 5. 20 cm

Take 5 representative measurements from the riffle/run habitat over the range of depths in the kick sample.

CURRENT VELOCITY in sampled area: Tick boxes for each current velocity present; more than 1 box can be ticked:

Kick sample : 0. No flow [] 1. Slow [] 2. Medium/moderate [x] 3 Fast to very fast [x]

EDGE/BACKWATER: All information in this section refers only to the edge area sampled.

Invertebrates collected by: Dani Beischer Invertebrates picked/sorted by: Dani Beischer

Length of riffle/run sampled: 10 metres [x] Other.....metres. Time taken to pick sample...40.....mins.

Approx.# of invertebrates picked: 200 [] 150 [] 100 [] 50 [] if < 150, why?.....

Percent of sampled area covered by	<1%	1-10%	10-35%	35-65%	65-90%	>90%
1. Backwaters	oa	ob	1	2	3	4
2. Leaf packs/CPOM	oa	ob	1	2	3	4
3. Undercut banks	oa	ob	1	2	3	4
4. Roots	oa	ob	1	2	3	4
5. Bare edge	oa	ob	1	2	3	4
6. Logs	oa	ob	1	2	3	4
7. Trailing bank vegetation (including grasses)	oa	ob	1	2	3	4
8. Filamentous algae	oa	ob	1	2	3	4
9. Macrophyte	oa	ob	1	2	3	4
10. Moss	oa	ob	1	2	3	4
11. Loose silt lying on substrate (organic & inorganic)	oa	ob	1	2	3	4
12. Other.....	oa	ob	1	2	3	4

CURRENT VELOCITY in sampled area: Tick boxes for each current velocity present; more than 1 box can be ticked:

Edge sample : 0. No flow [x] 1. Slow [x] 2. Medium/moderate [x] 3 Fast to very fast [x]

SITE OBSERVATIONS (Indicate appropriate number in brackets at right; some may consist of >1 category.)

WATER ODOURS: 1. Normal 2. Sewage 3. Petroleum 4. Chemical 5. Stormwater 6. Musty [1]

WATER OILS: 1. None 2. Slick 3. Sheen 4. Globbs 5. Flecks [1]

TURBIDITY: 1. Clear 2. Slight 3. Turbid 4. Opaque/ liquid silt (clay like) [1]

PLUME: (ONLY in riffle/run; amount of easily disturbed fine sediment)

1. Little or none 2. Some 3. Lots 4. No riffle/run present [1]

SEDIMENT ODOURS:

1. Normal 2. Sewage 3. Petroleum 4. Chemical 5. Anaerobic 6. Other..... [1]

FLOW LEVEL: (relative to "water mark", i.e. normal inundation level shown by limit of terrestrial grasses, by eroded area, or by boundary in bank sediment types.)

1. No flow 2. Low 3. Moderate 4. High 5. Flood [3]
(dry/isolated pools) (<< water mark) (around water mark) (>> water mark)

DO NOT SAMPLE IN HIGH FLOW OR FLOOD

BARE GROUND above normal inundations level shown by "water mark": looking downstream Left bank 2 %
(This refers only to erosional ground; bedrock is not erosional ground.) Right bank 2 %

LOCAL CATCHMENT EROSION: (within sight of site) 1. None 2. Slight 3. Moderate 4. Heavy [2]

LOCAL POINT SOURCE POLLUTION: 1. None 2. Gravel road/track/ford 3. Tip 4. Quarry 5. Drain

1. Fish farm 7. Earthworks 8. Mine 9. Stock access point 10. Culvert 11. STP
12. Other..... [2 & 9]

DAMS / BARRIERS:

1. Present upstream 2. Small artificial structure (e.g. weir) at or immediately downstream of site
3. Absent 4. Not known [2]

BRAIDING: 1. Yes, number of channels..... 2. No [2]

SITE CLASSIFICATION: 1. Steep valley 2. Broad valley 3. Plains [2]

LEFT BANK AND RIGHT BANK REFER TO DIRECTION FACING DOWNSTREAM.

LANDUSE: 1. Native forest 2. Forestry 3. Native heath/grassland 4. Grazing 5. Cropped
Left Bank 6. Residential 7. Industrial 8. Recreational 9. Intensive agriculture [4]

LANDUSE: 1. Native forest 2. Forestry 3. Native heath/grassland 4. Grazing 5. Cropped
Right Bank 6. Residential 7. Industrial 8. Recreational 9. Intensive agriculture [4]

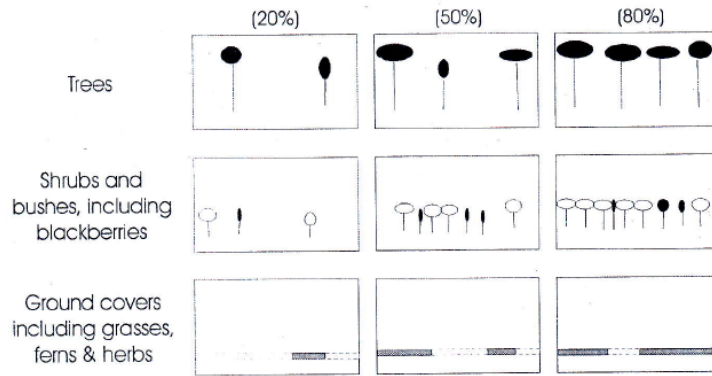
BARS: (bed surface protruding from water and forming a bar within the channel) 75 %

HAS THERE BEEN HEAVY RAINS OR SPATES IN THE LAST WEEK? 1. Yes 2. No 3. Not sure [1]

ALL LEFT BANK AND RIGHT BANK REFER TO DIRECTION FACING DOWNSTREAM
WIDTH of riparian zone (to a maximum of 30 m perpendicular to flow)

Left Bank: 20 m

Right Bank: 20 m

STRUCTURAL COMPOSITION of riparian zone. Using the diagrams below as a guide, tick the box corresponding to the percentage category that best describes the percent cover of each vegetation category; evaluate left (L) and right (R) bank separately.


	0	1	2	3	4
	0%	<20%	20-50%	50-80%	>80%
L	[]	[]	[x]	[]	[]
R	[]	[]	[x]	[]	[]
L	[x]	[]	[]	[]	[]
R	[]	[x]	[]	[]	[]
L	[]	[]	[]	[]	[x]
R	[]	[]	[]	[]	[x]

EXOTIC VEGETATION What percentage of each of the following categories is made up of exotic vegetation?

	0%	1-10%	11-40%	41-60%	>60%
Trees	0	1	2	3	4
Shrub Layer	0	1	2	3	4
Ground Cover	0	1	2	3	4

LONGITUDINAL EXTENT of riparian vegetation. Choose one category for each bank. Do not include ground cover layer except where site is in native grassland.

	Left Bank	Right Bank
0. None	[]	[]
1. Isolated / scattered	[]	[]
2. Regularly spaced	[]	[]
3. Occasional clumps	[3]	[3]
4. Semi-continuous	[]	[]
5. Continuous	[]	[]

ARE ALL SPACES FILLED IN ON ALL SHEETS? Yes [x] Checked Kirsten Hogan

COMMENTS and/or MAP(S) and/or SITE SKETCHES:

TABLE B2.2 - Rapid Bioassessment Methodology for Rivers and Streams GB_BKT010**RAPID BIOASSESSMENT METHODOLOGY FOR RIVERS AND STREAMS****APPENDIX 3: FIELD SAMPLING AND HABITAT ASSESSMENT SHEETS**

RIVER: Brankeet Creek CATCHMENT: Goulburn River
 LOCATION: Brankeet Creek at Mitchells Road, Ancona, downstream of bridge
 DATE: 24-11-16 TIME: 12:15 pm
 LOCATION CODE: GB_BKT010 PHOTOGRAPHS: Yes
 RECORDER(S) NAME(S): Kirsten Hogan and Danielle Beischer

AUSTRALIAN MAP GRID REFERENCE

EASTING: 392795 NORTHING: 5906190

IS LOCATION DOCUMENTATION COMPLETE? Yes

LENGTH OF SURVEYED REACH: 90 m

This is defined as 10x the average stream width, to a maximum of 150m. Minimum reach length is 50m.

Stream Habitat in surveyed reach(%) Riffle/Run 85 % Pool 15 %

Stream Width from edges of water.

Take 5 evenly spaced measurements within surveyed reach; also record maximum and minimum.

1. 16 m 2. 14 m 3. 9 m 4. 6 m 5. 7 m Max.: 16 m Min.: 6 m

Method used: tape measure [] range finder [x] estimate []

Channel width from tops of banks 1. 35 m 2. 28 m 3. 39 m 4. 38 m 5. 33 m

Method used: tape measure [] range finder [x] estimate []

WATER QUALITY MEASUREMENTS:

Instrument(s) make, model and number ...Eutech PCD 650 and Hach 2100 Q Turbidity Meter

Water temperature (°C): 13.3

pH: 6.1

Conductivity (ambient): N/A...µS/cm N/A mS/cm

Alkalinity (mg/L): N/A

Measured in lab [] or field []

Conductivity (@25°C): 86 µS/cm N/A mS/cm

Dissolved Oxygen (mg/L) 9.8

(agitate probe if flow <5cm/sec)

Turbidity (NTU) 18

Measured in lab [] or field [x]

% Sat. Dissolved Oxygen: 93

(agitate probe if flow <5cm/sec)

Water samples collected for: Nutrient Analysis

Yes [x] No []

Turbidity

Yes [] No [x]

Alkalinity

Yes [] No [x]

REACH: All information in this section refers to the entire reach.

SUBSTRATE DESCRIPTION (% cover): USE PARTICLE SIZE DIAGRAM.

Bedrock	[	5	]
Boulder (>256 mm)	[	20	]
Cobble (64 - 256 mm)	[	20	]
Pebble (16 - 64 mm).....	[	20	]
Gravel (2 - 16 mm).....	[	15	]
Sand (0.06 – 2 mm).....	[	15	]
Clay/Silt (<0.06 mm).....	[	5	]
Total		100%	

OTHER STREAM FEATURES

Percent of reach covered by	<1%	1-10%	10-35%	35-65%	65-90%	>90%
Willow Roots	oa	ob	1	2	3	4
Moss	oa	ob	1	2	3	4
Filamentous algae	oa	ob	1	2	3	4
Loose silt lying on substrate (organic & inorganic)	oa	ob	1	2	3	4
Total macrophytes	oa	ob	1	2	3	4

(For macrophytes, include those which are out of the water but in the active channel.)

ORGANIC MATERIAL (% cover of organic material)

Coarse Particulate Organic Material (leaves and wood < 10 cm in diameter)	1. <5%	2. 5-20%	3. >20%	[1]
Snags/Large Organic Material (wood >10 cm diameter)	1. <5%	2. 5-20%	3. >20%	[1]

CURRENT VELOCITY IN REACH: Choose one percentage category for each flow category in the reach:

	<u>0%</u>	<u>1-10%</u>	<u>11-40%</u>	<u>41-60%</u>	<u>>60%</u>
No obvious flow	0	1	2	3	4
Slow	0	1	2	3	4
Medium/moderate	0	1	2	3	4
Fast to very fast	0	1	2	3	4

VEGCAT (Landuse category for AUSRIVAS.) Land use beyond the riparian zone (30m). [3]

- Urban
- Intensive agriculture
- Mostly cleared, grazing
- Significant patches of forest remaining, some forestry/agriculture (eg. Grazing)
- Native forest/natural vegetation

SHADING of stream channel, as at mid day (shading category for AUSRIVAS). Use % shading diagrams.

- <5%
 - 6 – 25%
 - 26 – 50%
 - 51 – 75%
 - >76%
- [3]

RIFFLE/RUN: All information in this section refers only to the riffle/run area sampled. **N/A this site**

Invertebrates collected by: Kirsten Hogan Invertebrates picked/sorted by: Kirsten Hogan
Length of riffle/run sampled: 10 metres [x] Other.....metres. Time taken to pick sample...40.....mins.
Approx.# of invertebrates picked: 200[] 150 [] 100 [] 50 [] if < 150, why?

SUBSTRATE DESCRIPTION (% cover): USE PARTICLE DIAGRAM.

Bedrock[	0	]	
Boulder (>256 mm)	20	]	If riffle/run not sampled, why not?
Cobble (64 - 256 mm)	25	]	1. Not present []
Pebble (16 - 64 mm).....	25	]	2. Too shallow []
Gravel (2 - 16 mm).....	20	]	3. Too small []
Sand (0.06 – 2 mm).....	10	]	4. Too dangerous []
Clay/Silt (<0.06 mm).....	0	]	5. Other.....[]
Total	100%		

Percent of sampled area covered by	<1%	1-10%	10-35%	35-65%	65-90%	>90%
Willow Roots	oa	ob	1	2	3	4
Moss	oa	ob	1	2	3	4
Filamentous algae	oa	ob	1	2	3	4
Macrophytes	oa	ob	1	2	3	4
Loose silt lying on substrate (organic & inorganic)	oa	ob	1	2	3	4

Coarse Particulate Organic Material (leaves and wood < 10 cm in diameter)	1. <5%	2. 5-20%	3. >20%	[1]
Snags/Large Organic Material (wood >10 cm diameter)	1. <5%	2. 5-20%	3. >20%	[1]

DEPTH 1. 10 cm 2. 15 cm 3. 20 cm 4. 10 cm 5. 30 cm

Take 5 representative measurements from the riffle/run habitat over the range of depths in the kick sample.

CURRENT VELOCITY in sampled area: Tick boxes for each current velocity present; more than 1 box can be ticked:

Kick sample : 0. No flow [] 1. Slow [] 2. Medium/moderate [x] 3 Fast to very fast [x]

EDGE/BACKWATER: All information in this section refers only to the edge area sampled.

Invertebrates collected by: Dani Beischer Invertebrates picked/sorted by: Dani Beischer
Length of riffle/run sampled: 10 metres [x] Other.....metres. Time taken to pick sample...40.....mins.
Approx.# of invertebrates picked: 200[] 150 [] 100 [] 50 [] if < 150, why?.....

Percent of sampled area covered by	<1%	1-10%	10-35%	35-65%	65-90%	>90%
1. Backwaters	oa	ob	1	2	3	4
2. Leaf packs/CPOM	oa	ob	1	2	3	4
3. Undercut banks	oa	ob	1	2	3	4
4. Roots	oa	ob	1	2	3	4
5. Bare edge	oa	ob	1	2	3	4
6. Logs	oa	ob	1	2	3	4
7. Trailing bank vegetation (including grasses)	oa	ob	1	2	3	4
8. Filamentous algae	oa	ob	1	2	3	4
9. Macrophyte	oa	ob	1	2	3	4
10. Moss	oa	ob	1	2	3	4
11. Loose silt lying on substrate (organic & inorganic)	oa	ob	1	2	3	4
12. Other.....	oa	ob	1	2	3	4

CURRENT VELOCITY in sampled area: Tick boxes for each current velocity present; more than 1 box can be ticked:

Edge sample : 0. No flow [x] 1. Slow [x] 2. Medium/moderate [x] 3 Fast to very fast [x]

SITE OBSERVATIONS (Indicate appropriate number in brackets at right; some may consist of >1 category.)

WATER ODOURS: 1. Normal 2. Sewage 3. Petroleum 4. Chemical 5. Stormwater 6. Musty [1]

WATER OILS: 1. None 2. Slick 3. Sheen 4. Globbs 5. Flecks [1]

TURBIDITY: 1. Clear 2. Slight 3. Turbid 4. Opaque/ liquid silt (clay like) [1]

PLUME: (ONLY in riffle/run; amount of easily disturbed fine sediment)

1. Little or none 2. Some 3. Lots 4. No riffle/run present [1]

SEDIMENT ODOURS:

1. Normal 2. Sewage 3. Petroleum 4. Chemical 5. Anaerobic 6. Other..... [5]

FLOW LEVEL: (relative to "water mark", i.e. normal inundation level shown by limit of terrestrial grasses, by eroded area, or by boundary in bank sediment types.)

1. No flow 2. Low 3. Moderate 4. High 5. Flood [3]
(dry/isolated pools) (<< water mark) (around water mark) (>> water mark)

DO NOT SAMPLE IN HIGH FLOW OR FLOOD

BARE GROUND above normal inundations level shown by "water mark": looking downstream Left bank 5 %
(This refers only to erosional ground; bedrock is not erosional ground.) Right bank 20 %

LOCAL CATCHMENT EROSION: (within sight of site) 1. None 2. Slight 3. Moderate 4. Heavy [2]

LOCAL POINT SOURCE POLLUTION: 1. None 2. Gravel road/track/ford 3. Tip 4. Quarry 5. Drain

1. Fish farm 7. Earthworks 8. Mine 9. Stock access point 10. Culvert 11. STP
12. Other..... [2 & 9]

DAMS / BARRIERS:

1. Present upstream 2. Small artificial structure (e.g. weir) at or immediately downstream of site
3. Absent 4. Not known [2]

BRAIDING: 1. Yes, number of channels..... 2. No [2]

SITE CLASSIFICATION: 1. Steep valley 2. Broad valley 3. Plains [2]

LEFT BANK AND RIGHT BANK REFER TO DIRECTION FACING DOWNSTREAM.

LANDUSE: 1. Native forest 2. Forestry 3. Native heath/grassland 4. Grazing 5. Cropped
Left Bank 6. Residential 7. Industrial 8. Recreational 9. Intensive agriculture [4]

LANDUSE: 1. Native forest 2. Forestry 3. Native heath/grassland 4. Grazing 5. Cropped
Right Bank 6. Residential 7. Industrial 8. Recreational 9. Intensive agriculture [4]

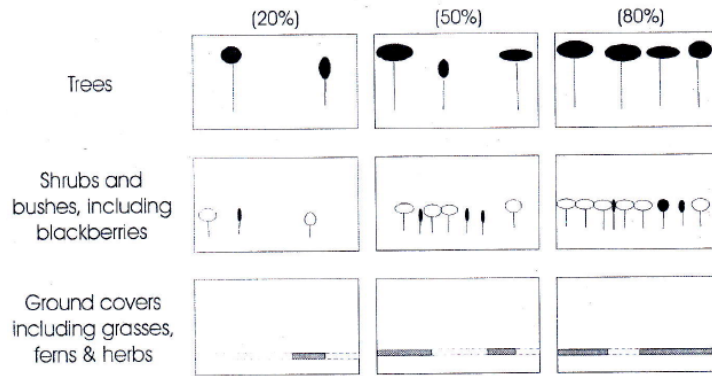
BARS: (bed surface protruding from water and forming a bar within the channel) 75 %

HAS THERE BEEN HEAVY RAINS OR SPATES IN THE LAST WEEK? 1. Yes 2. No 3. Not sure [1]

ALL LEFT BANK AND RIGHT BANK REFER TO DIRECTION FACING DOWNSTREAM
WIDTH of riparian zone (to a maximum of 30 m perpendicular to flow)

Left Bank: 30 m

Right Bank: 10 m

STRUCTURAL COMPOSITION of riparian zone. Using the diagrams below as a guide, tick the box corresponding to the percentage category that best describes the percent cover of each vegetation category; evaluate left (L) and right (R) bank separately.


	0	1	2	3	4
	0%	<20%	20-50%	50-80%	>80%
L	[]	[]	[]	[]	[x]
R	[]	[]	[]	[x]	[]
L	[]	[x]	[]	[]	[]
R	[]	[x]	[]	[]	[]
L	[]	[]	[]	[]	[x]
R	[]	[]	[]	[]	[x]

EXOTIC VEGETATION What percentage of each of the following categories is made up of exotic vegetation?

	0%	1-10%	11-40%	41-60%	>60%
Trees	0	1	2	3	4
Shrub Layer	0	1	2	3	4
Ground Cover	0	1	2	3	4

LONGITUDINAL EXTENT of riparian vegetation. Choose one category for each bank. Do not include ground cover layer except where site is in native grassland.

	Left Bank	Right Bank
0. None	[]	[]
1. Isolated / scattered	[]	[]
2. Regularly spaced	[]	[]
3. Occasional clumps	[]	[3]
4. Semi-continuous	[4]	[]
5. Continuous	[]	[]

ARE ALL SPACES FILLED IN ON ALL SHEETS? Yes [x] Checked Kirsten Hogan

TABLE B2.3 - Rapid Bioassessment Methodology for Rivers and Streams GB_BKT015**RAPID BIOASSESSMENT METHODOLOGY FOR RIVERS AND STREAMS**

APPENDIX 3: FIELD SAMPLING AND HABITAT ASSESSMENT SHEETS

RIVER: Brankeet Creek CATCHMENT: Goulburn River

LOCATION: Brankeet Creek at Cochrane Lane, Ancona

DATE: 24-11-16 TIME: 15:45 pm

LOCATION CODE: GB_BKT015 PHOTOGRAPHS: Yes

RECORDER(S) NAME(S): Kirsten Hogan and Danielle Beischer

AUSTRALIAN MAP GRID REFERENCE

EASTING: 392830

NORTHING: 5904497

IS LOCATION DOCUMENTATION COMPLETE? Yes

LENGTH OF SURVEYED REACH: 80 m

This is defined as 10x the average stream width, to a maximum of 150m. Minimum reach length is 50m.

Stream Habitat in surveyed reach(%)**Riffle/Run** 10 %**Pool** 90 %**Stream Width** from edges of water.

Take 5 evenly spaced measurements within surveyed reach; also record maximum and minimum.

1. 14 m 2. 16 m 3. 14 m 4. 18 m 5. 7 m Max.: 18 m Min.: 7 m

Method used: tape measure [] range finder [x] estimate []**Channel width** from tops of banks 1. 46 m 2. 44 m 3. 43 m 4. 46 m 5. 45 m**Method used:** tape measure [] range finder [x] estimate []**WATER QUALITY MEASUREMENTS:**

Instrument(s) make, model and number ...Eutech PCD 650 and Hach 2100 Q Turbidity Meter

Water temperature (°C): 15.3**pH:** 6.2**Conductivity (ambient):** N/A...µS/cm N/A mS/cm**Alkalinity (mg/L):** N/A

Measured in lab [] or field []

Conductivity (@25°C): 88 µS/cm N/A mS/cm**Dissolved Oxygen (mg/L)** 9.4

(agitate probe if flow <5cm/sec)

Turbidity (NTU) 22

Measured in lab [] or field [x]

% Sat. Dissolved Oxygen: 92

(agitate probe if flow <5cm/sec)

Water samples collected for: Nutrient Analysis

Yes [x] No []

Turbidity

Yes [] No [x]

Alkalinity

Yes [] No [x]

REACH: All information in this section refers to the entire reach.

SUBSTRATE DESCRIPTION (% cover): USE PARTICLE SIZE DIAGRAM.

Bedrock	[	0	]
Boulder (>256 mm)	[	10	]
Cobble (64 - 256 mm)	[	0	]
Pebble (16 - 64 mm).....	[	10	]
Gravel (2 - 16 mm).....	[	35	]
Sand (0.06 – 2 mm).....	[	35	]
Clay/Silt (<0.06 mm).....	[	10	]
Total		100%	

OTHER STREAM FEATURES

Percent of reach covered by	<1%	1-10%	10-35%	35-65%	65-90%	>90%
Willow Roots	oa	ob	1	2	3	4
Moss	oa	ob	1	2	3	4
Filamentous algae	oa	ob	1	2	3	4
Loose silt lying on substrate (organic & inorganic)	oa	ob	1	2	3	4
Total macrophytes	oa	ob	1	2	3	4
(For macrophytes, include those which are out of the water but in the active channel.)						

ORGANIC MATERIAL (% cover of organic material)

Coarse Particulate Organic Material (leaves and wood < 10 cm in diameter)	1. <5%	2. 5-20%	3. >20%	[1]
Snags/Large Organic Material (wood >10 cm diameter)	1. <5%	2. 5-20%	3. >20%	[1]

CURRENT VELOCITY IN REACH: Choose one percentage category for each flow category in the reach:

	<u>0%</u>	<u>1-10%</u>	<u>11-40%</u>	<u>41-60%</u>	<u>>60%</u>
No obvious flow	0	1	2	3	4
Slow	0	1	2	3	4
Medium/moderate	0	1	2	3	4
Fast to very fast	0	1	2	3	4

VEGCAT (Landuse category for AUSRIVAS.) Land use beyond the riparian zone (30m). [3]

1. Urban
2. Intensive agriculture
3. Mostly cleared, grazing
4. Significant patches of forest remaining, some forestry/agriculture (eg. Grazing)
5. Native forest/natural vegetation

SHADING of stream channel, as at mid day (shading category for AUSRIVAS). Use % shading diagrams.

1. <5%
 2. 6 – 25%
 3. 26 – 50%
 4. 51 – 75%
 5. >76%
- [5]

RIFFLE/RUN: All information in this section refers only to the riffle/run area sampled. **N/A this site**

Invertebrates collected by: Kirsten Hogan Invertebrates picked/sorted by: Kirsten Hogan
Length of riffle/run sampled: 10 metres [x] Other.....metres. Time taken to pick sample...30.....mins.
Approx.# of invertebrates picked: 200[] 150 [] 100 [] 50 [] if < 150, why?

SUBSTRATE DESCRIPTION (% cover): USE PARTICLE DIAGRAM.

Bedrock[	0	]	
Boulder (>256 mm)	0	]	If riffle/run not sampled, why not?
Cobble (64 - 256 mm)	0	]	1. Not present []
Pebble (16 - 64 mm).....	25	]	2. Too shallow []
Gravel (2 - 16 mm).....	30	]	3. Too small []
Sand (0.06 – 2 mm).....	30	]	4. Too dangerous []
Clay/Silt (<0.06 mm).....	15	]	5. Other.....[]
Total	100%		

Percent of sampled area covered by	<1%	1-10%	10-35%	35-65%	65-90%	>90%
Willow Roots	oa	ob	1	2	3	4
Moss	oa	ob	1	2	3	4
Filamentous algae	oa	ob	1	2	3	4
Macrophytes	oa	ob	1	2	3	4
Loose silt lying on substrate (organic & inorganic)	oa	ob	1	2	3	4

Coarse Particulate Organic Material (leaves and wood < 10 cm in diameter)	1. <5%	2. 5-20%	3. >20%	[1]
Snags/Large Organic Material (wood >10 cm diameter)	1. <5%	2. 5-20%	3. >20%	[1]

DEPTH 1. 20 cm 2. 40 cm 3. 40 cm 4. 30 cm 5. 45 cm

Take 5 representative measurements from the riffle/run habitat over the range of depths in the kick sample.

CURRENT VELOCITY in sampled area: Tick boxes for each current velocity present; more than 1 box can be ticked:

Kick sample : 0. No flow [] 1. Slow [] 2. Medium/moderate [x] 3 Fast to very fast [x]

EDGE/BACKWATER: All information in this section refers only to the edge area sampled.

Invertebrates collected by: Dani Beischer Invertebrates picked/sorted by: Dani Beischer
Length of riffle/run sampled: 10 metres [x] Other.....metres. Time taken to pick sample...30.....mins.
Approx.# of invertebrates picked: 200[] 150 [] 100 [] 50 [] if < 150, why?.....

Percent of sampled area covered by	<1%	1-10%	10-35%	35-65%	65-90%	>90%
1. Backwaters	oa	ob	1	2	3	4
2. Leaf packs/CPOM	oa	ob	1	2	3	4
3. Undercut banks	oa	ob	1	2	3	4
4. Roots	oa	ob	1	2	3	4
5. Bare edge	oa	ob	1	2	3	4
6. Logs	oa	ob	1	2	3	4
7. Trailing bank vegetation (including grasses)	oa	ob	1	2	3	4
8. Filamentous algae	oa	ob	1	2	3	4
9. Macrophyte	oa	ob	1	2	3	4
10. Moss	oa	ob	1	2	3	4
11. Loose silt lying on substrate (organic & inorganic)	oa	ob	1	2	3	4
12. Other.....	oa	ob	1	2	3	4

CURRENT VELOCITY in sampled area: Tick boxes for each current velocity present; more than 1 box can be ticked:

Edge sample : 0. No flow [x] 1. Slow [x] 2. Medium/moderate [x] 3 Fast to very fast [x]

SITE OBSERVATIONS (Indicate appropriate number in brackets at right; some may consist of >1 category.)

WATER ODOURS: 1. Normal 2. Sewage 3. Petroleum 4. Chemical 5. Stormwater 6. Musty [6]

WATER OILS: 1. None 2. Slick 3. Sheen 4. Globs 5. Flecks [3]

TURBIDITY: 1. Clear 2. Slight 3. Turbid 4. Opaque/ liquid silt (clay like) [1]

PLUME: (ONLY in riffle/run; amount of easily disturbed fine sediment)

1. Little or none 2. Some 3. Lots 4. No riffle/run present [1]

SEDIMENT ODOURS:

1. Normal 2. Sewage 3. Petroleum 4. Chemical 5. Anaerobic 6. Other..... [1]

FLOW LEVEL: (relative to "water mark", i.e. normal inundation level shown by limit of terrestrial grasses, by eroded area, or by boundary in bank sediment types.)

1. No flow 2. Low 3. Moderate 4. High 5. Flood [3]
(dry/isolated pools) (<< water mark) (around water mark) (>> water mark)

DO NOT SAMPLE IN HIGH FLOW OR FLOOD
BARE GROUND above normal inundations level shown by "water mark": looking downstream Left bank 20 %
(This refers only to erosional ground; bedrock is not erosional ground.) Right bank 1 %

LOCAL CATCHMENT EROSION: (within sight of site) 1. None 2. Slight 3. Moderate 4. Heavy [2]

LOCAL POINT SOURCE POLLUTION: 1. None 2. Gravel road/track/ford 3. Tip 4. Quarry 5. Drain

1. Fish farm 7. Earthworks 8. Mine 9. Stock access point 10. Culvert 11. STP
12. Other..... [1]

DAMS / BARRIERS:

1. Present upstream 2. Small artificial structure (e.g. weir) at or immediately downstream of site
3. Absent 4. Not known [3]

BRAIDING: 1. Yes, number of channels.....2..... 2. No [1]

SITE CLASSIFICATION: 1. Steep valley 2. Broad valley 3. Plains [2]

LEFT BANK AND RIGHT BANK REFER TO DIRECTION FACING DOWNSTREAM.
LANDUSE: 1. Native forest 2. Forestry 3. Native heath/grassland 4. Grazing 5. Cropped
Left Bank 6. Residential 7. Industrial 8. Recreational 9. Intensive agriculture [4]

LANDUSE: 1. Native forest 2. Forestry 3. Native heath/grassland 4. Grazing 5. Cropped
Right Bank 6. Residential 7. Industrial 8. Recreational 9. Intensive agriculture [4]

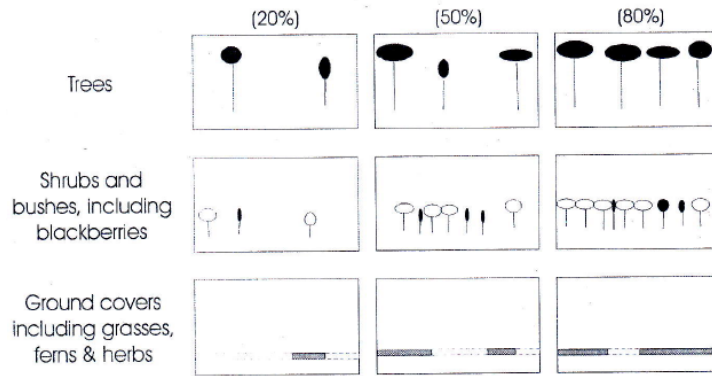
BARS: (bed surface protruding from water and forming a bar within the channel) 75 %

HAS THERE BEEN HEAVY RAINS OR SPATES IN THE LAST WEEK? 1. Yes 2. No 3. Not sure [1]

ALL LEFT BANK AND RIGHT BANK REFER TO DIRECTION FACING DOWNSTREAM
WIDTH of riparian zone (to a maximum of 30 m perpendicular to flow)

Left Bank: 30 m

Right Bank: 10 m

STRUCTURAL COMPOSITION of riparian zone. Using the diagrams below as a guide, tick the box corresponding to the percentage category that best describes the percent cover of each vegetation category; evaluate left (L) and right (R) bank separately.


	0	1	2	3	4
	0%	<20%	20-50%	50-80%	>80%
L	[]	[]	[]	[x]	[]
R	[]	[]	[x]	[]	[]
L	[]	[x]	[]	[]	[]
R	[]	[x]	[]	[]	[]
L	[]	[]	[]	[]	[x]
R	[]	[]	[]	[]	[x]

EXOTIC VEGETATION What percentage of each of the following categories is made up of exotic vegetation?

	0%	1-10%	11-40%	41-60%	>60%
Trees	0	1	2	3	4
Shrub Layer	0	1	2	3	4
Ground Cover	0	1	2	3	4

LONGITUDINAL EXTENT of riparian vegetation. Choose one category for each bank. Do not include ground cover layer except where site is in native grassland.

		Left Bank	Right Bank
0. None		[]	[]
1. Isolated / scattered		[]	[]
2. Regularly spaced		[]	[]
3. Occasional clumps		[]	[]
4. Semi-continuous		[4]	[4]
5. Continuous		[]	[]

ARE ALL SPACES FILLED IN ON ALL SHEETS? Yes [x] Checked Kirsten Hogan

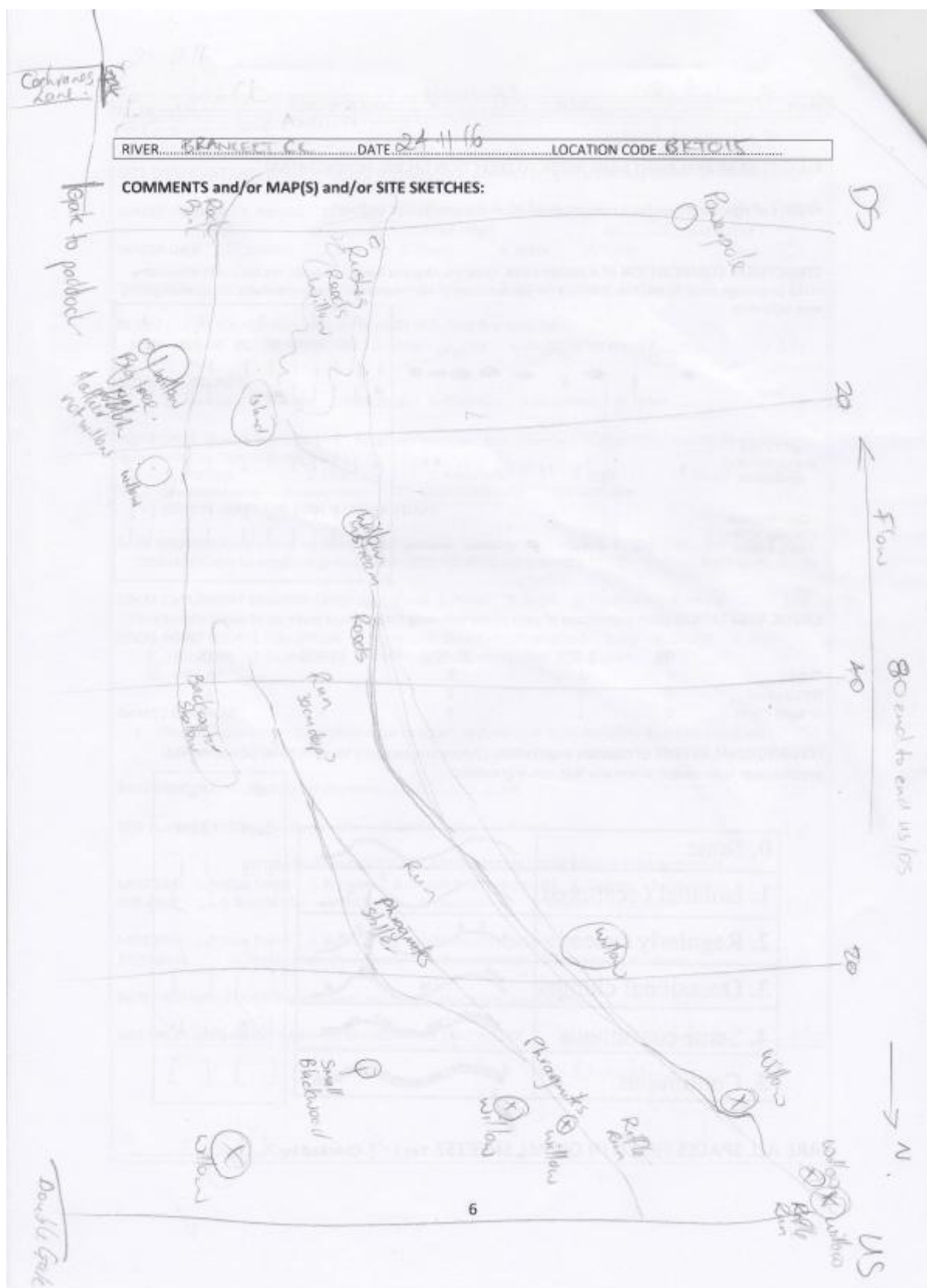


TABLE B2.4 - Rapid Bioassessment Methodology for Rivers and Streams GB_MER004**RAPID BIOASSESSMENT METHODOLOGY FOR RIVERS AND STREAMS**

APPENDIX 3: FIELD SAMPLING AND HABITAT ASSESSMENT SHEETS

RIVER: Merton Creek CATCHMENT: Goulburn River
 LOCATION: Merton Creek at Euroa Mansfield Road, Merton - upstream of bridge
 DATE: 23-11-16 TIME: 11:30 am
 LOCATION CODE: GB_MER004 PHOTOGRAPHS: Yes
 RECORDER(S) NAME(S): Kirsten Hogan and Danielle Beischer

AUSTRALIAN MAP GRID REFERENCE

EASTING: 384798 NORTHING: 5907753

IS LOCATION DOCUMENTATION COMPLETE? Yes

LENGTH OF SURVEYED REACH: 125 m

This is defined as 10x the average stream width, to a maximum of 150m. Minimum reach length is 50m.

Stream Habitat in surveyed reach (%) Riffle/Run 20 % Pool 80 %

Stream Width from edges of water.

Take 5 evenly spaced measurements within surveyed reach; also record maximum and minimum.

1. 3 m 2. 9 m 3. 9 m 4. 2 m 5. 7 m Max.: 9 m Min.: 2 m

Method used: tape measure [] range finder [x] estimate []

Channel width from tops of banks 1. 20 m 2. 23 m 3. 14 m 4. 27 m 5. 17 m

Method used: tape measure [] range finder [x] estimate []

WATER QUALITY MEASUREMENTS:

Instrument(s) make, model and number ...Eutech PCD 650 and Hach 2100 Q Turbidity Meter

Water temperature (°C): 16.4

pH: 5.9

Conductivity (ambient): N/A...µS/cm N/A mS/cm

Alkalinity (mg/L): N/A

Measured in lab [] or field []

Conductivity (@25°C): 175 µS/cm N/A mS/cm

Dissolved Oxygen (mg/L) 7.7

(agitate probe if flow <5cm/sec)

Turbidity (NTU) 74

Measured in lab [] or field [x]

% Sat. Dissolved Oxygen: 82

(agitate probe if flow <5cm/sec)

Water samples collected for: Nutrient Analysis

Yes [x] No []

Turbidity

Yes [] No [x]

Alkalinity

Yes [] No [x]

REACH: All information in this section refers to the entire reach.

SUBSTRATE DESCRIPTION (% cover): USE PARTICLE SIZE DIAGRAM.

Bedrock	[	5	]
Boulder (>256 mm)	[	0	]
Cobble (64 - 256 mm)	[	0	]
Pebble (16 - 64 mm).....	[	45	]
Gravel (2 - 16 mm).....	[	20	]
Sand (0.06 – 2 mm).....	[	10	]
Clay/Silt (<0.06 mm).....	[	20	]
Total		100%	

OTHER STREAM FEATURES

Percent of reach covered by	<1%	1-10%	10-35%	35-65%	65-90%	>90%
Willow Roots	oa	ob	1	2	3	4
Moss	oa	ob	1	2	3	4
Filamentous algae	oa	ob	1	2	3	4
Loose silt lying on substrate (organic & inorganic)	oa	ob	1	2	3	4
Total macrophytes	oa	ob	1	2	3	4

(For macrophytes, include those which are out of the water but in the active channel.)

ORGANIC MATERIAL (% cover of organic material)

Coarse Particulate Organic Material (leaves and wood < 10 cm in diameter)	1. <5%	2. 5-20%	3. >20%	[1]
Snags/Large Organic Material (wood >10 cm diameter)	1. <5%	2. 5-20%	3. >20%	[1]

CURRENT VELOCITY IN REACH: Choose one percentage category for each flow category in the reach:

	0%	1-10%	11-40%	41-60%	>60%
No obvious flow	0	1	2	3	4
Slow	0	1	2	3	4
Medium/moderate	0	1	2	3	4
Fast to very fast	0	1	2	3	4

VEGCAT (Landuse category for AUSRIVAS.) Land use beyond the riparian zone (30m). [3]

1. Urban
2. Intensive agriculture
3. Mostly cleared, grazing
4. Significant patches of forest remaining, some forestry/agriculture (eg. Grazing)
5. Native forest/natural vegetation

SHADING of stream channel, as at mid day (shading category for AUSRIVAS). Use % shading diagrams.

1. <5%
 2. 6 – 25%
 3. 26 – 50%
 4. 51 – 75%
 5. >76%
- [3]

RIFFLE/RUN: All information in this section refers only to the riffle/run area sampled. **N/A this site**

Invertebrates collected by: Kirsten Hogan Invertebrates picked/sorted by: Kirsten Hogan
Length of riffle/run sampled: 10 metres [] Other.....8...metres. Time taken to pick sample...40.....mins.
Approx.# of invertebrates picked: 200[] 150 [] 100 [] 50 [] if < 150, why?

SUBSTRATE DESCRIPTION (% cover): USE PARTICLE DIAGRAM.

Bedrock.....[	30	]	
Boulder(>256 mm)	0	]	If riffle/run not sampled, why not? 1. Not present [] 2. Too shallow [] 3. Too small [] 4. Too dangerous [] 5. Other.....[]
Cobble (64 - 256 mm)	0	]	
Pebble (16 - 64 mm).....	0	]	
Gravel (2 - 16 mm).....	20	]	
Sand (0.06 – 2 mm).....	30	]	
Clay/Silt (<0.06 mm).....	20	]	
Total.....			100%.....

Percent of sampled area covered by	<1%	1-10%	10-35%	35-65%	65-90%	>90%
Willow Roots	oa	ob	1	2	3	4
Moss	oa	ob	1	2	3	4
Filamentous algae	oa	ob	1	2	3	4
Macrophytes	oa	ob	1	2	3	4
Loose silt lying on substrate (organic & inorganic)	oa	ob	1	2	3	4

Coarse Particulate Organic Material (leaves and wood < 10 cm in diameter)	1. <5%	2. 5-20%	3. >20%	[1]
Snags/Large Organic Material (wood >10 cm diameter)	1. <5%	2. 5-20%	3. >20%	[1]

DEPTH 1. 50 cm 2. 30 cm 3. 50 cm 4. 50 cm 5. 50 cm

Take 5 representative measurements from the riffle/run habitat over the range of depths in the kick sample.

CURRENT VELOCITY in sampled area: Tick boxes for each current velocity present; more than 1 box can be ticked:

Kick sample : 0. No flow [] 1. Slow [] 2. Medium/moderate [] 3 Fast to very fast [x]

EDGE/BACKWATER: All information in this section refers only to the edge area sampled.

Invertebrates collected by: Dani Beischer Invertebrates picked/sorted by: Dani Beischer
Length of riffle/run sampled: 10 metres [x] Other.....metres. Time taken to pick sample...40.....mins.
Approx.# of invertebrates picked: 200[] 150 [] 100 [] 50 [] if < 150, why?.....

Percent of sampled area covered by	<1%	1-10%	10-35%	35-65%	65-90%	>90%
1. Backwaters	oa	ob	1	2	3	4
2. Leaf packs/CPOM	oa	ob	1	2	3	4
3. Undercut banks	oa	ob	1	2	3	4
4. Roots	oa	ob	1	2	3	4
5. Bare edge	oa	ob	1	2	3	4
6. Logs	oa	ob	1	2	3	4
7. Trailing bank vegetation (including grasses)	oa	ob	1	2	3	4
8. Filamentous algae	oa	ob	1	2	3	4
9. Macrophyte	oa	ob	1	2	3	4
10. Moss	oa	ob	1	2	3	4
11. Loose silt lying on substrate (organic & inorganic)	oa	ob	1	2	3	4
12. Other.....	oa	ob	1	2	3	4

CURRENT VELOCITY in sampled area: Tick boxes for each current velocity present; more than 1 box can be ticked:

Edge sample : 0. No flow [] 1. Slow [] 2. Medium/moderate [x] 3 Fast to very fast [x]

SITE OBSERVATIONS (Indicate appropriate number in brackets at right; some may consist of >1 category.)

WATER ODOURS: 1. Normal 2. Sewage 3. Petroleum 4. Chemical 5. Stormwater 6. Musty [1]

WATER OILS: 1. None 2. Slick 3. Sheen 4. Globbs 5. Flecks [1]

TURBIDITY: 1. Clear 2. Slight 3. Turbid 4. Opaque/ liquid silt (clay like) [3]

PLUME: (ONLY in riffle/run; amount of easily disturbed fine sediment)

1. Little or none 2. Some 3. Lots 4. No riffle/run present [3]

SEDIMENT ODOURS:

1. Normal 2. Sewage 3. Petroleum 4. Chemical 5. Anaerobic 6. Other..... [1]

FLOW LEVEL: (relative to "water mark", i.e. normal inundation level shown by limit of terrestrial grasses, by eroded area, or by boundary in bank sediment types.)

1. No flow 2. Low 3. Moderate 4. High 5. Flood [2]
(dry/isolated pools) (<< water mark) (around water mark) (>> water mark)

DO NOT SAMPLE IN HIGH FLOW OR FLOOD

BARE GROUND above normal inundations level shown by "water mark": looking downstream Left bank 0 %
(This refers only to erosional ground; bedrock is not erosional ground.) Right bank 10 %

LOCAL CATCHMENT EROSION: (within sight of site) 1. None 2. Slight 3. Moderate 4. Heavy [1]

LOCAL POINT SOURCE POLLUTION: 1. None 2. Gravel road/track/ford 3. Tip 4. Quarry 5. Drain

1. Fish farm 7. Earthworks 8. Mine 9. Stock access point 10. Culvert 11. STP
12. Other..... [1]

DAMS / BARRIERS:

1. Present upstream 2. Small artificial structure (e.g. weir) at or immediately downstream of site
3. Absent 4. Not known [3]

BRAIDING: 1. Yes, number of channels..... 2. No [2]

SITE CLASSIFICATION: 1. Steep valley 2. Broad valley 3. Plains [2]

LEFT BANK AND RIGHT BANK REFER TO DIRECTION FACING DOWNSTREAM.

LANDUSE: 1. Native forest 2. Forestry 3. Native heath/grassland 4. Grazing 5. Cropped
Left Bank 6. Residential 7. Industrial 8. Recreational 9. Intensive agriculture [4]

LANDUSE: 1. Native forest 2. Forestry 3. Native heath/grassland 4. Grazing 5. Cropped
Right Bank 6. Residential 7. Industrial 8. Recreational 9. Intensive agriculture [4]

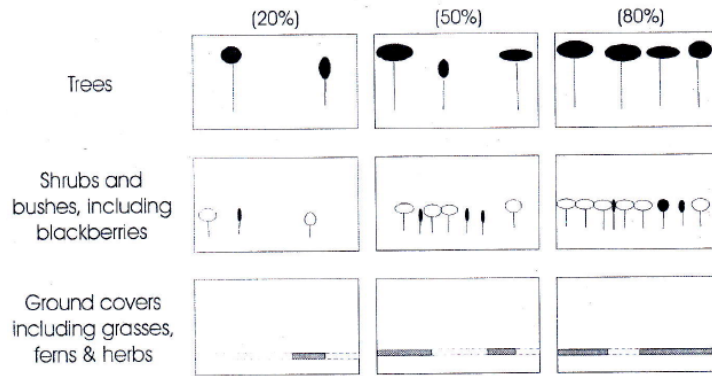
BARS: (bed surface protruding from water and forming a bar within the channel) 75 %

HAS THERE BEEN HEAVY RAINS OR SPATES IN THE LAST WEEK? 1. Yes 2. No 3. Not sure [1]

ALL LEFT BANK AND RIGHT BANK REFER TO DIRECTION FACING DOWNSTREAM
WIDTH of riparian zone (to a maximum of 30 m perpendicular to flow)

Left Bank: 20 m

Right Bank: 20 m

STRUCTURAL COMPOSITION of riparian zone. Using the diagrams below as a guide, tick the box corresponding to the percentage category that best describes the percent cover of each vegetation category; evaluate left (L) and right (R) bank separately.


	0	1	2	3	4
	0%	<20%	20-50%	50-80%	>80%
L	[]	[]	[x]	[]	[]
R	[]	[]	[x]	[]	[]
L	[]	[x]	[]	[]	[]
R	[]	[x]	[]	[]	[]
L	[]	[]	[]	[]	[x]
R	[]	[]	[]	[]	[x]

EXOTIC VEGETATION What percentage of each of the following categories is made up of exotic vegetation?

	0%	1-10%	11-40%	41-60%	>60%
Trees	0	1	2	3	4
Shrub Layer	0	1	2	3	4
Ground Cover	0	1	2	3	4

LONGITUDINAL EXTENT of riparian vegetation. Choose one category for each bank. Do not include ground cover layer except where site is in native grassland.

	Left Bank	Right Bank
0. None	[]	[]
1. Isolated / scattered	[]	[]
2. Regularly spaced	[]	[]
3. Occasional clumps	[3]	[3]
4. Semi-continuous	[]	[]
5. Continuous	[]	[]

ARE ALL SPACES FILLED IN ON ALL SHEETS? Yes [x] Checked Kirsten Hogan

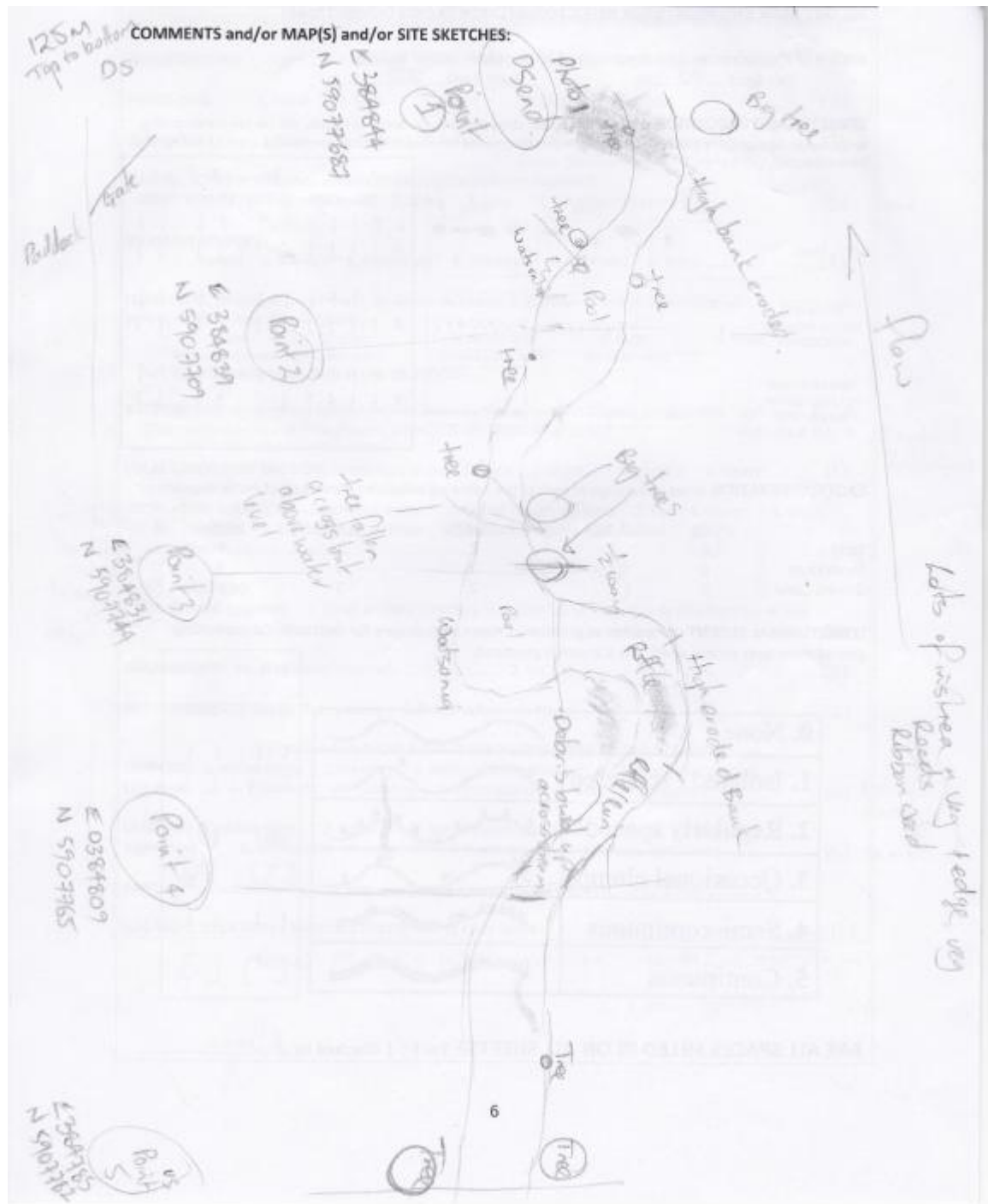


TABLE B2.5 - Rapid Bioassessment Methodology for Rivers and Streams GB_MER008**RAPID BIOASSESSMENT METHODOLOGY FOR RIVERS AND STREAMS**

APPENDIX 3: FIELD SAMPLING AND HABITAT ASSESSMENT SHEETS

RIVER: Merton Creek CATCHMENT: Goulburn River
 LOCATION: Merton Creek at Strathbogrie Road, Merton - upstream of bridge
 DATE: 23-11-16 TIME: 17:00 am
 LOCATION CODE: GB_MER008 PHOTOGRAPHS: Yes
 RECORDER(S) NAME(S): Kirsten Hogan and Danielle Beischer

AUSTRALIAN MAP GRID REFERENCE

EASTING: 386722 NORTHING: 5906492

IS LOCATION DOCUMENTATION COMPLETE? Yes

LENGTH OF SURVEYED REACH: 80 m

This is defined as 10x the average stream width, to a maximum of 150m. Minimum reach length is 50m.

Stream Habitat in surveyed reach (%) Riffle/Run 70 % Pool 30 %

Stream Width from edges of water.

Take 5 evenly spaced measurements within surveyed reach; also record maximum and minimum.

1. 10 m 2. 7 m 3. 11 m 4. 12 m 5. 6 m Max.: 12 m Min.: 6 m

Method used: tape measure [] range finder [x] estimate []

Channel width from tops of banks 1. 19 m 2. 22 m 3. 26 m 4. 35 m 5. 25 m

Method used: tape measure [] range finder [x] estimate []

WATER QUALITY MEASUREMENTS:

Instrument(s) make, model and number ...Eutech PCD 650 and Hach 2100 Q Turbidity Meter

Water temperature (°C): 17.3

pH: 6.0

Conductivity (ambient): N/A...µS/cm N/A mS/cm

Alkalinity (mg/L): N/A

Measured in lab [] or field []

Conductivity (@25°C): 168 µS/cm N/A mS/cm

Dissolved Oxygen (mg/L) 8.8

(agitate probe if flow <5cm/sec)

Turbidity (NTU) 105

Measured in lab [] or field [x]

% Sat. Dissolved Oxygen: 89

(agitate probe if flow <5cm/sec)

Water samples collected for: Nutrient Analysis

Yes [x] No []

Turbidity

Yes [] No [x]

Alkalinity

Yes [] No [x]

REACH: All information in this section refers to the entire reach.

SUBSTRATE DESCRIPTION (% cover): USE PARTICLE SIZE DIAGRAM.

Bedrock	[	0	]
Boulder (>256 mm)	[	0	]
Cobble (64 - 256 mm)	[	5	]
Pebble (16 - 64 mm).....	[	45	]
Gravel (2 - 16 mm).....	[	20	]
Sand (0.06 – 2 mm).....	[	20	]
Clay/Silt (<0.06 mm).....	[	10	]
Total		100%	

OTHER STREAM FEATURES

Percent of reach covered by	<1%	1-10%	10-35%	35-65%	65-90%	>90%
Willow Roots	oa	ob	1	2	3	4
Moss	oa	ob	1	2	3	4
Filamentous algae	oa	ob	1	2	3	4
Loose silt lying on substrate (organic & inorganic)	oa	ob	1	2	3	4
Total macrophytes	oa	ob	1	2	3	4

(For macrophytes, include those which are out of the water but in the active channel.)

ORGANIC MATERIAL (% cover of organic material)

Coarse Particulate Organic Material (leaves and wood < 10 cm in diameter)	1. <5%	2. 5-20%	3. >20%	[2]
Snags/Large Organic Material (wood >10 cm diameter)	1. <5%	2. 5-20%	3. >20%	[2]

CURRENT VELOCITY IN REACH: Choose one percentage category for each flow category in the reach:

	<u>0%</u>	<u>1-10%</u>	<u>11-40%</u>	<u>41-60%</u>	<u>>60%</u>
No obvious flow	0	1	2	3	4
Slow	0	1	2	3	4
Medium/moderate	0	1	2	3	4
Fast to very fast	0	1	2	3	4

VEGCAT (Landuse category for AUSRIVAS.) Land use beyond the riparian zone (30m). [3]

1. Urban
2. Intensive agriculture
3. Mostly cleared, grazing
4. Significant patches of forest remaining, some forestry/agriculture (eg. Grazing)
5. Native forest/natural vegetation

SHADING of stream channel, as at mid day (shading category for AUSRIVAS). Use % shading diagrams.

1. <5%
 2. 6 – 25%
 3. 26 – 50%
 4. 51 – 75%
 5. >76%
- [1]

RIFFLE/RUN: All information in this section refers only to the riffle/run area sampled. **N/A this site**

Invertebrates collected by: Kirsten Hogan Invertebrates picked/sorted by: Kirsten Hogan
 Length of riffle/run sampled: 10 metres [x] Other.....metres. Time taken to pick sample...40.....mins.
 Approx.# of invertebrates picked: 200[] 150 [] 100 [] 50 [] if < 150, why?

SUBSTRATE DESCRIPTION (% cover): USE PARTICLE DIAGRAM.

Bedrock.....[	0	]	
Boulder(>256 mm)	0	]	If riffle/run not sampled, why not?
Cobble (64 - 256 mm)	0	]	1. Not present []
Pebble (16 - 64 mm).....[	50	]	2. Too shallow []
Gravel (2 - 16 mm).....[	20	]	3. Too small []
Sand (0.06 – 2 mm).....[	15	]	4. Too dangerous []
Clay/Silt (<0.06 mm).....[	15	]	5. Other.....[]
Total.....100%.....			

Percent of sampled area covered by	<1%	1-10%	10-35%	35-65%	65-90%	>90%
Willow Roots	oa	ob	1	2	3	4
Moss	oa	ob	1	2	3	4
Filamentous algae	oa	ob	1	2	3	4
Macrophytes	oa	ob	1	2	3	4
Loose silt lying on substrate (organic & inorganic)	oa	ob	1	2	3	4

Coarse Particulate Organic Material (leaves and wood < 10 cm in diameter)	1. <5%	2. 5-20%	3. >20%	[1]
Snags/Large Organic Material (wood >10 cm diameter)	1. <5%	2. 5-20%	3. >20%	[1]

DEPTH 1. 10 cm 2. 30 cm 3. 50 cm 4. 20 cm 5. 15 cm

Take 5 representative measurements from the riffle/run habitat over the range of depths in the kick sample.

CURRENT VELOCITY in sampled area: Tick boxes for each current velocity present; more than 1 box can be ticked:

Kick sample : 0. No flow [] 1. Slow [] 2. Medium/moderate [x] 3 Fast to very fast [x]

EDGE/BACKWATER: All information in this section refers only to the edge area sampled.

Invertebrates collected by: Dani Beischer Invertebrates picked/sorted by: Dani Beischer
 Length of riffle/run sampled: 10 metres [x] Other.....metres. Time taken to pick sample...40.....mins.
 Approx.# of invertebrates picked: 200[] 150 [] 100 [] 50 [] if < 150, why?.....

Percent of sampled area covered by	<1%	1-10%	10-35%	35-65%	65-90%	>90%
1. Backwaters	oa	ob	1	2	3	4
2. Leaf packs/CPOM	oa	ob	1	2	3	4
3. Undercut banks	oa	ob	1	2	3	4
4. Roots	oa	ob	1	2	3	4
5. Bare edge	oa	ob	1	2	3	4
6. Logs	oa	ob	1	2	3	4
7. Trailing bank vegetation (including grasses)	oa	ob	1	2	3	4
8. Filamentous algae	oa	ob	1	2	3	4
9. Macrophyte	oa	ob	1	2	3	4
10. Moss	oa	ob	1	2	3	4
11. Loose silt lying on substrate (organic & inorganic)	oa	ob	1	2	3	4
12. Other.....	oa	ob	1	2	3	4

CURRENT VELOCITY in sampled area: Tick boxes for each current velocity present; more than 1 box can be ticked:

Edge sample : 0. No flow [x] 1. Slow [x] 2. Medium/moderate [x] 3 Fast to very fast [x]

SITE OBSERVATIONS (Indicate appropriate number in brackets at right; some may consist of >1 category.)

WATER ODOURS: 1. Normal 2. Sewage 3. Petroleum 4. Chemical 5. Stormwater 6. Musty [1]

WATER OILS: 1. None 2. Slick 3. Sheen 4. Globbs 5. Flecks [3]

TURBIDITY: 1. Clear 2. Slight 3. Turbid 4. Opaque/ liquid silt (clay like) [3]

PLUME: (ONLY in riffle/run; amount of easily disturbed fine sediment)

1. Little or none 2. Some 3. Lots 4. No riffle/run present [2]

SEDIMENT ODOURS:

1. Normal 2. Sewage 3. Petroleum 4. Chemical 5. Anaerobic 6. Other..... [1]

FLOW LEVEL: (relative to "water mark", i.e. normal inundation level shown by limit of terrestrial grasses, by eroded area, or by boundary in bank sediment types.)

1. No flow 2. Low 3. Moderate 4. High 5. Flood [4]
(dry/isolated pools) (<< water mark) (around water mark) (>> water mark)

DO NOT SAMPLE IN HIGH FLOW OR FLOOD

BARE GROUND above normal inundations level shown by "water mark": looking downstream Left bank 5 %
(This refers only to erosional ground; bedrock is not erosional ground.) Right bank 25 %

LOCAL CATCHMENT EROSION: (within sight of site) 1. None 2. Slight 3. Moderate 4. Heavy [2]

LOCAL POINT SOURCE POLLUTION: 1. None 2. Gravel road/track/ford 3. Tip 4. Quarry 5. Drain

1. Fish farm 7. Earthworks 8. Mine 9. Stock access point 10. Culvert 11. STP
12. Other..... [9]

DAMS / BARRIERS:

1. Present upstream 2. Small artificial structure (e.g. weir) at or immediately downstream of site
3. Absent 4. Not known [2]

BRAIDING: 1. Yes, number of channels.....2..... 2. No [1]

SITE CLASSIFICATION: 1. Steep valley 2. Broad valley 3. Plains [2]

LEFT BANK AND RIGHT BANK REFER TO DIRECTION FACING DOWNSTREAM.

LANDUSE: 1. Native forest 2. Forestry 3. Native heath/grassland 4. Grazing 5. Cropped
Left Bank 6. Residential 7. Industrial 8. Recreational 9. Intensive agriculture [4]

LANDUSE: 1. Native forest 2. Forestry 3. Native heath/grassland 4. Grazing 5. Cropped
Right Bank 6. Residential 7. Industrial 8. Recreational 9. Intensive agriculture [4]

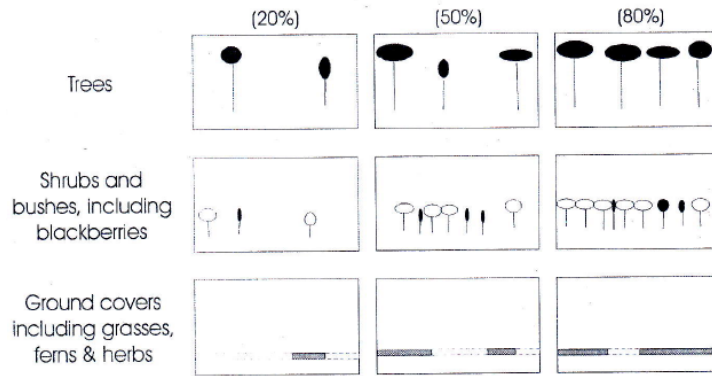
BARS: (bed surface protruding from water and forming a bar within the channel) 75 %

HAS THERE BEEN HEAVY RAINS OR SPATES IN THE LAST WEEK? 1. Yes 2. No 3. Not sure [1]

ALL LEFT BANK AND RIGHT BANK REFER TO DIRECTION FACING DOWNSTREAM
WIDTH of riparian zone (to a maximum of 30 m perpendicular to flow)

Left Bank: 30 m

Right Bank: 30 m

STRUCTURAL COMPOSITION of riparian zone. Using the diagrams below as a guide, tick the box corresponding to the percentage category that best describes the percent cover of each vegetation category; evaluate left (L) and right (R) bank separately.


	0	1	2	3	4
	0%	<20%	20-50%	50-80%	>80%
L	[]	[x]	[]	[]	[]
R	[]	[x]	[]	[]	[]
L	[x]	[]	[]	[]	[]
R	[x]	[]	[]	[]	[]
L	[]	[]	[]	[]	[x]
R	[]	[]	[]	[]	[x]

EXOTIC VEGETATION What percentage of each of the following categories is made up of exotic vegetation?

	0%	1-10%	11-40%	41-60%	>60%
Trees	<u>0</u>	1	2	3	4
Shrub Layer	<u>0</u>	1	2	3	4
Ground Cover	0	1	2	3	<u>4</u>

LONGITUDINAL EXTENT of riparian vegetation. Choose one category for each bank. Do not include ground cover layer except where site is in native grassland.

		Left Bank	Right Bank
0. None		[]	[]
1. Isolated / scattered		[1]	[1]
2. Regularly spaced		[]	[]
3. Occasional clumps		[]	[]
4. Semi-continuous		[]	[]
5. Continuous		[]	[]

ARE ALL SPACES FILLED IN ON ALL SHEETS? Yes [x] Checked Kirsten Hogan

