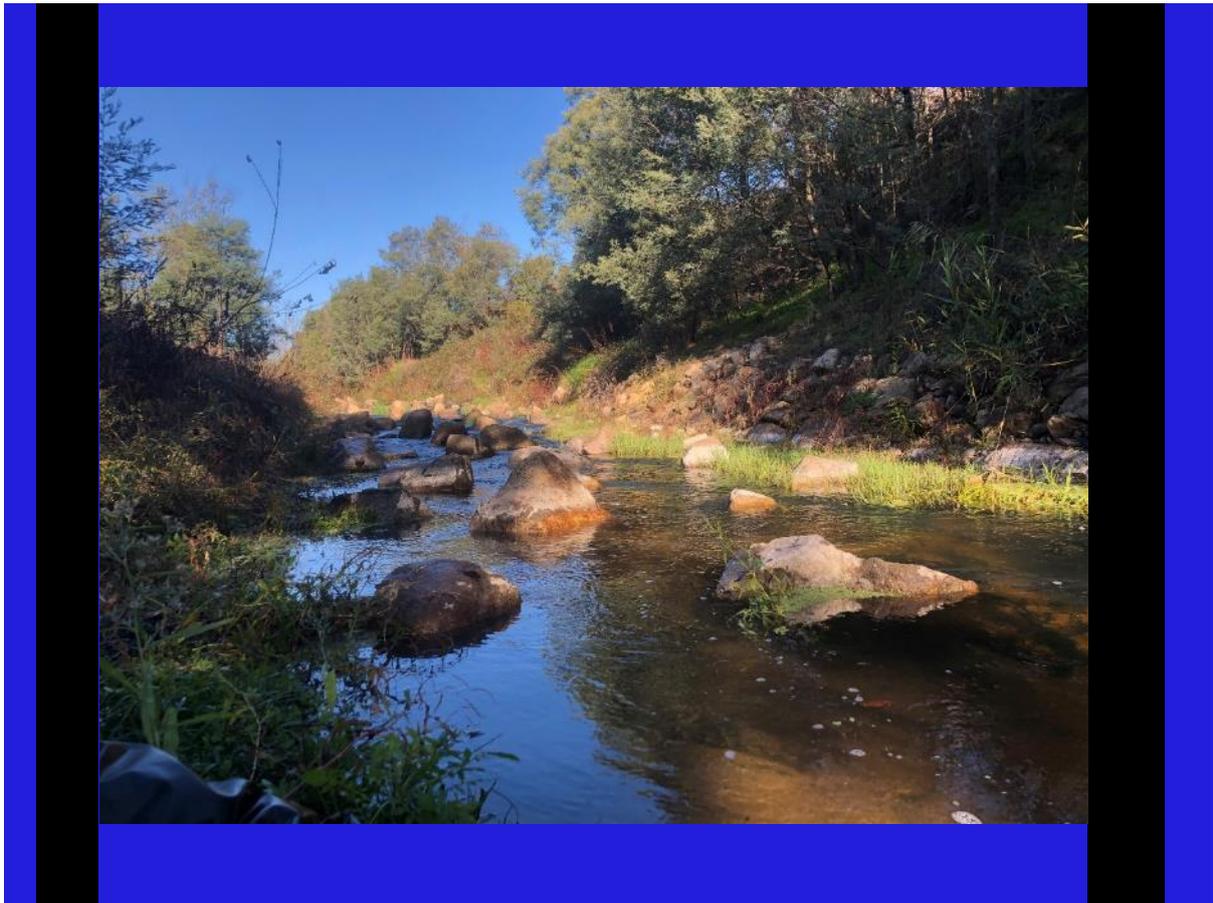


2023 Healthy Waterways Strategy Fish Survey

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2023 Healthy Waterways Strategy Fish Survey
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Jacobs Group (Australia) Pty Limited

Floor 11, 452 Flinders Street
Melbourne, VIC 3000
PO Box 312, Flinders Lane
Melbourne, VIC 8009
Australia

T +61 3 8668 3000
F +61 3 8668 3001
www.jacobs.com

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Executive summary

The Healthy Waterways Strategy (HWS) 2018-28 sets out a strategy for managing the health of rivers, wetlands and estuaries in the Melbourne Water Management Region (Port Phillip and Westernport regions). To assess progress against HWS objectives and to understand the success of their investment programs, MW collect data to inform annual reporting. Data gathering for such reporting follows the Monitoring Evaluation Reporting and Improvement (MERI) framework. The MERI was developed to provide guidance for data collection and reporting so that Melbourne Water (MW) can conduct condition reporting of key values and conditions, track progress towards objectives, and evaluate and understand the effectiveness of management actions so that they can improve decision making regarding catchment management. One of the key ecological values outlined in the HWS is fish communities. To achieve this monitoring aim, MW engaged Jacobs to undertake fish surveys across the Werribee, Maribyrnong, Yarra, Dandenong, and Western Port catchments within the Melbourne Water Management Region and to report the findings for later analysis in line with the MERI framework.

Surveys were undertaken at 24 sites across the Werribee (4 sites), Maribyrnong (3 sites), Yarra (7 sites), Dandenong (2 sites), and Western Port (8 sites) catchments within the Melbourne Water Management Region in late Autumn, between the 2-25th May 2022. Nine of the priority riverine species outlined in the MERI, were present at one or more of the study sites, which provides support for their choice as monitoring locations: Australian grayling (*Prototroctes maraena*), Common galaxias (*Galaxias maculatus*), Estuary Perch (*Percalates colonorum*), Ornate galaxias (*Galaxias ornatus*), River blackfish (*Gadopsis marmoratus*), Short-finned eel (*Anguilla australis*), Shorthead lamprey (*Mordacia mordax*), Southern pygmy perch (*Nannoperca australis*), Tupong (*Pseudaphritis urvillii*), and Yarra pygmy perch (*Nannoperca obscura*).

Notable non-detections relative to expectations included Dwarf galaxias (*Galaxias pusilla*) that were not captured in Balcombe Creek or Cardinia Creek where they were expected to be present. Short-headed lamprey (*Mordacia mordax*) was not caught in the Yarra or Werribee catchment sites where they were thought likely to be. Australian grayling was not found in Cardinia Creek where they may have been present, and Australian mudfish were not detected on the Yarra River below Dights Falls, although they have not been detected there for many years.

We conducted an analysis of catchment condition based on species richness and nativeness indices, which indicated that each of the MW catchments are in *low* (Werribee), *moderate* (Maribyrnong and Dandenong), or *high* (Yarra and Western Port) condition. We also investigated various health metrics related to non-migratory priority species. These results showed that YOY and 1+ Ornate galaxias were present in the Yarra catchment, suggesting successful recruitment is occurring and individuals are surviving to reproductive age. However, for the second consecutive year only 1+ fish were observed in the Werribee catchment at the Lerderderg Gorge site (LER-22832-7). Nearly a third of the fish at this site were also infected by parasites, similar to the previous year. In addition, Brown trout were detected at the site and are known to heavily predate on this species, particularly young-of-year fish that exhibit a preference for pelagic feeding. Together these results indicate the continuing poor health of this population.

At almost every catchment where River blackfish and Southern pygmy perch were recorded, both YOY and 1+ fish were present, again suggesting successful recruitment during the last breeding season and that individuals are surviving to reproductive age.

Based on the results we recommend the following actions:

- As Dwarf galaxias have not been captured at Balcombe Creek, Upper Dandenong Creek or Lower Cardinia Creek in 2022 or 2023, consider additional survey effort at these sites. Additional survey effort could include intensive dip netting and/or overnight bait trapping and fyke netting. Additional survey sites could be added at nearby wetland habitats or smaller tributaries, however wetland surveys are likely outside the scope of this project.
- Consider additional survey effort (fyke netting) for Australian grayling at the Maribyrnong River, as this target species has not been recorded in 2022 or 2023 at this site. The species is known from the Maribyrnong in the vicinity of the survey site but in low abundance.
- As River blackfish were not recorded at Werribee Gorge or Lerderderg Gorge in 2023, additional survey sites within and upstream of the gorges should be considered in 2024 so the status of these

poorly known and potentially imperilled populations can be better understood. Additional sites in Lerderderg Gorge would also help determine if and where successful Ornate galaxias recruitment is taking place and to provide a clearer picture of overall population health. This is a necessary step if early intervention is to take place for any of these populations.

- If the current Lower Cardinia Creek site is not to be moved, add a site below the Thompson Road structure and fishway on Cardinia Creek to improve the likelihood of surveying Australian grayling in the catchment. The Thompson Road structure and fishway is thought to prevent the upstream movement of Australian grayling. Having sites above and below the fishway will allow for upstream/downstream comparison and confirmation of its impact on fish movement, which could inform remediation actions.

In summary, the aims of the project were achieved. The results add to the previous year of sampling and provide a sound point of comparison against future surveys. Furthermore, the data is recorded in such a way that it can be analysed in line with the MERI. Finally, our brief analysis aids with interpretation of the data, providing some general insight into catchment condition and the status of the non-migratory priority species.

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1. Introduction

The Healthy Waterways Strategy 2018-28 sets a long-term vision for managing the health of rivers, wetlands and estuaries in the Port Phillip and Westernport region. As waterway managers in the region, Melbourne Water (MW) are responsible for monitoring the progress of the Healthy Waterways Strategy (HWS).

To assess progress against HWS objectives and to understand the success of their investment programs, MW collect information to inform annual reporting, leading towards an end-of- strategy (2026) review. A key component of the information gathering, and reporting process is the Monitoring Evaluation Reporting and Improvement framework (MERI) (King *et al.* 2020). The framework is in place to guide the monitoring programs which are required to inform the HWS reporting and reviews. The MERI objective is to assess if the performance objectives and targets for each major catchment are being achieved. A key success measure is the state or condition of key values (birds, fish, frogs, etc.), and whether each key value is achieving its projected trajectories, objectives and targets. As one of the key waterway values set out in the HWS, monitoring programs have been put in place to track the state and trajectory of fish values in the region. This monitoring program has been established to complement other programs measuring progress against the objectives and targets set for fish in the region and commenced in 2022 (Jacobs 2022).

In March 2023, MW engaged Jacobs to undertake the second year of fish surveys across the Port Phillip and Westernport regions as part of the HWS program. The aim of the project is to undertake fish surveys across the Werribee, Maribyrnong, Yarra, Dandenong, and Western Port catchments within the Melbourne Water Management Region and to report the findings for later analysis in line with the MERI framework.

2. Methods

2.1 Survey sites and timing

Surveys were undertaken at 24 sites across the Werribee (4 sites), Maribyrnong (3 sites), Yarra (7 sites), Dandenong (2 sites), and Western Port (8 sites) catchments within the Melbourne Water Management Region in late Autumn, between the 2–25th May 2022. Flows were relatively stable and weather conditions were suitable for fish sampling (Appendix A).

The sites were selected by MW prior to the first year of sampling in 2022, with some refinement based on input from Jacobs. Site selection was based on proximity to previous sampling sites and fish records, known or likely habitat for fish, the representative nature of a site in the broader system, location relative to fish barriers that may impact fish population and movement, or proximity to previous eDNA and water quality sampling sites.

Following sampling in 2022, two sites were determined to be not suitable, as they were either located too close to other sites or too difficult to sample effectively, so they were moved for 2023 sampling and future years. The Balcombe Creek site (BLC-3709-0) was moved ~1km downstream to Briars Parkland, just upstream of the confluence with Devil Bend Creek as fishing efficiency was greatly limited at the previous site by thick emergent vegetation and blackberries. The lower Bunyip River site (BNY-70608-3) was moved ~9km downstream to the intersection of Main Drain Road and Dessent Road as it was decided that it was too close to the Tarago River site (TAR-22224-5). A full list of site codes, descriptions, and coordinates (at the downstream end of study reach) are listed in Table 1 and shown in Figure 1.

No additional sites were included in 2023.

During sampling, the location coordinates of the upstream and downstream ends of the sampling reach were recorded to ensure that study reach can be accurately relocated during subsequent surveys (see Appendix A for both downstream and upstream coordinates).

Table 1 Study sites, site specific target species and locations. Words in bold indicate site names used in this report. Sites that were moved between 2022 and 2023 sampling are highlighted in blue.

Site code	Catchment	Site description and MW site target species	Latitude	Longitude
LER-22832-7	Werribee River	Lerderderg Gorge , Lerderderg River, Mackenzies Flat Picnic Area. Target species: River blackfish and Short-headed lamprey	-37.61468	144.42484
WERRIBEE GORGE		Werribee Gorge , upstream of Meikles Point picnic area. Target species: River Blackfish	-37.67258	144.36253
WER-30289-9		Middle Werribee River , Werribee Vale Road, downstream of diversion weir. Australian Grayling (although site is above the Melton Reservoir)	-37.67916	144.37922
WER-138085-6		Lower Werribee River , Werribee River, downstream of lower diversion weir, off Redgum Close. Target species: Tupong, Common Galaxias, Short-finned Eel	-37.88260	144.64074
DPW-13586-2	Maribyrnong River	Upper Deep Creek , Deep Creek at Musteys Bridge. Target species: Yarra Pygmy Perch and Southern Pygmy Perch	-38.21579	145.09347
DPW-63085-7		Lower Deep Creek , Deep Creek, Konagaderra Bridge Reserve, off Konagaderra Rd. No target species.	-37.55105	144.84959
MRB-130320-2		Maribyrnong River , off Flora Street, Keilor, 100m d/s of Calder Fwy crossing. Target species: Australian Grayling.	-37.72097	144.83980
PLE-16938-4	Yarra River	Plenty River , accessed from parklands off Laurel Street	-37.51481	145.12621
ART-4232-0		Diamond Creek , below confluence with Arthurs Creek, upstream of Arthurs Creek Road. Target species: Tupong	-37.63724	145.19173

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Site code	Catchment	Site description and MW site target species	Latitude	Longitude
NCC-3576-4		New Chum Creek , downstream from Blackwoods Road crossing. Target species: River Blackfish	-37.61969	145.49809
YAR-42313-7		Upper Yarra River at reservoir gate. Target species: River Blackfish and Short-headed Lamprey	-37.67416	145.87355
YAR-374049-3		Lower Yarra River , immediately downstream of Dights Falls. Target species: Australian Mudfish	-37.79699	145.00099
HDL-2685-5		Hoddles Creek , Hoddles Creek Bushland Reserve, upstream of Glenview Road bridge crossing. Target species: River Blackfish, Short-headed Lamprey and Tupong	-37.79669	145.58481
WOY-8964-3		Woori Yallock Creek , off Macclesfield Road. Target species: River Blackfish and Short-headed Lamprey	-37.81328	145.50353
DNG-13753-1	Dandenong Creek	Upper Dandenong Creek , downstream end at High Street Road Bridge. Target species: Dwarf Galaxias.	-37.87656	145.19189
DNG-31881-2		Lower Dandenong Creek , upstream of fishway, off Perry Road. No target species.	-38.02988	145.18458
BLC-3709-0	Western Port	Balcombe Creek , upstream end of the Briars Parkland, within swamp and defined creek, upstream of the confluence with Devil Bend Creek. Target species: Dwarf Galaxias.	-38.26683	145.05521
CDC-7795-5		Upper Cardinia Creek , upstream of Luke Place bridge. No target species.	-38.01169	145.38379
CDC-10600-4		Lower Cardinia Creek , at environmental reserve off Pebblestone Circuit. Target species: Australian Grayling.	-38.08553	145.38149
BNY-11161-3		Upper Bunyip River , Bunyip State Forest, upstream from start of Freemans Mill Track, off Aqueduct Track. Target species: Short-finned Eel, River Blackfish, Short-headed Lamprey, Southern Pygmy Perch and Tupong	-37.97040	145.73629
BNY-70608-3		Lower Bunyip River , at the intersection of Main Drain Road and Dessent Road. Target species: Short-finned Eel, Common Galaxias, and Tupong	-38.13716	145.64400
TAR-22224-5		Tarago River , Tarago River Picnic Point Reserve, off Princes Way. Target species: Short-finned Eel, Common Galaxias and Tupong	-38.08323	145.81177
LNG-29460-1		Lang Lang River in stream reserve off Camerons Road. Target species: Tupong and Short-headed Lamprey	-38.23992	145.61047
BAS-22307-6		Bass River , private property immediately upstream of Grantville-Glen Alvie Road bridge. No target species.	-38.43674	145.56327

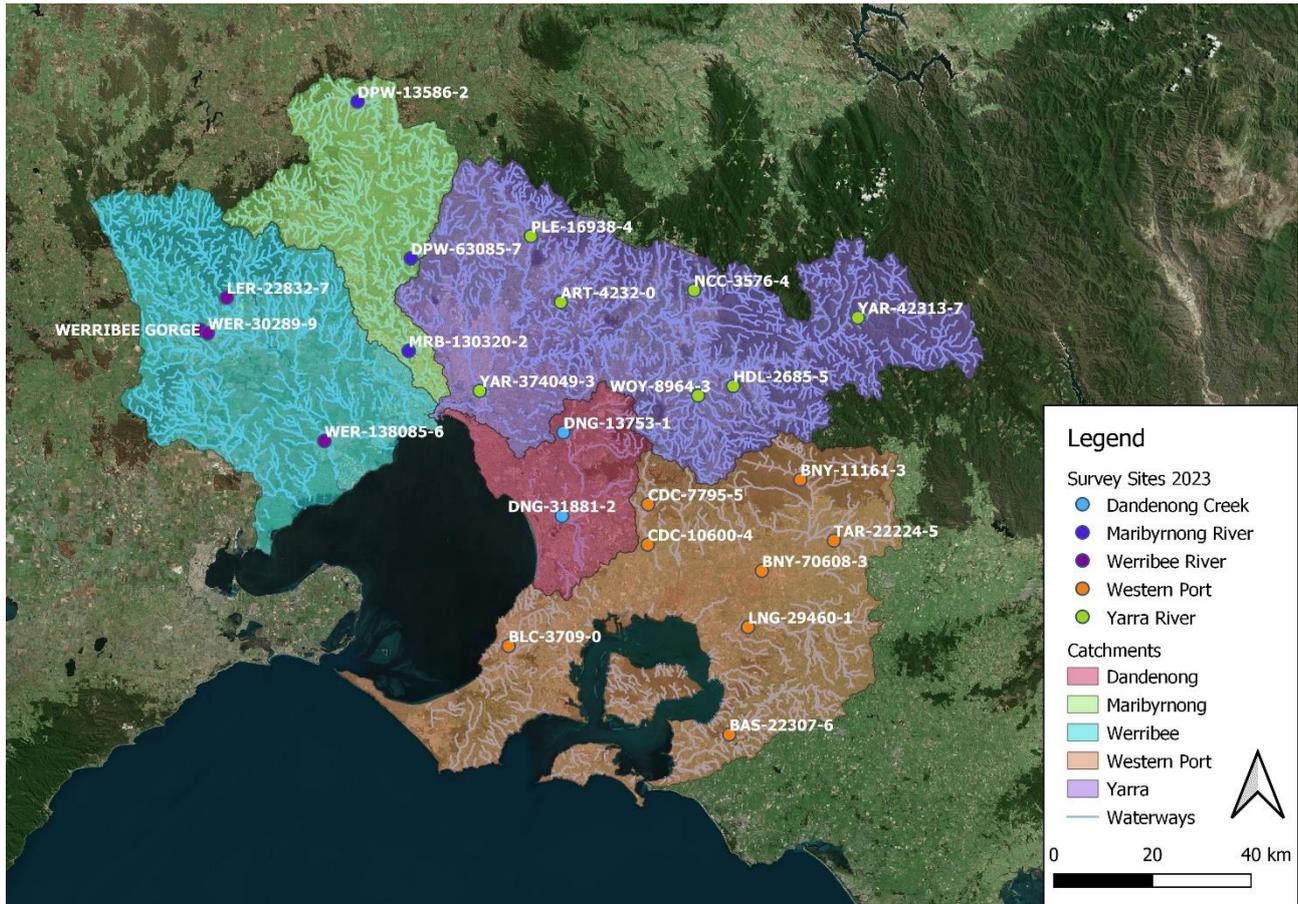


Figure 1 The location of fish survey sites (dots) within each of the major catchments within the Melbourne Water Management Region

2.2 Recording of water quality and physical habitat

An instream habitat assessment was undertaken at all sites surveyed following the specified MW format (Appendix A). This assessment included in-situ measurement of water quality parameters and estimation of biological and physical attributes (e.g. wetted instream cover, riparian shading, aquatic vegetation, substrate composition, flow and depth).

Water quality measurements were taken at each site prior to other surveys being undertaken using a calibrated YSI ProPlus water quality meter. Water quality variables measured were:

- Temperature
- pH
- Conductivity
- Turbidity
- Specific Conductivity
- Dissolved Oxygen (mg/L and % saturation)

In line with the project brief, this data is summarised here and broadly discussed in such a way to allow for assessment of the physical conditions that may affect sampling efficiency and fish condition at each site. It may also be used as a point of reference when interpreting changes in fish communities during any subsequent surveys.

2.3 Fish surveys

2.3.1 Data collection

The fish survey aimed to collect the following variables from each site:

- Species present
- Number of each species caught
- Lengths of individual fish (if necessary, a sub-sample of 30 fish per site/ per species/ per method was measured)
- Health and condition of individuals (parasites, lesions, diseases, and abnormalities (sub-sampled where necessary))

All fish captured were identified, weighed and measured prior to release. Fish that were observed but not captured were also recorded.

2.3.2 Electrofishing

Fish monitoring was conducted using an E-Fish backpack electrofisher following Sustainable Rivers Audit methods (MDBC 2008). In brief, 8 x 150 second power-on electrofishing shots were made, moving in an upstream direction over a continuous stream reach, with all representative habitat types being fished. Sampling effort (pulse time on), and voltage and ampere settings were recorded (Appendix A).

Electrofishing was conducted by a suitably qualified senior electrofisher operator and an experienced assistant. All electrofishing was conducted in accordance with the Australian Code of Electrofishing Practice (NSW Fisheries 1997).

2.3.3 Bait traps

At each site 10 bait traps were deployed in water less than 1 m depth. Traps were not baited and were set in slow flowing or backwater areas independent from electrofishing. Traps were set for the duration of the site visit, typically being cleared after 2.5 hours. Fish captures were recorded for each individual trap.

2.3.4 Dip netting

Targeted dip netting was conducted over a 10-minute period at where small-bodied priority species (see Table 3) were predicted to be present but were not caught with the electrofisher or bait traps. During a random walk of the site, the dip nets were pushed through vegetation and checked for fish catch between dips. Ultimately, this method was applied at sites on Upper Deep Creek (DPW-13586-2), Lower Cardinia Creek (CDC-10600-4), Upper Cardinia Creek (CDC-7795-5) Balcombe Creek (BLC-3709-0), Upper Bunyip River (BNY-11161-3), and Dandenong Creek (DNG-13753-1).

2.3.5 Data analysis and presentation

The MERI outlines a number of metrics, that can be informed by the type of data collected in this project, that provide insight into community and species level health at individual monitoring sites and more broadly across the MW catchments. As the scope of this project is limited to a more general overview of the results of the survey, we only present what we consider to be the key findings that help with the overall interpretation of results.

2.3.5.1 Community level metrics

At the community level we focussed on species richness and nativeness (i.e. the proportion of native species compared to exotic species), using an adaptation of the catchment-level metrics of condition presented in the MERI for guide our interpretation of the results (Table 2). Notably, we did not include an analysis of observed versus expected species richness. Furthermore, we used proportional abundance rather than biomass as a measure of nativeness as we considered it a more reliable measurement; eels (often the heaviest native fish) are very difficult to weigh in the field and can greatly skew biomass results. We combined the fish community condition scores by assigning values of 1-5 (1 = very low, 5 = very high) to each metric and

calculating the overall median score. This is to provide an overall catchment condition rating, but we note that this is not a complete assessment, and the results should be interpreted accordingly.

Table 2 Metrics for assessing fish community condition at the catchment scale (adapted in part from King *et al.* 2020).

Metric	Very high	High	Moderate	Low	Very low
Species richness	>8 native species	7-8 native species	4-6 native species	2-3 native species	<2 native species
Nativeness (species richness)	>90% native species	70-89% native species	50-69% native species	30-49% native species	<30% native species
Nativeness (abundance)	>90% native biomass	70-89% native biomass	50-69% native biomass	30-49% native biomass	<30% native biomass

2.3.5.2 Species level metrics

At the species level, we focussed on priority non-migratory species outlined in the MERI (Table 3). These non-migratory species exist in isolated populations within the MW management region and are each experiencing population decline. Being non-migratory, their health reflects the habitat condition in the direct vicinity of the study reach. As such we chose to focus on them in this instance. Specifically, we report on species abundance, health (e.g. parasites, fin damage), and evidence of reproduction (i.e. presence of young-of-year fish).

Of the priority species captured, we considered young-of-year fish to be:

- Ornate galaxias ≤ 50mm (Hammer and Beitzel 2018)
- River blackfish ≤ 80mm (Sanger 1986)
- Yarra pygmy perch ≤ 48mm (Wedderburn *et al.* 2019)
- Southern pygmy perch ≤ 36mm (Humphries 1995)

Table 3 List of priority non-migratory fish species for monitoring in the MW management region and rationale for their selection (adapted in part from King et al. 2020).

Common name	Scientific name	Current conservation status	Rationale
Australian mudfish	<i>Neochanna cleaveri</i>	IUCN: Endangered, unknown FFG: Endangered	Threatened species.
Dwarf galaxias	<i>Galaxiella pusilla</i>	IUCN: Endangered, decreasing EPBC: Vulnerable FFG: Endangered	Threatened species. Representative of non-migratory riverine life history.
Ornate galaxias	<i>Galaxias ornatus</i>	IUCN: Least concern, decreasing	Representative of non-migratory riverine life history.
River blackfish	<i>Gadopsis marmoratus</i>	IUCN: Least concern, decreasing	Representative of non-migratory riverine life history. Risk of climate change impact.
Southern pygmy perch	<i>Nannoperca australis</i>	IUCN: Near threatened, decreasing	Representative of non-migratory wetland life history.
Yarra pygmy perch	<i>Nannoperca obscura</i>	IUCN: Endangered, decreasing EPBC: Vulnerable FFG: Vulnerable	Threatened species.

3. Results

3.1 Water quality and physical habitat

Water quality and physical habitat measurements taken at each study sites are summarised in Table 4. At all sites conditions were suitable for fish sampling (i.e. fishing was not unduly impacted by high flows, high turbidity or inclement weather) and are considered characteristic at the time of sampling. Given that the MW catchments drain a highly modified urban landscape, it is a given that the sites themselves will reflect such land-use change to a degree. However, comment is made when sites show signs of significant degradation that would be expected to have a significant impact on what species may be able to persist there, and fishing efficiency in general.

In addition, a significant flow event was recorded in spring 2022 in many catchments across the Melbourne Water region. Based on data from BOM (2023), many survey sites appear to have experienced their most significant high flow event for a decade or more, and in some instances the highest on record (Maribyrnong Catchment sites). This has likely led to changes in the quality, distribution and abundance of habitat within survey sites and across catchments more broadly since surveys in autumn 2022. Some of the observed changes are outlined in text below.

Sites within the Werribee catchment were considered typical of the catchment in terms of habitat condition. Habitat quality varied considerably between sites, with the Middle Werribee River supporting relatively poor fish habitat but habitat was relatively good at the gorge sites and downstream site. All sites had slow to medium flow, and displayed a range of substrate types, in-stream cover, native riparian vegetation, and slow/deep (e.g. pools) to shallow/fast (e.g. riffles) mesohabitat types. All sites in the Werribee River showed evidence of the high flow event in October 2022, with noticeable erosion, deposition, movement of debris and rocks and scour of vegetation. Based on mean daily discharge, the October 2022 high flow event was the most significant since 2011 in Bacchus Marsh (based on Werribee River at Bacchus Marsh gauge #231200) and Werribee (based on Werribee River at Cottrell Street Ford, Werribee gauge #231237a). The impacts to fish habitat were particularly evident at Werribee Gorge, where habitat preferred by River Blackfish in 2022 such as large woody debris placed by Melbourne Water and manmade in stream rockpools/rockbaths had been washed away.

Sites within the Maribyrnong catchment varied in condition. For instance, riparian habitat at Upper Deep Creek (DPW-13586-2) was quite degraded with no riparian trees, and bed sediment dominated by mud and silt. However, there was abundant emergent, floating and submergent vegetation at this site and it was fenced off from cattle. The other two sites (Lower Deep Creek [DPW-63085-7] and the Maribyrnong River at Keilor [MRB-130320-2]) exhibited slow to medium flow, and a range of substrate types, in-stream cover, native riparian vegetation, and slow/deep (e.g. pools) to shallow/fast (e.g. riffles) mesohabitat types. Similar to the Werribee River, the Maribyrnong catchment sites showed evidence of the high flow event in October 2022, with noticeable erosion, deposition, movement of debris and rocks and scour of vegetation. Based on discharge, the October 2022 high flow event was highest recorded at many sites along the Maribyrnong near the field sites (e.g. Deep Creek at Doggetts Bridge Lancefield gauge #230119A, Deep Creek at Konagaderra gauge #230107A and Maribyrnong River at Keilor gauge 230105A). This was particularly evident at Lower Deep Creek (DPW-63085-7), where Deep Creek is constrained within a small but deeply incised gorge. When the site was surveyed in May 2023, there was evidence of erosion and movement of complex habitat (e.g. large woody debris) with substantial woody debris still suspended from the road bridge ~7 m above the creek line.

Yarra catchment sites had slow to medium flow and were mostly considered typical of the catchment in terms of water quality parameters, riparian vegetation, and the variety of physical habitat available. Compared to 2022 water quality at the Plenty River (PLE-16938-4) site had improved significantly, with DO rising from 23.0%/2.7 mg/L in 2022 to 71.4%/8.1 mg/L in 2023. For many of the survey sites in the Yarra River Catchment, the high flow event in spring 2022 was the highest for over two decades. This was particularly evident at Upper Yarra River, where there has been considerable movement of large woody debris, with woody debris cleared from some areas and large log jams formed in others. Based on data from a long term study of high flow released from the Upper Yarra Dam, this has led to loss of some woody debris and likely movement of River Blackfish from the area surveyed as part of this study, whereas areas upstream (and possibly downstream) have developed significant logjams that now support high numbers of River Blackfish that were not present in 2022. However, while there was localised erosion and scour, banks and vegetation

appeared relatively resilient to high flows (Jacobs 2023). It is likely that habitat at other sites across the Yarra Catchment changed quite substantially compared to 2022.

Both of the Dandenong catchment sites were heavily modified. The lower site (DNG-31881-2) was situated in an industrial park, immediately upstream of the Pillars Crossing fishway. The channel itself had been straightened and native riparian vegetation removed. The bed sediment was predominantly mud and silt and sand, but a rock-fishway had been installed at the site which provided cover in the form of large rocks and riffle habitat which was unique to the stream reach. Flow was slow to medium, but there were large backwaters with no flow. The upper catchment site (DNG-13753-1) was a small stream reach (average 2.5 m wide) with a mud and silt base and the riparian zone was a mix of native and exotic tree and grass species. Otherwise, a reasonable amount and diversity of cover and mesohabitats were available. Fish habitat at the Dandenong Creek sites were likely less affected by the Spring 2022 high flow event compared to sites in other catchments, as while it was a substantial event, there have been other similarly sized events recently (e.g. 2020).

The Western Port catchment region covers a large area and six individual well-separated catchments outlined below. Habitat is quite variable across these catchments, with lower reaches often highly degraded and in some instances channelised (e.g. Bunyip River, Lang Lang River), whereas upper reaches support much higher quality habitats.

- The Balcombe Creek catchment site (BLC-3709-0) was moved this year to a more appropriate site located in the Briars. Conditions were much more suitable, with water quality parameters acceptable and the area supporting a much less degraded habitat with fewer weeds. Habitats included more open slow flowing section of creek through swamp scrub and areas with dense stands of emergent vegetation.
- The banks of the lower Cardinia Creek site (CDC-10600-4) were overgrown with blackberry, making access difficult. The stream reach also contained several deep holes which couldn't be electrofished and couldn't be safely navigated past. As such, only six electrofishing shots were conducted before the creek entered private property. Dip netting was conducted as well. The site also had notably high turbidity (54.2 NTU) that exceeded the ANZECC (2000) guideline for lowland rivers of 50 NTU which would be expected to impact on fishing efficiency. In Cardinia Creek, the spring 2022 high flow event was the most significant for a decade, and likely altered habitat across the catchment.
- The lower Bunyip River site (BNY-70608-3) is located in a channelised section of river contained within large containment banks. Considerable work has gone into improving riparian vegetation and fish passage through this section of the Bunyip River. In the Bunyip River, the spring 2022 high flow event was the most significant for a decade, and likely altered habitat across the catchment.
- The Lang Lang site (LNG-29460-1) is located in a channelised section of river contained within large containment banks. Considerable work has gone into improving riparian vegetation this section of the Lang Lang River. This site is located below the Heads Road weir, which is a barrier to upstream movement for many fish species. In the Lang Lang River, the spring 2022 high flow event was the most significant for a decade, and likely altered habitat across the catchment. There was evidence of small sections of erosion and scour at this site. Surveys at this site were undertaken at the tail end of a high flow event, which may have provided movement cues for migratory species.
- Finally, The Bass River site (BAS-22307-6) was quite degraded, supporting bed sediments dominated by mud, silt, and clay. The riparian zone was dominated by exotic willows (*Salix* spp.) that were intruding on the stream.

Other than these notable exceptions, the sites exhibited water quality parameters that were within an acceptable range, a range of substrate types, in-stream cover, native riparian vegetation, and slow/deep (e.g. pools) to shallow/fast (e.g. riffles) mesohabitat types. Most sites had slow to medium flow, although the upper Bunyip River and Lang Lang River sites was running fast at the time of sampling.

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Table 4 Water quality and physical habitat recordings at each study site. Physical habitat observations are presented as the percent of electrofishing shot reaches where they those habitat features were observed (e.g. boulders were present where 4 out of 8 (50%) electrofishing shots were conducted). Velocity is given as a range across the site (Fast = F, Medium = M, Slow = S, or No Flow = NF).

	Werribee River					Maribyrnong River			Yarra River							Dandenong Creek		Western Port									
	LER-22832-7	WERRIBE E GORGE	WER-30289-	WER-138085-	DPW-13586-	DPW-63085-	MRB-130320-	PLE-16938-	ART-4232-0	NCC-3576-4	YAR-42313-	YAR-374049-	HDL-2685-5	WOY-8964-3	DNG-13753-1	DNG-31881-	BLC-3709-0	CDC-7795-5	CDC-10600-	BNY-11161-	BNY-70608-	TAR-22224-	LNG-29460-	BAS-22307-			
Water Quality																											
Temp. (°C)	9	9.1	10.8	12.0	10.8	8.6	10.9	9.9	9.2	11.4	13.9	14.5	11.6	12.1	11.5	13.6	12	11.2	12.8	11.0	13.0	13.1	10.4	12.2			
pH	7.7	8.1	7.8	8.2	6.9	8.1	8.3	6.5	7.6	7.3	6.8	7.5	6.9	7.3	7.5	7.6	7.5	7.2	7.1	6.3	7.3	7.6	7.6	7.7			
Cond. (µS.cm)	158	470	521	1122	526	1286	1053	166	381	164	46.6	247	103	111	186	211	950	185	114	72	156	206	370	790			
Turbid. (NTU)	2.5	5.5	6.6	6.8	5.1	5.1	15.0	21.0	46.9	149	5.1	47.8	25.8	51.3	37.7	62.6	22.1	21.1	57.0	19.5	25.9	13.7	28.8	14.9			
DO (mg/L)	10.0	9.9	1.0	10.4	8.1	8.6	9.6	8.1	9.9	9.2	9.3	8.4	9.7	10.3	8.9	9.3	9.0	9.4	8.5	9.5	9.4	9.7	8.6	6.7			
DO (%)	86.5	87.1	91.2	95.6	76.1	74.3	86.7	71.4	84.6	84.9	92.0	82.1	89.2	97.0	75	89.7	83.2	86.3	79.1	84.5	88.7	94.2	76.8	66.0			
Substrate																											
Bed-rock	50	25	100	37.5	0	12.5	12.5	0	0	37.5	100	0	12.5	0	0	0	0	0	0	0	0	0	0	0			
Boulder (>120 mm)	100	100	100	87.5	0	12.5	100	0	12.5	62.5	100	100	25	12.5	12.5	37.5	0	0	0	12.5	100	50	75	0			
Cobb-le (60-200 mm)	100	100	100	100	0	0	100	0	0	50	100	100	32.5	0	37.5	37.5	0	0	0	0	100	0	75	0			

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	Werribee River				Maribyrnong River			Yarra River							Dandenong Creek		Western Port							
Gravel (2-60 mm)	100	100	100	100	0	0	100	0	12.5	100	100	0	100	0	12.5	0	0	0	0	25	100	100		0
Sand (0.6-2 mm)	100	100	100	100	0	100	100	0	0	100	0	0	100	100	0	0	0	100	0	100	100	100	100	100
Mud/silt (0.002-0.6 mm)	100	100	100	100	100	100	100	100	0	100	100	37.5	100	100	100	100	100	100	100	100	100	100	100	100
Clay (<0.002 mm)	0	0	0	0	0	100	0	0	100	25	100	37.5	100	100	100	100	100	100	100	0	0	0	100	100
Plants																								
Native trees	100	100	50	100	100	100	100	100	100	100	100	100	100	100	100	0	100	100	100	100	100	100	100	0
Exotic trees	12.5	0	100	0	0	0	50	100	0	12.5	0	62.5	100	0	0	12.5	12.5	0	0	0	0	12.5	25	100
Native shrubs	100	100	0	100	100	0	100	0	100	100	100	0	100	100	100	0	100	100	0	100	100	25		0
Riparian grass	100	100	100	100	100	100	100	100	100	100	100	100	0	100	100	25	100	100	100	100	100	100	100	100
Floating macro.	0	0	0	0	100	0	0	0	0	0	100	0	100	0	0	0	0	0	0	0	0	0		100
Emerg macro.	62.5	100	100	100	100	100	100	100	100	0	100	0	62.5	75	100	100	100	100	100	100	100	25	100	25
Submerged macro.	12.5	62.5	25	0	100	0	0	100	0	0	0	0	0	0	25	0	100	0	0	0	0	0	100	100

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	Werribee River				Maribyrnong River			Yarra River							Dandenong Creek		Western Port								
Filamentous algae	37.5	100	100	100	100	100	100	0	0	0	0	100	0	0	100	100	0	0	0	0	100	0	100	100	
Suspended algae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Biofilms	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
Cover																									
Rock	100	100	100	100	0	25	100	0	0	50	100	100	50	12.5	37.5	37.5	0	0	0	12.5	100	50	75	0	
Timber	62.5	100	50	100	0	100	100	100	100	100	100	12.5	100	100	100	0	100	100	100	100	100	100	100	50	100
Undercuts	50	75	75	50	0	0	75	0	100	100	100	12.5	100	100	50	0	0	100	100	100	100	100	100	0	100
Leaf litter	62.5	0	100	50	0	100	0	0	0	100	100	12.5	100	0	75	0	0	100	0	75	0	87.5	0	100	
Macrophytes	62.5	100	100	100	100	100	100	100	100	0	0	12.5	100	100	87.5	100	100	100	100	100	100	100	25	100	100
Mesohabitat																									
Pools	75	100	75	62.5	100	100	75	37.5	87.5	50	100	0	100	0	37.5	62.5	37.5	0	0	0	0	0	12.5	100	
Run	37.5	50	37.5	50	0	37.5	37.5	100	87.5	100	100	37.5	100	100	100	0	62.5	100	100	100	100	100	50	87.5	
Riffle	37.5	37.5	25	50	0	12.5	25	0	12.5	50	100	75	12.5	0	50	37.5	0	0	0	100	0	0	37.5	0	
Rapid	0	0	0	0	0	0	0	0	0	0	100	0	0	0	75	0	0	0	0	0	0	0	50	0	
Backwater	0	0	0	0	0	0	12.5	0	0	0	100	25	0	0	87.5	0	0	0	0	0	0	0	0	0	
Velocity	NF-M	NF-S/M	NF-M	NF-M	NF	S-M	S-M	S	S-M	S-M/F	M	S-M	S/M-M	M-M/F	NF-M	NF-F	S	M	M	M-F	M	S-M	S-F	NF-M	

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	Werribee River				Maribyrnong River			Yarra River							Dandenong Creek		Western Port							
Aver. wetted width (m)	15.8	6.6	9.9	10	28.8	6.6	20	8	5.25	4	8	16.3	4	5	5.4	20	4.4	3.1	3.6	5.75	6	7.4	8	8
Aver. depth (m)	0.41	0.75	0.4	0.6	0.9	0.63	0.8	1	0.76	0.5	0.4	1	0.5	0.9	0.94	0.47	0.5	0.5	1	0.5	0.75	0.81	0.75	1
Total dist. travel. (m)	275	200	200	200	160	200	200	200	200	200	200	190	200	200	200	135	200	200	250	200	200	200	140	200

3.2 Fish communities

3.2.1 Werribee catchment

The survey of the four Werribee catchment sites captured a total of 267 fish from nine species (five native and four exotic) (Table 5). By far the most abundant species overall were Roach (*Rutilus rutilus*; 144 fish), followed by Smelt (*Retropinna semoni*; 40 fish), Common galaxias (*Galaxias maculatus*; 19), Redfin perch (19 fish), Ornate galaxias (*Galaxias ornatus*; 13 fish), Brown trout (*Salmo trutta*; 13 fish), Roach (nine fish), Southern shortfin eel (*Anguilla australis*; seven fish), Tupong (*Pseudaphritis urvilli*; six fish), and Tench (*Tinca tinca*; 8 fish). Flatheaded gudgeon (*Philypnodon grandiceps*) and Eastern Gambusia (*Gambusia holbrooki*) were not detected in 2023, but were in the previous year's sampling.

The lower Werribee River site (WER-138085-6) exhibited the highest nativeness scores based on both richness (100%) and abundance (100%), while the middle Werribee River site (WER-30289-9) had the lowest (richness [20%], abundance [2%]). In the previous year's sampling, Lerderderg Gorge (LER-22832-7) had the highest nativeness scores due to an absence of exotic species, however, Brown trout and Redfin perch were observed in 2023.

In terms of non-diadromous priority species Ornate galaxias was found at Lerderderg Gorge (LER-22832-7; 13 fish) as in the previous year's sampling. Notably, River blackfish was not detected at any site in the Werribee catchment, whereas it was found at the Lerderderg Gorge (1 fish) and Werribee Gorge (14 fish) sites in the previous year.

Three diadromous species were also caught in the Werribee River this year however abundances were often lower than in 2022 (Southern Shortfin Eel - 7 individuals in 2023 compared to 19 in 2022; Common Galaxias - 19 individuals in 2023 compared to 67 in 2022), with Tupong being the exception (6 individuals in 2023 compared to 2 in 2022).

While not target species, Common yabby (*Cherax destructor*) was caught at Lerderderg Gorge (LER-22832-7, 15 individuals). The southern Victorian spiny crayfish (*Euastacus yarraensis*) was not detected, while it was caught at Werribee Gorge during 2022 sampling (15 individuals).

Table 5 Catch data for Werribee catchment sites. Data are presented as number of individuals caught at each site, and aggregate metrics are presented for each species and site.

Species Name	Common Name	Site				Total
		LER-22832-7	WERRIBEE GORGE	WER-30289-9	WER-138085-6	
Native Fish						
Southern Shortfin Eel	<i>Anguilla australis</i>			4	3	7
Ornate Galaxias	<i>Galaxias ornatus</i>	13				13
Common Galaxias	<i>Galaxias maculatus</i>				19	19
Tupong	<i>Pseudaphritis urvilli</i>				6	6
Smelt	<i>Retropinna semoni</i>		40			40
Exotic Fish						
Brown Trout	<i>Salmo trutta</i>	4	4	5		13
Redfin Perch	<i>Perca fluviatilis</i>	1	1	17		19
Roach	<i>Rutilus rutilus</i>			144		144
Tench	<i>Tinca tinca</i>		1	5		6
Native Crustaceans (Non-target species)						
Common Yabby	<i>Cherax destructor</i>	2				2
Native fish species richness (TOTAL)		1	1	1	3	5
Exotic fish species richness (TOTAL)		2	3	4	0	4
Native fish species abundance (TOTAL)		13	40	4	28	85
Exotic fish species abundance (TOTAL)		5	6	171	0	182
Nativeness – Richness (%)		33	25	20	100	56
Nativeness – Abundance (%)		72	87	2	100	32

3.2.2 Maribyrnong catchment

During the survey of the Maribyrnong catchment a total of 58 fish were caught over three sites representing eight species (six native and two exotic) (Table 6). The native Common galaxias (17 fish) was the most abundant, followed by Southern Pygmy perch (10 fish), Southern shortfin eel (nine fish), Yarra pygmy perch (five fish), Flathead Gudgeon (four fish), the exotic Goldfish (four fish), Eastern gambusia (four fish), Tench (one fish), and the native Estuary perch (*Macquaria colonorum*; one fish). Of note, Tupong were not detected during 2023 sampling, but were in low abundance in 2022, while Estuary perch were detected for the first time as part of this program.

Lower Deep Creek (DPW-63085-7) and Maribyrnong River (MRB-130320-2) sites had the highest nativeness scores based on both richness (100%) and abundance (100%), same as the year before, while Upper Deep Creek (DPW-13586-2) had the lowest (richness [50%], abundance [70%]).

Upper Deep Creek site also held the non-diadromous two priority species, Southern pygmy perch (10 fish) and Yarra pygmy perch (5 fish). Furthermore, Estuary perch (one fish) were detected at the Maribyrnong River site.

Two diadromous species were captured in 2023 (Common galaxias and Southern shortfin eel), with abundances similar to or higher than those in 2022. Common Galaxias were caught at Lower Deep Creek (DPW-63085-7) at moderate abundance for the first time as part of this survey program. However, Tupong which was caught in low abundance in 2022 at the Lower Maribyrnong River site (MRB-130320-2, 2 individuals) was not recorded in 2023.

No crayfish were caught.

Table 6 Catch data for Maribyrnong catchment sites. Data are presented as number of individuals caught at each site, and aggregate metrics are presented for each species and site.

Species Name	Common Name	Site			Total
		DPW-13586-2	DPW-63085-7	MRB-130320-2	
Native Species					
Southern Shortfin Eel	<i>Anguilla australis</i>	6	1	2	9
Common Galaxias	<i>Galaxias maculatus</i>		15	5	17
Estuary Perch	<i>Macquaria colonorum</i>			1	1
Southern Pygmy Perch	<i>Nannoperca australis</i>	10			10
Yarra Pygmy Perch	<i>Nannoperca obscura</i>	5			5
Flathead Gudgeon	<i>Philypnodon grandiceps</i>			4	4
Exotic Species					
Goldfish	<i>Carassius auratus</i>	4			4
Eastern Gambusia	<i>Gambusia holbrooki</i>	4			4
Tench	<i>Tinca tinca</i>	1			1

Species Name	Common Name	Site			Total
Native fish species richness (TOTAL)		3	2	4	6
Exotic fish species richness (TOTAL)		3	0	0	3
Native fish species abundance (TOTAL)		21	16	12	49
Exotic fish species abundance (TOTAL)		9	0	0	9
Nativeness – Richness (%)		50	100	100	67
Nativeness – Abundance (%)		70	100	100	84

3.2.3 Yarra catchment

During the survey of the seven Yarra catchment sites 205 fish were caught representing 11 species (seven native and four exotic) (Table 7). The native Ornate galaxias were the most abundant species (73 fish), followed by Common galaxias (53 fish), Southern pygmy perch (21 fish), River blackfish (17 fish), Southern shortfin eel (15 fish), the exotic Brown trout (13 fish), the native Flathead gudgeon (six fish), the exotic Yellowfin goby (*Acanthogobius flavimanus*; two fish), Rainbow trout (*Onchorhynchus mykiss*; two fish), and Redfin perch (two fish), and the native Estuary perch (one fish). Notably Smelt were not detected during 2023 sampling, but were found in low abundance (two fish) the previous year.

All sites scored highly for nativeness by abundance (>92%), although the Diamond Creek site (ART-4232-0) had the highest nativeness scores based on both richness (100%) and abundance (100%). Woori Yallock Creek (WOY-8964-3) and Plenty River (PLE-16938-4) had the lowest nativeness by richness score (50%). Other sites ranged between 67-80% for nativeness by richness.

Regarding non-diadromous priority species, River blackfish, Ornate galaxias, and Southern pygmy perch were caught in the catchment. River blackfish were found in the Upper Yarra River (YAR-42313-7; seven fish) and Hoddles Creek (HDL-2685-5; nine fish), and New Chum Creek (NCC-3576-4; one fish). In the previous year they were also found in Woori Yallock Creek in low abundance (WOY-8964-3; 1 fish), but not New Chum Creek. Ornate galaxias were found in Diamond Creek (ART-4232-0; two fish), New Chum Creek (NCC-3576-4; 36 fish), Hoddles Creek (20 fish), and Woori Yallock Creek (15 fish) as in the previous year. Southern pygmy perch were found in the Plenty River (LE-16938-4; 21 fish), but not in Diamond Creek (ART-4232-0) where they were detected the year before (11 fish). Finally, Estuary perch (one fish) were detected in the Lower Yarra River site for the first time as part of HWS fish surveys.

Two diadromous species were recorded in the Yarra Catchment in 2023. Southern Shortfin Eel abundance was substantially higher in 2023 compared to 2022, with 15 individuals caught in 2023 and only 1 in 2022. Common Galaxias were slightly less abundance in 2023, with 53 individuals caught in 2023 compared to 75 in 2022.

Southern Victorian Spiny Crayfish were caught in the New Chum Creek (NCC-3576-4; three crayfish) and Hoddles Creek (two crayfish), while Gippsland Spiny Crayfish were detected in Upper Yarra River (YAR-42313-7; 3 crayfish), Hoddles Creek (two crayfish), and Woori Yallock Creek (five crayfish).

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Table 7 Catch data for Yarra catchment sites. Data are presented as number of individuals caught at each site, and aggregate metrics are presented for each species and site.

Species Name	Common Name	Site							Total
		PLE-16938-4	ART-4232-0	NCC-3576-4	YAR-42313-7	YAR-374049-3	HDL-2685-5	WOY-8964-3	
Native Species									
Southern Shortfin Eel	<i>Anguilla australis</i>		2		5	8			15
River Blackfish	<i>Gadopsis marmoratus</i>			1	7		9		17
Ornate Galaxias	<i>Galaxias ornatus</i>		2	36			20	15	73
Common Galaxias	<i>Galaxias maculatus</i>		1			52			53
Estuary Perch	<i>Macquaria colonorum</i>					1			1
Southern Pygmy Perch	<i>Nannoperca australis</i>	21							21
Flathead Gudgeon	<i>Philypnodon grandiceps</i>			3		3			6
Exotic Species									
Yellowfin Goby	<i>Acanthogobius flavimanus</i>					2			2
Rainbow Trout	<i>Onchorhincus mykiss</i>							2	2
Redfin Perch	<i>Perca fluviatilis</i>	2							2
Brown Trout	<i>Salmo trutta</i>			1	9		3		13
Native Crustaceans (Non-target species)									
Gippsland Spiny Crayfish	<i>Euastacus kershawi</i>				3		2	5	10
Southern Victorian Spiny Crayfish	<i>Euastacus yarraensis</i>			2			2		4
Native fish species richness (TOTAL)		1	3	3	2	4	2	1	7

Species Name	Common Name	Site							Total
		1	2	3	4	5	6	7	
Exotic fish species richness (TOTAL)		1	0	1	1	1	1	1	4
Native fish species abundance (TOTAL)		21	5	40	12	64	29	15	186
Exotic fish species abundance (TOTAL)		2	0	1	9	2	3	2	19
Nativeness – Richness (%)		50	100	75	67	80	67	50	64
Nativeness – Abundance (%)		100	100	93	100	92	100	100	91

3.2.4 Dandenong catchment

The survey of the two Dandenong Creek sites resulted in 69 fish being caught representing seven species (three native and three exotic) (Table 8). The exotic Eastern gambusia (26 fish) was the most abundant species, followed by the native Southern shortfin eel (22 fish), Common galaxias (14 fish), Flathead gudgeon (three fish), Goldfish (three fish), and European carp (one fish). A single Tupong was caught in Lower Dandenong Creek in 2022, but none were detected in the catchment in 2023, but this was the only difference to the native fish community composition.

Two diadromous species were recorded in the Dandenong Creek Catchment in 2023. Southern Shortfin Eel and Common Galaxias abundance was higher in 2023 compared to 2022.

Both sites had relatively low nativeness scores, with Upper Dandenong Creek (DNG-13753-1) scoring the highest on richness (60%), but lowest on abundance (34%) compared to the Lower Dandenong Creek (DNG-31881-2) scores of 40% for richness and 89% for abundance. No priority fish species and no crayfish were caught.

Table 8 Catch data for Dandenong catchment sites. Data are presented as number of individuals caught at each site, and aggregate metrics are presented for each species and site.

Species Name	Common Name	Site		Total
		DNG-13753-1	DNG-31881-2	
Native Species				
Southern Shortfin Eel	<i>Anguilla australis</i>	5	17	22
Common Galaxias	<i>Galaxias maculatus</i>	6	8	14

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Species Name	Common Name	Site		Total
Flathead Gudgeon	<i>Philypnodon grandiceps</i>	3		3
Exotic Species				
Goldfish	<i>Carassius auratus</i>	2	1	3
European Carp	<i>Cyprinus carpio</i>		1	1
Eastern Gambusia	<i>Gambusia holbrooki</i>	25	1	26
Native fish species richness (TOTAL)		3	2	5
Exotic fish species richness (TOTAL)		2	3	5
Native fish species abundance (TOTAL)		14	25	39
Exotic fish species abundance (TOTAL)		27	3	30
Nativeness – Richness (%)		60	40	50
Nativeness – Abundance (%)		34	89	57

3.2.5 Western Port catchment region

The survey of the Western Port catchment region included eight sites spread across six individual catchments that drain into Western Port. A total of 255 fish were caught representing 12 species (eight native and four exotic) (Table 9). Native Common galaxias (97 fish) was the most abundant, followed by Southern shortfin eel (76 fish), Tupong (37 fish), Southern pygmy perch (29 fish), Australian grayling (*Prototroctes maraena*; three fish), the exotic European carp (three fish), Eastern gambusia (two fish), and Brown trout (two fish), and the native River blackfish (2 fish), Shorthead lamprey (*Mordacia mordax*; two fish), Flathead gudgeon (one fish), and the exotic Redfin perch (one fish). This was the first detection of Shorthead lamprey as part of HWS monitoring.

Given the above results, it is unsurprising that nativeness scores were typically high across the sites sites. Lower Cardinia Creek (CDC-10600-4) and Bass River (BAS-22307-6) sites each recorded the highest possible nativeness scores for richness (100%) and abundance (100%). Upper Cardinia Creek (CDC-7795-5) scored the lowest based on species richness (60%), while the Lang Lang River site (LNG-29460-1) scores the lowest based on abundance (62%).

Regarding non-diadromous priority species, River blackfish and Southern pygmy perch were caught in the region. River blackfish were only caught at the Upper Bunyip River site (BNY-11161-3; two fish), the same as the year before. Southern pygmy perch were caught in the lower (one fish) and upper (14 fish) Cardinia Creek sites, and the Upper Bunyip River site (14 fish), as in 2022, and additionally at Lower Cardinia Creek (three fish), Lower Bunyip River (BNY-70608-3; one fish), and Balcombe Creek (BLC-3709-0; 19 fish) sites.

Five diadromous species were recorded in the Western Port Region Catchment in 2023. Southern Shortfin Eel abundance was the same in 2023 compared to 2022, with the number of individuals per site similar between years. Common Galaxias were slightly more abundance in 2023, with 97 individuals caught in 2023 compared to 71 in 2022 and they were recorded at every site surveyed. Tupong were more abundant in 2023 (37 individuals) compared to 2022 (22 individuals). Australian grayling was recorded at two sites, with two individuals recorded in the Lang Lang River compared to eight in 2022 and one individual was captured in the

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Lower Bunyip River (compared to no individuals on 2022). Finally, Shorthead lamprey were detected for the first time as part of the HWS survey program at the Lang Lang River site. The high abundance of migratory species caught at the Lang Lang River in 2023 may have been due to the survey taking place at the end of the flow event that may have triggered movement of migratory species.

Non-target species, the Lowland burrowing crayfish (*Engaeus quadrimanus*), was found at the Balcombe Creek site (one crayfish). Gippsland spiny crayfish (*Euastacus kershawi*) were found at Upper Cardinia Creek (one crayfish), Upper Bunyip River (six crayfish), and Tarago River (TAR-22224-5; one crayfish). Finally, one Southern Victorian spiny crayfish (*Euastacus yarraensis*) was caught at the Upper Bunyip River site.

Table 9 Catch data for Western Port catchment sites. Data are presented as number of individuals caught at each site, and aggregate metrics are presented for each species and site.

Species Name	Common Name	Site								Total
		BLC-3709-0	CDC-7795-5	CDC-10600-4	BNY-11161-3	BNY-70608-3	TAR-22224-5	LNG-29460-1	BAS-22307-6	
Native Species										
Southern Shortfin Eel	<i>Anguilla australis</i>	2	4	5	1	4	3	39	18	76
River Blackfish	<i>Gadopsis marmoratus</i>				2					2
Common Galaxias	<i>Galaxias maculatus</i>	36	1	16	1	13	17	5	8	97
Shorthead Lamprey	<i>Mordacia mordax</i>							2		2
Southern Pygmy Perch	<i>Nannoperca australis</i>	19	3	3	3	1				29
Flathead Gudgeon	<i>Philypnodon grandiceps</i>			1						1
Australian Grayling	<i>Prototroctes maraena</i>					1		2		3
Tupong	<i>Pseudaphritis urvilli</i>					4	7	26		37
Exotic Species										
European Carp	<i>Cyprinus carpio</i>		1			1	1			3
Eastern Gambusia	<i>Gambusia holbrooki</i>	2								2
Redfin Perch	<i>Perca fluviatilis</i>		1							1

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Species Name	Common Name	Site								Total
Brown Trout	<i>Salmo trutta</i>				2					2
Native Crustaceans (Non-target species)										
Lowland Burrowing Crayfish	<i>Engaeus quadrimanus</i>	1								1
Gippsland Spiny Crayfish	<i>Euastacus kershawi</i>		1		6		1			8
Southern Victorian Spiny Crayfish	<i>Euastacus yarraensis</i>				1					1
Native fish species richness (TOTAL)		3	3	4	4	5	3	5	2	8
Exotic fish species richness (TOTAL)		1	2	0	1	1	1	0	0	4
Native fish species abundance (TOTAL)		57	8	25	7	23	27	74	26	247
Exotic fish species abundance (TOTAL)		2	2	0	2	1	1	0	0	8
Nativeness – Richness (%)		75	60	100	80	83	75	100	100	67
Nativeness – Abundance (%)		97	80	100	78	96	96	62	100	97

3.3 Community-level condition

The catchment level fish community condition ratings are summarised in Table 10. Based on the three metrics of community condition presented here, Yarra and Western Port catchments scored equal highest with an average score of 4.0 (*High*) each. Both scored *High* for species richness, *Moderate* for nativeness by species richness, and *Very High* for nativeness by abundance. They were also amongst the highest scoring catchments based on 2022 sampling.

The Maribyrnong (average score of 3.3) and Dandenong (average score of 3.0) scored the next highest, averaging in the *Moderate* category. The catchment received a *Moderate* score for species richness, a *Moderate* score for nativeness based on richness, and a *High* score for nativeness based on species abundance. The Dandenong catchment received a *Moderate* score across all indices. On average these catchments scored similarly to the 2022 sampling year.

The Werribee catchment scored the lowest with an average score of 2.7 (*Low*). This was due to receiving a *Moderate* score for species richness and nativeness based on richness, and a *Low* score for nativeness based on species abundance. This contrasts with 2022 sampling where the catchment scored in the *High* category for species richness and nativeness by abundance.

Table 10 Catchment level fish community status ratings

Metric	Maribyrnong		Werribee		Yarra		Dandenong		Western Port	
	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023
Species richness	Mod.	Mod.	High	Mod.	High	High	Mod.	Mod.	Mod.	High
Nativeness - species richness	High	Mod.	Mod.	Mod.	Mod.	Mod.	Mod.	Mod.	Mod.	Mod.
Nativeness - abundance	Low	High	High	Low	High	Very High	High	Mod.	Very High	Very High

3.4 Priority species assessment

In this section we present a number of metrics that can be used to monitor the status of priority non-migratory species over time. As this is the second year of surveys as part of the HWS project, the results of both years are presented for comparison.

3.4.1 Ornate galaxias (*Galaxias ornatus*)

The metrics for Ornate galaxias are presented in Table 11. This species was captured at 25% (1) of the sites within the Werribee catchment and the catch per unity effort (CPUE) was 0.13, less than the previous year. As in 2022, only adults were caught at the survey site which may indicate another poor season for juvenile recruitment. The length-frequency distribution also shifted to the right, which may indicate an aging population that isn't being replenished by recruitment. In addition, predatory Brown trout were detected at the site. That said, the capture of a several 1+ fish (conservatively estimated to be 50-70 mm), indicates that recruitment is occurring to some degree, but juveniles are difficult to detect, at least at the survey site. Parasitism was again high (30%) in the community. The distribution of adult versus young-of-year catch is visually presented in Figure 2.

Ornate galaxiids were also caught at 57% (four) of the sites within the Yarra catchment. This includes a detection in Diamond Creek where it was not detected in 2022. The average CPUE across sites was 0.52, which can be split into 0.27 for young-of-year fish and 0.25 for adults. This marks an overall increase in CPUE from the previous year, mainly driven by the larger number of young-of-year fish caught.

Table 11 Metrics for monitoring the status of Ornate galaxias (*Galaxias ornatus*) calculated by sampling year since the beginning of the program. CPUE calculated as fish / 1 minute of electrofishing.

Metric	Werribee		Maribyrnong		Yarra		Dandenong		Western Port	
	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023

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Metric	Werribee		Maribyrnong		Yarra		Dandenong		Western Port	
Sites present (% , number)	25 (1)	25 (1)	0	0	43 (3)	57 (4)	0	0	0	0
Average Abundance (CPUE)	0.21	0.13	n/a	n/a	0.27	0.52	n/a	n/a	n/a	n/a
Juvenile recruitment (YOY CPUE)	0.00	0.00	n/a	n/a	0.06	0.27	n/a	n/a	n/a	n/a
Mature fish abundance (mature fish CPUE)	0.21	0.13	n/a	n/a	0.21	0.25	n/a	n/a	n/a	n/a
Disease/parasite/ abnormality prevalence (%)	47 (Parasites)	30 (Parasites)	n/a	n/a	0	0	n/a	n/a	n/a	n/a

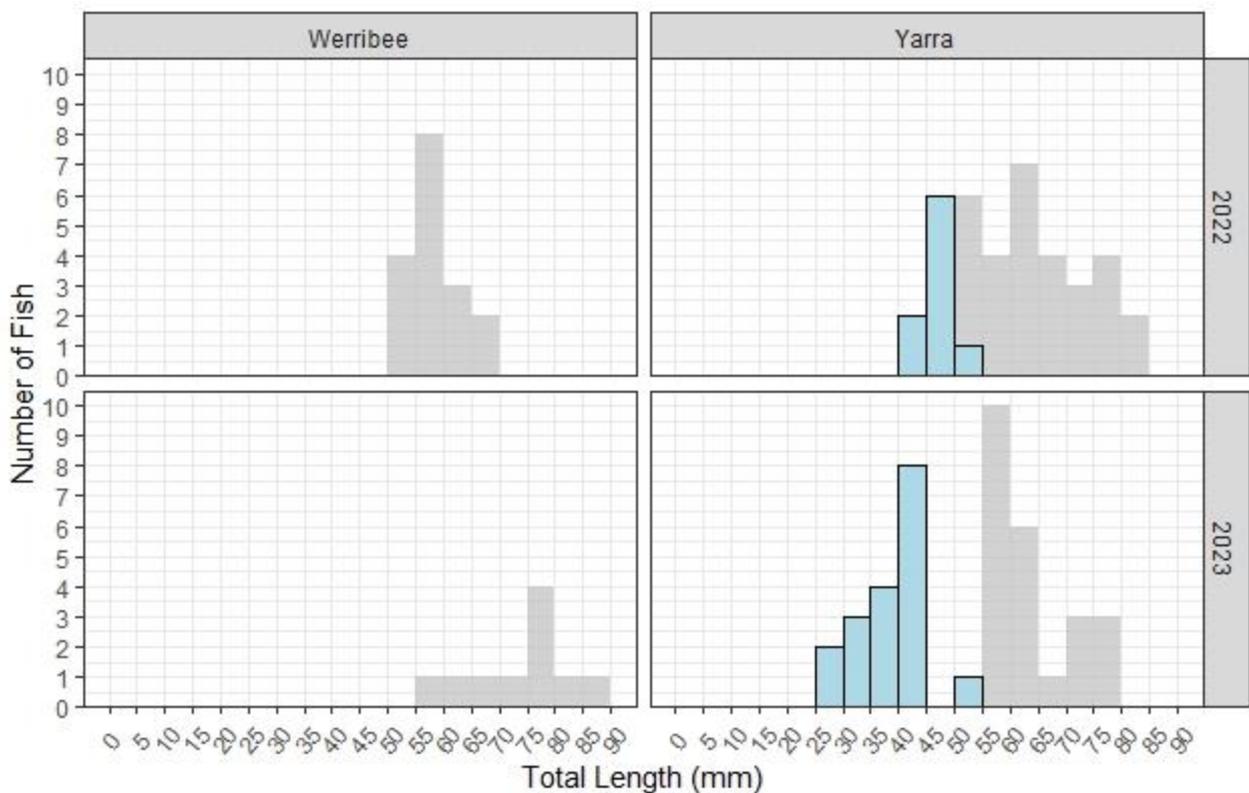


Figure 2 Size class frequency for Ornate galaxias (*Galaxias ornatus*) in each catchment it was detected in 2022 and 2023. Young-of-year fish are highlighted in blue. Note that each column represents the number of fish that fall within a particular size class (e.g. 0-4mm, 5-9mm, 10-14mm). As such, both young-of-year and 1+ fish can occur in a single column where their cut-off length falls.

3.4.2 River blackfish (*Gadopsis marmoratus*)

The metrics for River blackfish are presented in Table 12. River blackfish were not detected in the Werribee catchment, whereas they were detected at two sites the year prior. Within the Yarra catchment the species was caught at 43% (3) of sites, the same as the year before. The average CPUE was 0.11, which is roughly in line with the previous year. The distribution of adult versus young-of-year catch is visually presented in Figure 3. Adult CPUE was 0.10, while young-of-year CPUE was 0.01. Of the fish caught in the catchment, 7% exhibited fin damage.

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Within the Western Port catchment area, the species was caught at one site (12.5% of sites) with the CPUE being 0.01 (two fish caught). The CPUE was 0.005 for both adults and young-of-year (one adult and one juvenile fish caught). These results were similar to the previous year.

Table 12 Metrics for monitoring the status River blackfish (*Gadopsis marmoratus*) calculated by sampling year since the beginning of the program. CPUE calculated as fish / 1 minute of electrofishing.

Metric	Werribee		Maribyrnong		Yarra		Dandenong		Western Port	
	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023
Sites present (% , number)	50 (2)	0	0	0	43 (3)	43 (3)	0	0	12.5 (1)	12.5 (1)
Average Abundance (CPUE)	0.19	n/a	n/a	n/a	0.10	0.11	n/a	n/a	0.01	0.01
Juvenile recruitment (YOY CPUE)	0.09	n/a	n/a	n/a	0.00	0.01	n/a	n/a	0.005	0.005
Mature fish abundance (mature fish CPUE)	0.10	n/a	n/a	n/a	0.10	0.10	n/a	n/a	0.005	0.005
Disease/parasite/ abnormality prevalence (%)	0	n/a	n/a	n/a	20 (Fin damage)	7 (Fin damage)	n/a	n/a	0	0

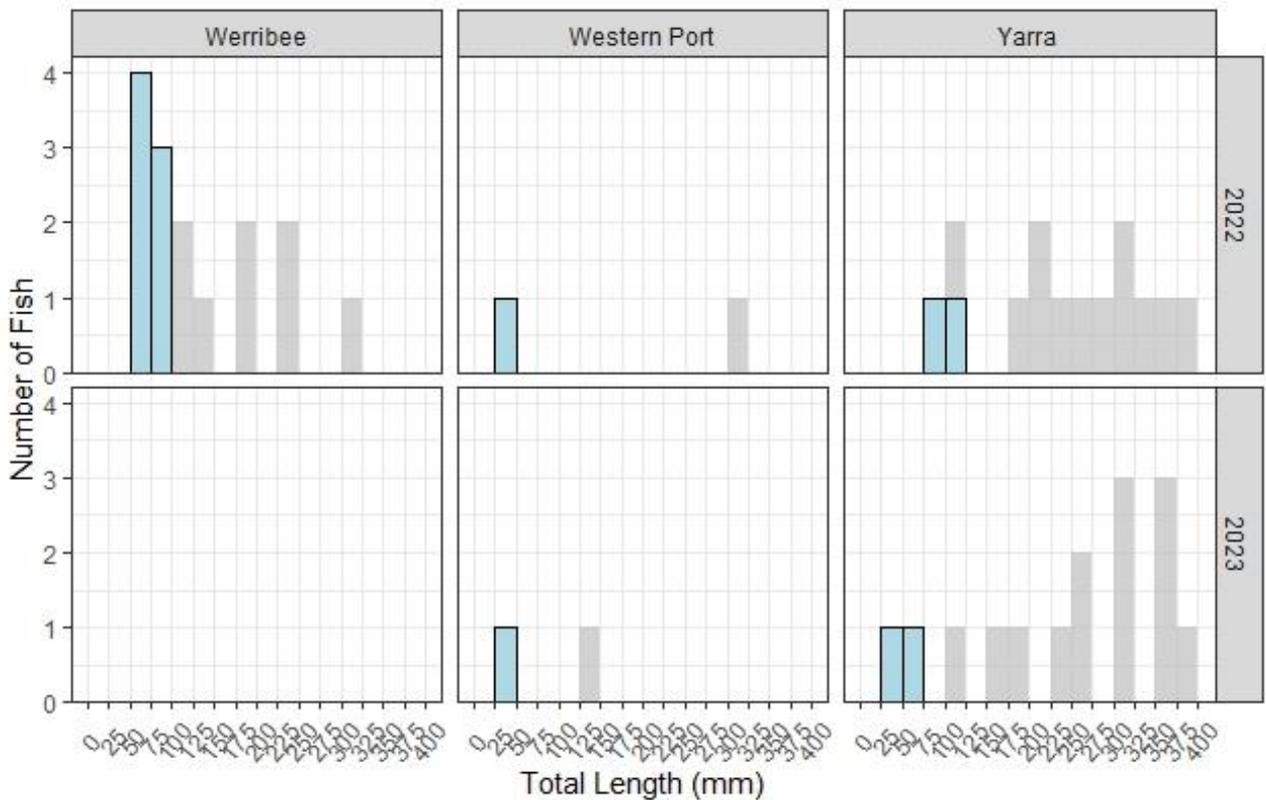


Figure 3 Size class frequency for River blackfish (*Gadopsis marmoratus*) in each catchment it was detected in 2022 and 2023. Young of year fish are highlighted in blue. Note that each column represents the

number of fish that fall within a particular size class (e.g. 0-24mm, 25-49mm, 50-74mm). As such, both young-of-year and 1+ fish can occur in a single column where their cut-off length falls.

3.4.3 Southern pygmy perch (*Nannoperca australis*)

The metrics for Southern pygmy perch are presented in Table 13. Within the Maribyrnong catchment, the species was captured at one site (33% of all sites) and the CPUE was 0.17. The distribution of adult versus young-of-year catch is visually presented in Figure 4. The CPUE was 0.10 for adults and 0.07 for young-of-year fish. These results are broadly in line with the previous year, although no fin damage or any other health defects were observed in 2023.

Within the Yarra catchment the species was only caught at one site (14% of all sites). This is one site less than the previous year. The average CPUE was 0.15. The catch was made up of predominantly adult fish (CPUE 0.13) with some young-of-year fish present (CPUE 0.02). The size distribution of the catch was broadly similar between years.

In Western Port catchment region, the species was caught at 63% (five) of the sites. This marks a substantial increase from the previous year with detections at three additional sites. The average CPUE was 0.19 which was entirely made up of predominantly adult fish (CPUE 0.15) and some young-of-year fish (CPUE 0.04). The size distribution of the catch was broadly similar between years.

Table 13 Metrics for monitoring the status Southern pygmy perch (*Nannoperca australis*) calculated by sampling year since the beginning of the program. CPUE calculated as fish / 1 minute of electrofishing.

Metric	Werribee		Maribyrnong		Yarra		Dandenong		Western Port	
	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023
Sites present (% , number)	0	0	33 (1)	33 (1)	29 (2)	14 (1)	0	0	25 (2)	63 (5)
Average Abundance (CPUE)	n/a	n/a	0.27	0.17	0.34	0.15	n/a	n/a	0.18	0.19
Juvenile recruitment (YOY CPUE)	n/a	n/a	0.22	0.07	0.09	0.02	n/a	n/a	0.01	0.04
Mature fish abundance (mature fish CPUE)	n/a	n/a	0.05	0.10	0.25	0.13	n/a	n/a	0.17	0.15
Disease/parasite/ abnormality prevalence (%)	n/a	n/a	31 (Fin damage)	0	0	0	n/a	n/a	0	0

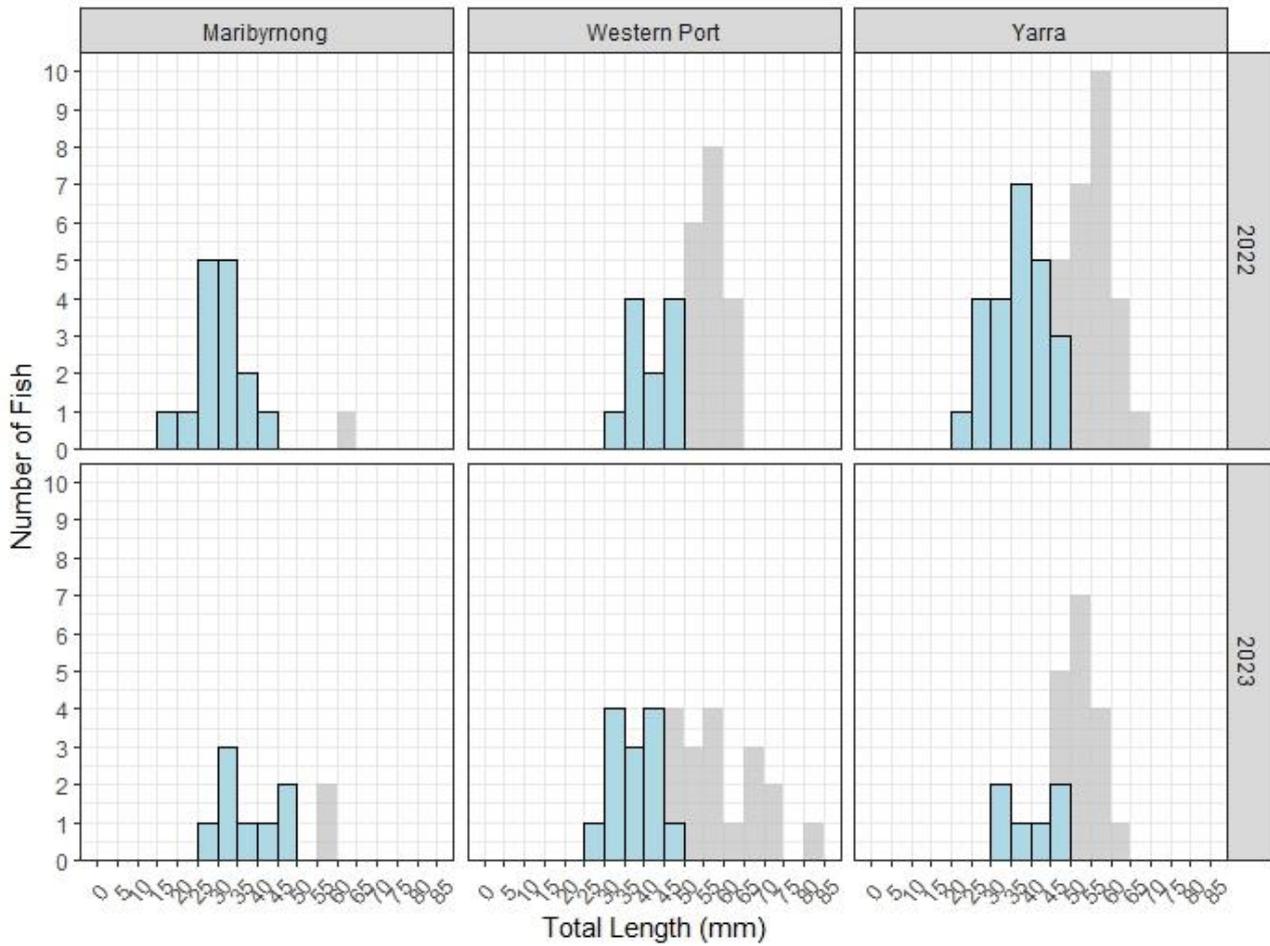


Figure 4 Size class frequency for Southern pygmy perch (*Nannoperca australis*) in each catchment it was detected in 2022 and 2023. Young of year fish are highlighted in blue. Note that each column represents the number of fish that fall within a particular size class (e.g. 0-4mm, 5-9mm, 10-14mm). As such, both young-of-year and 1+ fish can occur in a single column where their cut-off length falls.

3.4.4 Yarra pygmy perch (*Nannoperca obscura*)

The metrics for Yarra pygmy perch are presented in Table 14. Within the Maribyrnong catchment, the only catchment where it was caught, the species was captured at one site (33% of all sites). The CPUE was 0.08 overall, which was split between both adult fish (CPUE 0.03) and young-of-year fish (CPUE 0.05). In the previous year only one adult was captured. The distribution of adult versus young-of-year catch is visually presented in Figure 5.

Table 14 Metrics for monitoring the status Yarra pygmy perch (*Nannoperca obscura*) calculated by sampling year since the beginning of the program. CPUE calculated as fish / 1 minute of electrofishing.

Metric	Werribee		Maribyrnong		Yarra		Dandenong		Western Port	
	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023
Sites present (% , number)	0	0	33 (1)	33 (1)	0	0	0	0	0	0
Average Abundance (CPUE)	n/a	n/a	0.02	0.08	n/a	n/a	n/a	n/a	n/a	n/a
Juvenile recruitment (young-of-year CPUE)	n/a	n/a	0.00	0.05	n/a	n/a	n/a	n/a	n/a	n/a
Mature (1+) fish abundance (mature fish CPUE)	n/a	n/a	0.02	0.03	n/a	n/a	n/a	n/a	n/a	n/a
Disease/parasite/abnormality prevalence (%)	n/a	n/a	0	0	n/a	n/a	n/a	n/a	n/a	n/a

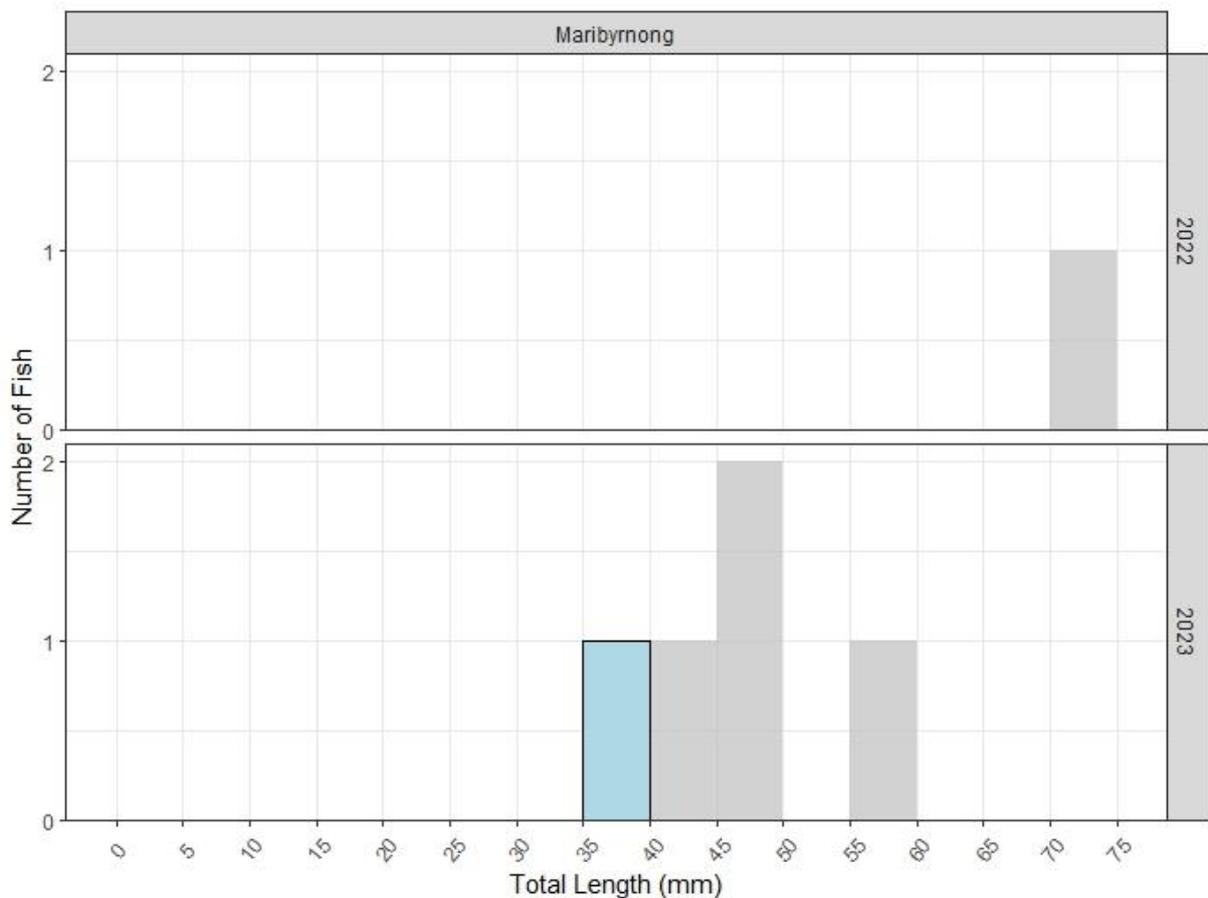


Figure 5 Size class frequency for Yarra pygmy perch (*Nannoperca obscura*) in each catchment it was detected in 2022 and 2023. Young of year fish are highlighted in blue. Note that each column represents the number of fish that fall within a particular size class (e.g. 0-4mm, 5-9mm, 10-14mm). As such, both young-of-year and 1+ fish can occur in a single column where their cut-off length falls.

4. Discussion

The aim of the project was to undertake the second year of fish surveys for the HWS and to report the broad findings, which has been achieved. The results strengthen the baseline of data that is being built by the strategy and, at this early stage in the strategy, provides some cursory insights into the condition of the fish communities within these catchments, and the populations of target species sampled. The data is recorded in such a way that it can be analysed in greater detail in line with the MERI.

Two sites were moved in 2023. The site on Balcombe Creek (BLC-3709-0) was moved approximately 1 km downstream to the upstream end of the Briars as the original site had low sampling efficiency due to dense emergent vegetation. The Lower Bunyip River site (BNY-70608-3) was moved approximately 7 km downstream as, in retrospect, the original site was considered to be located too close to the Tarago River site. Both survey sites were easily surveyed and the habitat was deemed appropriate, and at the Lower Bunyip Site all target species were recorded and an additional two MERI priority species were recorded. As such, these two new survey sites were considered appropriate.

Nine of the priority riverine species outlined in the MERI were present at one or more of the study sites. There were some exceptions that have been discussed following the previous monitoring season (Jacobs 2022a) and are updated below following the 2023 sampling season.

- Dwarf galaxias (*Galaxias pusilla*) was not captured in Upper Dandenong Creek, Balcombe Creek or Cardinia Creek, although they are known to be in the vicinity of the sites. This species is likely to be rare in the main channel of these creeks as it shows a greater affinity for slow flowing wetland habitat (Coleman *et al.* 2018). Due to their habitat preferences, the MERI identifies Dwarf galaxias as a species that occurs in riverine habitats, but monitoring in riverine habitats is not prioritised. In Cardinia Creek, the failure to capture Dwarf galaxias may also be impacted by reduced fishing efficiency due to thick emergent vegetation and deep-water habitat present at the site. The new site surveyed in 2023 at Balcombe Creek was much more readily surveyed compared to the 2022 site which was covered in abundant emergent vegetation. Targeted dip netting (10 minutes) and passive trapping was conducted at both sites but was ultimately unsuccessful. These issues may be overcome by conducting more intensive dip netting and overnight trapping (fyke nets and/or bait traps) at the site, or by adding a site at a nearby tributary or wetland where more suitable habitat is present. As such, we recommend considering additional survey effort at these sites in subsequent years.
- Short-headed lamprey (*Mordacia mordax*) was not caught in the Yarra or Werribee catchment sites where it was thought likely to be (Melbourne Water 2018). However, it was caught on the Lang Lang River in Western Port in 2023. This is a cryptic and patchily distributed species, and it is not unsurprising that it may be missed during surveys that are done once annually. In addition, while this species is poorly known they are primarily thought to migrate upstream in July to November so autumn surveys are likely to miss the peak migration period (Miller *et al.* 2021). Analysis of MWs long-term fish distribution dataset highlighted the ongoing patchiness of records for this species in the MW management region and the difficulties in making any strong inferences about population trajectory (Jacobs 2022b). That said, future surveys will shed more light on the significance of the non-detections.
- Australian grayling was not found in Maribyrnong River or Cardinia Creek where its presence was considered possible. The population in the Maribyrnong is thought to be small. The two survey sites along Cardinia Creek are located above a barrier (with poorly designed fish passage) located in Clyde North that appears to prevent upstream passage of Australian grayling (Gilbert 2021). Hence it is unsurprising that Australian grayling were not captured at these sites.
- Australian mudfish (*Neochanna cleaveri*) was not detected on the Lower Yarra River below Dights Falls, although it has not been detected there for many years.

Our analysis of catchment condition, based on species richness and nativeness indices, indicated that the MW catchments ranged from *Low* to *High* condition. The Werribee catchment was at the upper end of the low category, with its score being brought down by the very large abundance of exotic Roach caught at the middle Werribee River site which is situated just below an impoundment in an area with quite degraded habitat. Ignoring the anomalous result caused by the large catch of Roach at one site, the broader catchment condition was much the same as the previous year where it averaged *Moderate* condition. Furthermore, River

blackfish were not detected during this sampling season in the Werribee catchment. This is likely due to substantial changes in the quality and distribution of habitat at Werribee Gorge that was likely driven by a high flow event in Spring 2022. In 2022, fourteen River blackfish were recorded at Werribee Gorge, with many of them inhabiting large woody debris (some installed by Melbourne Water) and manmade rockpools in the survey reach. In 2023 no River blackfish were caught at the site, and much of the woody debris had been washed away and the manmade rock pools destroyed, resulting in lower quality habitat in the survey area. Blackfish were likely either washed downstream, or have moved to areas with higher quality habitat. While a single River blackfish was recorded at Lerderderg Gorge in 2022, none were recorded in 2023. Additional surveys in and above Lerderderg Gorge and Werribee Gorge will give further insight into the distribution and abundance of these poorly known populations of River blackfish.

Dandenong Creek and Maribyrnong River fell within the *Moderate* conditions category and their fish communities were broadly similar to the previous year. Yarra and Western Port catchments scored within the *High* condition category following 2023 sampling, up from the *Moderate* category in 2022. The increase in the Yarra catchment was due to a greater abundance of native fish being caught relative to exotic fish. This result was helped by a large (2x) increase in the number of Ornate galaxias caught. The increase in the condition score of Western Port was due to an increase in native species richness due to the detection of Shorthead lamprey in Lang Lang River.

Regarding the non-diadromous priority species examined, young-of-year and 1+ Ornate galaxias were observed in the Yarra catchment again, suggesting another year of successful recruitment and that individuals are surviving to reproductive age. However, only 1+ fish were observed in the Werribee catchment at Lerderderg Gorge (LER-22832-7) for the second consecutive year. Furthermore, as in the previous year, a large proportion (30%) of the adults caught were infected with parasites, suggesting poor health, perhaps resulting from degraded habitat quality. Finally, predatory Brown trout were observed at the site in 2023, whereas they weren't in 2022. Closs and Lake (1996) studied the distribution of Brown trout and Ornate galaxias in the Lerderderg River over three years, finding that (1) Ornate galaxias can only live in sympatry with predatory trout when Brown trout are in low abundance, (2) the distribution of Brown trout in the upper reaches of the river such as in Lerderderg Gorge is limited by high water temperatures, (3) Brown trout distribution changes seasonally with changes in temperature, and (4) Ornate galaxias distributions vary seasonally in response to changes in Brown trout abundance. With this in mind, fluctuations in the condition of the Ornate galaxias population in Lerderderg Gorge would be expected to some degree. Following several years of higher-than-average rainfall in the region, it may be that Brown trout are more abundant and widely distributed in the gorge which is placing increased predation pressure on Ornate galaxias population. Young-of-year Ornate galaxias are particularly susceptible to Brown trout predation as they prefer feeding on organic drift in the water column where they are easily preyed upon, whereas adults find refuge amongst the stoney stream bed. As such, Trout predation may explain the absence of young-of-year fish. Combined with the high parasite load that the population has, the results indicate that the population is in poor health and is potentially in decline. That said, the significance and extent of the issue is difficult to determine from annual survey data of this one site. More widespread sampling in the upper Lerderderg River would help to determine if and where successful recruitment is taking place and to provide a clearer picture of overall population health. This would allow for early, proactive intervention (e.g. trout removal or trout barrier installation) if needed. These sites could potentially be added during the next year of HWS sampling.

At almost every site where River blackfish and Southern pygmy perch were recorded, both young-of-year and 1+ fish were present, again suggesting successful recruitment during the last breeding season and that individuals are surviving to reproductive age. There were no clear signs of poor health (e.g. parasites) among these communities either.

Finally, both adult and juvenile Yarra pygmy perch were captured at Upper Deep Creek site this year, compared to one adult in 2022. This is a positive result indicates that the site is indeed suitable for monitoring this population of Yarra pygmy perch.

5. Recommendations

Additional survey effort

- As Dwarf galaxias have not been captured at Balcombe Creek, Upper Dandenong Creek or Lower Cardinia Creek in 2022 or 2023, consider additional survey effort at these sites. Additional survey effort could include intensive dip netting and/or overnight bait trapping and fyke netting. Additional survey sites could be added at nearby wetland habitats or smaller tributaries, however wetland surveys are likely outside the scope of this project.
- Consider additional survey effort (fyke netting) for Australian grayling at the Maribyrnong River, as this target species has not been recorded in 2022 or 2023 at this site. The species is known from the Maribyrnong in the vicinity of the survey site but in low abundance.

Additional survey sites

- As River blackfish were not recorded at Werribee Gorge or Lerderderg Gorge in 2023, additional survey sites within and upstream of the gorges should be considered in 2024 so the status of these poorly known and potentially imperilled populations can be better understood. Additional sites in Lerderderg Gorge would also help determine if and where successful Ornate galaxias recruitment is taking place and to provide a clearer picture of overall population health. This is a necessary step if early intervention is to take place for any of these populations.
- If the current Lower Cardinia Creek site is not to be moved, add a site below the Thompson Road structure and fishway on Cardinia Creek to improve the likelihood of surveying Australian grayling in the catchment. The Thompson Road structure and fishway is thought to prevent the upstream movement of Australian grayling. Having sites above and below the fishway will allow for upstream/downstream comparison and confirmation of its impact on fish movement, which could provide quantitative support for remediation actions.

6. References

- Beitzel, M., Evans, L., & Jekabsons, M. (2020). Monitoring of Two-spined Blackfish (*Gadopsis bispinosus*) in relation to Environmental Flows.
- BOM (2023). Water Data Online. Bureau of Meteorology. Commonwealth of Australia. Available at: <http://www.bom.gov.au/waterdata/> [accessed 7 July 2023]
- Coleman, R. A., Butcher, J., Mclean, J., Shipp, A., & Weeks, A. R. (2018). Habitat improvement and creation for threatened dwarf galaxias (*Galaxiella pusilla*) along the Dandenong Creek corridor. In *9th Australian Stream Management Conference* (pp. 744–751).
- Gilbert, F. (2020) Officer South Fauna Investigation. Project report prepared for Melbourne Water. Jacobs publication, project number IA5000DG.
- Hammer, M. & Beitzel, M. (2018). Australian Capital Territory region Bush Blitz Fishes and Crayfish.
- Harris, J. H. (1995). The use of fish in ecological assessments. *Australian Journal of Ecology*, 20(1), 65–80.
- Humphries, P. (1995). Life history, food and habitat of southern pygmy perch, *Nannoperca australis*, in the Macquarie River, Tasmania. *Marine and Freshwater Research*, 46(8), 1159–1169.
- Jacobs (2022). 2022 Healthy Waterways Strategy Fish Survey. Report prepared for Melbourne Water. Jacobs, Melbourne.
- Jacobs (2023). Upper Yarra ecological surveys: Autumn 2023. Report prepared for Melbourne Water. Jacobs, Melbourne.
- Jones, M.J., Tinkler, P., Lindeman, M., Hackett, G., & Pickworth, A. (2008). Threats, distribution and abundance of Yarra Pygmy Perch in Victoria during a drought period. Arthur Rylah Institute for Environmental Research, Heidelberg.
- King, A., Crook, D., Shackleton, M., & Bond, N. (2020). MERI for Fish of the Melbourne Water region: A Discussion Paper. Report prepared for Melbourne Water by the Centre for Freshwater Ecosystems, La Trobe University. CFE Publication 263.
- Macdonald, J. I., Tonkin, Z. D., Ramsey, D. S., Kaus, A. K., King, A. K., & Crook, D. A. (2012). Do invasive eastern gambusia (*Gambusia holbrooki*) shape wetland fish assemblage structure in south-eastern Australia? *Marine and Freshwater Research*, 63(8), 659–671.
- MDBC (2008). Sustainable Rivers Audit Protocols: Approved manual for Implementation Period 5: 2008–09. Murray–Darling Basin Commission, Canberra.
- Melbourne Water (2018) HWS2018 Habitat suitability modelling results for Fish. Accessed from [HWS2018 Habitat suitability modelling results for Fish \(arcgis.com\)](https://www.melbournewater.com.au/hws2018-habitat-suitability-modelling-results-for-fish).
- Miller AK, Baker C, Kitson JC, Yick JL, Manquel PEI, Alexander A, Gemmell NJ (2021). The Southern Hemisphere lampreys (Geotriidae and Mordaciidae). *Reviews in Fish Biology and Fisheries* 31, 201–232. doi:10.1007/s11160-021-09639-x
- NSW Fisheries (1997). Australian Code of Electrofishing Practice. New South Wales Fisheries Management Publication 1.
- Sanger, A.C. (1986). The evolution and ecology of the *Gadopsis marmoratus* complex. Ph.D. thesis, The University of Melbourne, Melbourne.
- Wedderburn, S., Whiterod, N., & Gwinn, D. C. (2019). Determining the status of Yarra Pygmy Perch in the Murray–Darling Basin. Report to the Murray–Darling Basin Authority and the Commonwealth Environmental Water Office. The University of Adelaide and Aquasave–Nature Glenelg Trust, Adelaide.

Appendix A. Field data sheets

BIOLOGICAL RECORD Melbourne Water

Biological page # (e.g. 1/5) 1 / 3

Collector <u>J. LAMIN</u> Helper 1 <u>G. CLEMENTS</u> Helper 2 _____	Site code <u>NLC-3709-0</u> Waterbody <u>ALCOMBE CRK</u>	Health Codes (disease, parasite, deformities) D - Deformity (skeletal, eye, fins, asymmetric etc.) F - Fin condition poor (broken, eroded) G - Fungus L - Larvae (only when notable) O - Other (e.g. gas bubble eye. IMPORTANT: describe and photograph)
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Seq. #	Gear type	OP. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Health Codes	Sex	Repro. Cond.	Comment (and Tag #)
1	BP	3	SPP	1	34	TL	2				
2	"	3	"	2	58	TL	4	M			
3	"	3	"	3	59	TL	4	F			
4	"	3	"	4	70	TL	6	M			
5	"	3	"	5	82	TL	10				
6	"	3	"	6	71	TL	9				
7	"	4	SPP	7	67	TL	8	M			
8	"	4	"	8	60	TL	6				
9	"	4	"	9	49	TL	4				
10	"	4	"	10	48	TL	3				
11	"	4	"	11	44	TL	2				
12	"	5	SFE	1	155	TL	8				
13	"	5	ENCA. QUAD.	1	20	CL	2				
14	"	5	G.MAC	1	96	LCF	9				
15	"	5	G.MAC	2	152	LCF	22				
16	"	5	G.MAC	3	103	LCF	8				
17	"	6	G.MAC	4	64	LCF	2				
18	"	6	G.MAC	5	125	LCF	13				
19	"	6	G.MAC	6	113	LCF	9				
20	"	6	SPP	12	35	TL	2				
21	"	6	SPP	13	56	TL	4	F			
22	"	7	G.MAC	7	123	LCF	14				
23	"	7	"	8	126	LCF	14				
24	"	7	"	9	113	LCF	10				
25	"	7	"	10	126	LCF	14				

Gear codes: Electrofishers: BP-backpack, LB-large boat, MB-medium boat, SB-small boat. Other: BT-bait trap, S-seine net, P-panel net, F-fyke net, L-larval net. Length codes: TL-Total length, LCF-length to Caudal Fork. Reproductive Condition: E-eggs discharging, S-sperm discharging, O-other. (describe)

BIOLOGICAL RECORD Melbourne Water

Biological page # (e.g. 1/5) 2 / 3

Collector <u>S. LAMIN</u>	Site code <u>BLC-3709-0</u>	Health Codes (disease, parasite, deformities) D - Deformity (skeletal, eye, fins, asymmetric etc.) F - Fin condition poor (broken, eroded) G - Fungus L - Larvae (only when notable) O - Other (e.g. gas bubble eye. IMPORTANT: describe and photograph)	
Helper 1 <u>G. CLEMENTS</u>	Waterbody <u>BALCOMBE CREEK</u>		
Helper 2 _____			

Gear codes: Electrofishers: BP-backpack, LB-large boat, MB-medium boat, SB-small boat. Other: BT-bait trap, S-seine net, P-panel net, F-fyke net, L-larval net. Length codes: TL-Total length, LCF-Length to Caudal Fork. Reproductive Condition: E-eggs discharging, S-sperm discharging, O-other (describe)

Seq. #	Gear type	OP. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Health Codes	Sex	Repro. Cond.	Comment (and Tag #)
1	BP	7	G. MAC	11	119	LCF	19				
2	"	7	"	12	125	LCF	7				
3	"	7	"	13	87	LCF	10				
4	"	7	"	14	103	LCF	14				
5	"	7	"	15	123	LCF	2				
6	"	7	"	16	59	LCF	13				
7	"	7	"	17	124	LCF	4				
8	"	7	SPP	14	57	TL	4				
9	"	7	SPP	15	46	TL	4				
10	"	8	G. MAC	18	125	LCF	13				
11	"	8	"	19	145	TL	23		S		
12	"	8	"	20	97	TL	9				
13	"	8	"	21	108	TL	8				
14	"	8	"	22	62	TL	4				
15	"	8	"	23	103	TL	7				
16	"	8	"	24	110	TL	8				
17	"	8	"	25	89	TL	6				
18	"	8	"	26	75	TL	3				
19	"	8	"	27	94	TL	3				
20	"	8	"	28	105	TL	4				
21	"	8	"	29	106	TL	8				
22	"	8	"	30	59	TL	2				
23	"	8	SPP	16	38	TL	1				
24	"	8	SPP	17	39	TL	1				
25	"	8	SPP	18	29	TL	1				

BIOLOGICAL RECORD Melbourne Water

Biological page # (e.g. 1/5) 3 / 3

dd mm yy <u>05 / 05 / 23</u>	Collector <u>S. Lamin</u> Helper 1 <u>G. Clements</u> Helper 2 _____	Site code <u>DLK-3709-0</u> Waterbody <u>DALCOMBE CRK</u>	Health Codes (disease, parasite, deformities) P - Other parasites (leech, lamprey, isopod) S - Lesions (raised or reddish skin or scales) T - Tumour (localised abnormal growth) U - Ulcer (skin is broken, crater like, redness) W - Wounds (e.g. bird strikes, hook wounds)
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Gear codes: Electrofishers: BP-backpack, LB-large boat, MB-medium boat, SB-small boat. Other: BT-bait trap, S-seine net, P-panel net, F-fyke net, L-larval net. Length codes: TL-Total length, LCF-Length to Caudal Fork. Reproductive Condition: E-eggs discharging, S-sperm discharging, O-other (describe)

Seq. #	Gear type	OP. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Health Codes	Sex	Repro. Cond.	Comment (and Tag #)
1	BP	8	SPP	19	31	TL	1				
2	BT	8	GAMO	1	26	TL	1				
3	BT	9	G.MAC	1	95	TL	7				
4	DIPNET	10	GAMO	1	24	TL	1				
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

EFFORT AND CATCH RECORD Melbourne Water

Effort/catch pg # (e.g. 1/3) 1 / 1

Collector		Site code		Gear codes	
<u>S. LAMIN</u>		<u>BLC-3709-0</u>		Electrofishers: BP - backpack, LB - large boat, MB - medium boat, SB - small boat	
Helper 1 <u>L. CLEMENTS</u>		Waterbody <u>BALCONISE CRK</u>		Other: BT - bait trap, S - seine net, P - panel net, F - fyke net, L - larval net	
Helper 2					

Operation #	Start Time (24hr)	End Time	Date (dd/mm/yy)	Method	nets length (m) / start (sec)	mesh (mm) / end (sec)	Volts	pulses per sec	% duty cycle (range)	amps	Species Code	#cght (#obs)					
<u>1</u>	<u>8:45</u>	<u>9:05</u>	<u>5/5/23</u>	<u>BP</u>	<u>0</u>	<u>150</u>	<u>100</u>	<u>80 HZ</u>	<u>25%</u>	<u>0.8</u>	<u>NO FISH</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>
<u>2</u>	<u>8:55</u>	<u>9:05</u>	<u>5/5/23</u>	<u>BP</u>	<u>150</u>	<u>300</u>					<u>SOUTHERN BROWN PARCH</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>
<u>3</u>	<u>9:05</u>	<u>9:15</u>	<u>5/5/23</u>	<u>BP</u>	<u>300</u>	<u>450</u>					<u>SHORTFIN EEL</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>
<u>4</u>	<u>9:15</u>	<u>9:25</u>	<u>5/5/23</u>	<u>BP</u>	<u>450</u>	<u>600</u>					<u>GALAXIAS MACUL</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>
<u>5</u>	<u>9:25</u>	<u>9:35</u>	<u>5/5/23</u>	<u>BP</u>	<u>600</u>	<u>750</u>					<u>ENGAEUS QUADRIMANUS</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>
<u>6</u>	<u>9:35</u>	<u>9:45</u>	<u>5/5/23</u>	<u>BP</u>	<u>750</u>	<u>900</u>					<u>GARHI BOSIA</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>
<u>7</u>	<u>9:45</u>	<u>9:55</u>	<u>5/5/23</u>	<u>BP</u>	<u>900</u>	<u>1050</u>						<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>
<u>8</u>	<u>9:55</u>	<u>10:05</u>	<u>5/5/23</u>	<u>BP</u>	<u>1050</u>	<u>1200</u>						<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>
<u>9</u>	<u>10:15</u>	<u>10:25</u>	<u>5/5/23</u>	<u>BT</u>	<u>1050/13</u>	<u>X10 NETS</u>						<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>
<u>10</u>	<u>10:25</u>	<u>10:35</u>	<u>5/5/23</u>	<u>DIP NET</u>	<u>10 NETS</u>							<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>	<u>(1)</u>

HABITAT RECORD Melbourne Water

Habitat page # (e.g. 1/3) 1 / 1

dd mm yy
05/05/23

Collector
Helper 1
Helper 2

S. LAMIN
G. CLEMENTS

Site code ML-3709-0
Waterbody BALCOMBE CREEK

Instructions

Mark circles with cross or fill in. Leave boxes blank if the item was not seen. Definitions for some items are on first sheet.

Operation #	1	2	3	4	5	6	7	8	9	10
Substrate										
Bedrock	<input type="checkbox"/>									
Boulder (>120 mm)	<input type="checkbox"/>									
Cobble (60-200 mm)	<input type="checkbox"/>									
Gravel (2-60 mm)	<input type="checkbox"/>									
Sand (0.6-2 mm)	<input type="checkbox"/>									
Mid/silt (0.002-0.6 mm)	<input checked="" type="checkbox"/>									
Clay (<0.002 mm)	<input checked="" type="checkbox"/>									
Unknown	<input type="checkbox"/>									
Plants										
Native trees	<input checked="" type="checkbox"/>									
Exotic trees	<input type="checkbox"/>									
Native shrubs	<input checked="" type="checkbox"/>									
Riparian grass	<input checked="" type="checkbox"/>									
Floating macrophytes	<input type="checkbox"/>									
Emergent macrophytes	<input checked="" type="checkbox"/>									
Submerged macrophytes	<input checked="" type="checkbox"/>									
Filamentous algae	<input type="checkbox"/>									
Suspended algae	<input type="checkbox"/>									
Biofilms	<input checked="" type="checkbox"/>									
Cover										
Rock	<input type="checkbox"/>									
Timber	<input checked="" type="checkbox"/>									
Undercuts	<input type="checkbox"/>									
Leaf litter	<input type="checkbox"/>									
Macrophytes	<input checked="" type="checkbox"/>									
Mesohabitat										
Pools	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Run	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Riffle	<input type="checkbox"/>									
Rapid	<input type="checkbox"/>									
Backwater	<input type="checkbox"/>									
Velocity (F, M, S, NF)	<u>6</u>	<u>6</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>5</u>	<u>3</u>	<u>5</u>	<u>3</u>	<u>6</u>
Average wetted width (m)	<u>0.5</u>									
Average depth (m)	<u>0.5</u>									
Distance travelled (m)	<u>25</u>	<u>30</u>	<u>30</u>							

SITE MAP Melbourne Water

Site map page # (e.g. 1/2) 1 / 1

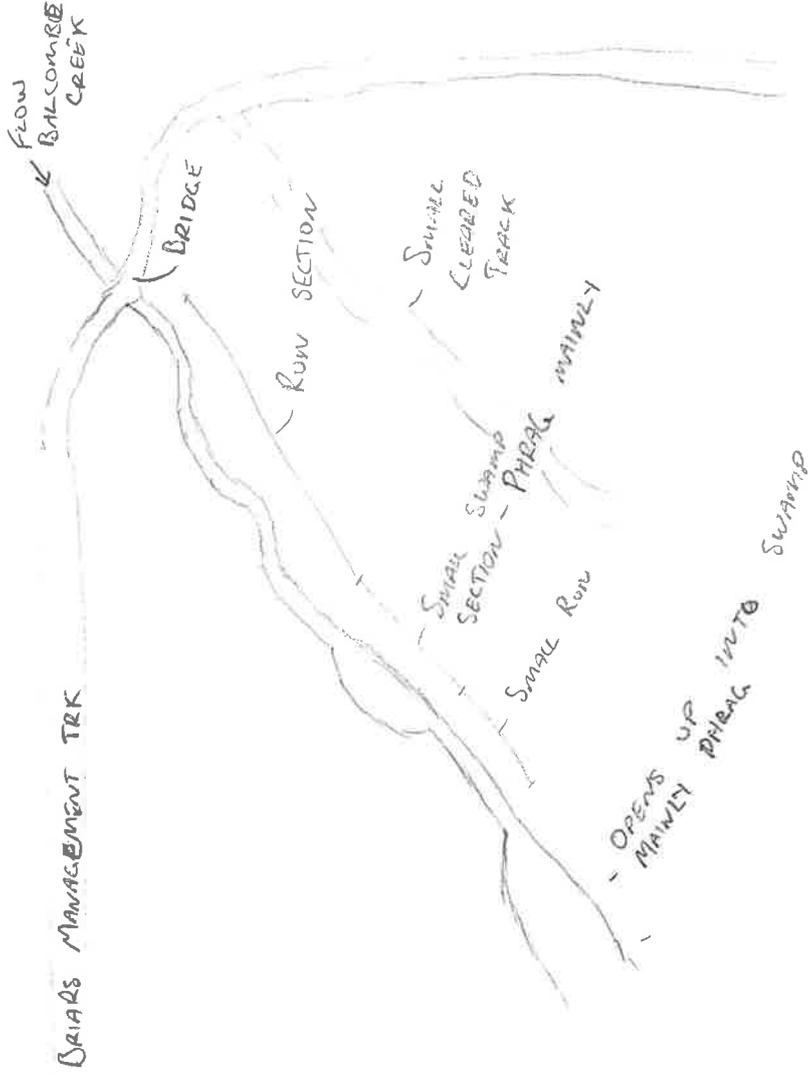
dd mm yy
05 / 05 / 23

Drawer S. LAMIN

Site code DL-3707-0
Waterbody BALCOMBE CREEK

Instructions

Draw picture to help explain location, site details etc., if required or needed.



Comments: TEA TREE ALONG EDGES OF CREEK, ACCESS VIA CLEARED TRACK NOT OVERLY OVERGROWN TO GET IN

Biological page # (e.g. 1/5) 1 / 1 **BIOLOGICAL RECORD Melbourne Water**

Collector <u>J. LARMIN</u>	Site code <u>BAS-22307-6</u>	Health Codes (disease, parasite, deformities) P - Other parasites (leech, lamprey, isopod) S - Lesions (raised or reddish skin or scales) T - Tumour (localised abnormal growth) U - Ulcer (skin is broken, crater like, redness) W - Wounds (e.g. bird strikes, hook wounds)
Helper 1 <u>G. CLEMENTS</u>	Waterbody <u>BASS RIVER</u>	D - Deformity (skeletal, eye, fins, asymmetric etc.) F - Fin condition poor (broken, eroded) G - Fungus L - Lernaea (only when notable) O - Other (e.g. gas bubble eye. IMPORTANT: describe and photograph)
Helper 2 <u></u>		

Seq. #	Gear type	OP. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Health Codes	Sex	Repro. Cond.	Comment (and Tag #)
1	BP	1	SFE	1	517	TL	266				
2	"	1	SFE	2	751	TL	-				
3	"	1	G.MAC	1	74	LCF	2				
4	"	2	SFE	3	583	TL	445				
5	"	3	G.MAC	2	63	LCF	2				
6	"	4	SFE	4	663	TL	-				
7	"	5	G.MAC	3	56	LCF	1				
8	"	5	G.MAC	4	69	LCF	3				
9	"	5	G.MAC	5	68	LCF	3				
10	"	5	G.MAC	6	85	LCF	4				
11	"	6	SFE	8	407	TL	133				
12	"	6	SFE	6	533	TL	302				
13	"	7	SFE	7	506	TL	295				
14	"	7	SFE	8	310	TL	49				
15	"	7	SFE	9	581	TL	253				
16	"	7	G.MAC	7	119	LCF	11				
17	"	7	G.MAC	8	71	LCF	3				
18	"	8	SFE	10	182	TL	14				
19											
20											
21											
22											
23											
24											
25											

EFFORT AND CATCH RECORD Melbourne Water

Effort/catch pg # (e.g. 1/3) 1 / 1

Collector		Site code		Gear codes														
S. LAMIN		BAS-22307-6		Electrofishers: BP - backpack, LB - large boat, MB - medium boat, SB - small boat Other: BT - bait trap, S - seine net, P - panel net, F - fyke net, L - larval net														
Helper 1		Waterbody																
G. CLEMENTS		BASS RIVER																
Helper 2																		
Operation #	Start Time (24hr)	End Time	Date (dd/mm/yy)	Method	nets length (m) / start (sec)	mesh (mm) / end (sec)	Volts	pulses per sec	% duty cycle (range)	amps	Species Code	#cght (#obs)						
1	7:30	7:38	3/5/23	BP	0	150	120	40HZ	25%	0.5	SHERFINI EEL	2 (1)	1 (2)	1 (3)	1 (1)	2 ()	3 ()	1 (2)
	7:38	7:45	3/5/23	BP	0	150	120	40HZ	25%	0.5	GALAXIAS MACUL.	1	1 (2)	1 (3)	1 (1)	2 ()	3 ()	1 (2)
	7:45	7:53	3/5/23	BP	0	150	120	40HZ	25%	0.5	NO FISH							
	7:53	8:00	3/5/23	BP	0	150	120	40HZ	25%	0.5								
	8:00	8:08	3/5/23	BP	0	150	120	40HZ	25%	0.5								
	8:08	8:15	3/5/23	BP	0	150	120	40HZ	25%	0.5								
	8:15	8:23	3/5/23	BP	0	150	120	40HZ	25%	0.5								
	8:23	8:30	3/5/23	BP	0	150	120	40HZ	25%	0.5								
	8:30	8:40	3/5/23	BP	0	150	120	40HZ	25%	0.5								
	8:40	8:45	3/5/23	BP	0	150	120	40HZ	25%	0.5								
	8:45	8:50	3/5/23	BP	0	150	120	40HZ	25%	0.5								
	8:50	8:55	3/5/23	BP	0	150	120	40HZ	25%	0.5								
	8:55	9:00	3/5/23	BP	0	150	120	40HZ	25%	0.5								
	9:00	9:05	3/5/23	BP	0	150	120	40HZ	25%	0.5								
	9:05	9:10	3/5/23	BP	0	150	120	40HZ	25%	0.5								
	9:10	9:15	3/5/23	BP	0	150	120	40HZ	25%	0.5								
	9:15	9:20	3/5/23	BP	0	150	120	40HZ	25%	0.5								
	9:20	9:25	3/5/23	BP	0	150	120	40HZ	25%	0.5								
	9:25	9:30	3/5/23	BP	0	150	120	40HZ	25%	0.5								
	9:30	9:35	3/5/23	BP	0	150	120	40HZ	25%	0.5								
	9:35	9:40	3/5/23	BP	0	150	120	40HZ	25%	0.5								
	9:40	9:45	3/5/23	BP	0	150	120	40HZ	25%	0.5								
	9:45	9:50	3/5/23	BP	0	150	120	40HZ	25%	0.5								
	9:50	9:55	3/5/23	BP	0	150	120	40HZ	25%	0.5								
	9:55	10:00	3/5/23	BP	0	150	120	40HZ	25%	0.5								

HABITAT RECORD Melbourne Water

Collector J. LAMIA

dd mm yy 03 / 05 / 23

Site code BAS-22307-6

Helper 1 G. CLEMENTS

Helper 2 _____

Instructions
Mark circles with cross or fill in. Leave boxes blank if the item was not seen.
Definitions for some items are on first sheet.

Waterbody BASS RIVER

Operation #	1	2	3	4	5	6	7	8	9	10	Operation #
Substrate											Substrate
Bedrock	<input type="checkbox"/>	Bedrock									
Boulder (>120 mm)	<input type="checkbox"/>	Boulder (>120 mm)									
Cobble (60-200 mm)	<input type="checkbox"/>	Cobble (60-200 mm)									
Gravel (2-60 mm)	<input type="checkbox"/>	Gravel (2-60 mm)									
Sand (0.6-2 mm)	<input checked="" type="checkbox"/>	Sand (0.6-2 mm)									
Mid/silt (0.002-0.6 mm)	<input checked="" type="checkbox"/>	Mid/silt (0.002-0.6 mm)									
Clay (<0.002 mm)	<input checked="" type="checkbox"/>	Clay (<0.002 mm)									
Unknown	<input type="checkbox"/>	Unknown									
Plants											Plants
Native trees	<input type="checkbox"/>	Native trees									
Exotic trees	<input checked="" type="checkbox"/>	Exotic trees									
Native shrubs	<input type="checkbox"/>	Native shrubs									
Riparian grass	<input checked="" type="checkbox"/>	Riparian grass									
Floating macrophytes	<input checked="" type="checkbox"/>	Floating macrophytes									
Emergent macrophytes	<input checked="" type="checkbox"/>	Emergent macrophytes									
Submerged macrophytes	<input checked="" type="checkbox"/>	Submerged macrophytes									
Filamentous algae	<input type="checkbox"/>	Filamentous algae									
Suspended algae	<input type="checkbox"/>	Suspended algae									
Biofilms	<input checked="" type="checkbox"/>	Biofilms									
Cover											Cover
Rock	<input type="checkbox"/>	Rock									
Timber	<input checked="" type="checkbox"/>	Timber									
Undercuts	<input checked="" type="checkbox"/>	Undercuts									
Leaf litter	<input checked="" type="checkbox"/>	Leaf litter									
Macrophytes	<input checked="" type="checkbox"/>	Macrophytes									
Mesohabitat											Mesohabitat
Pools	<input checked="" type="checkbox"/>	Pools									
Run	<input checked="" type="checkbox"/>	Run									
Riffle	<input type="checkbox"/>	Riffle									
Rapid	<input type="checkbox"/>	Rapid									
Backwater	<input type="checkbox"/>	Backwater									
Velocity (F, M, S, NF)	<u>S</u>	<u>R</u>	<u>S</u>	<u>S</u>	<u>S</u>	<u>S</u>	<u>S/M</u>	<u>NF</u>	<u>S</u>	<u>S</u>	Velocity (F, M, S, NF)
Average wetted width (m)	<u>1</u>	<u>8</u>	<u>1</u>	<u>8</u>	<u>1</u>	<u>1</u>	<u>9</u>	<u>8</u>	<u>1</u>	<u>1</u>	Average wetted width (m)
Average depth (m)	<u>25</u>	Average depth (m)									
Distance travelled (m)											Distance travelled (m)

SITE MAP Melbourne Water

Site map page # (e.g. 1/2) ____ / ____

dd mm yy
____ / ____ / ____

Drawer

Site code
Waterbody

Instructions
Draw picture to help explain location, site details etc., if required or needed.

Comments:

BIOLOGICAL RECORD Melbourne Water

Biological page # (e.g. 1/5) 1 / 1

Collector	J. LAMIN	Site code	WY-11161-3
Helper 1	G. CLEMENTS	Waterbody	BUNYIP RIVER
Helper 2			
dd mm yy	02 / 05 / 23		

Seq. #	Gear type	OP. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Health Codes	Sex	Repro. Cond.	Comment (and Tag #)
1	BP	1	EVAS. YARR.	1	55	CL	33				
2	"	1	SPP	1	50	TL	4		M.		
3	"	1	CAL. MCL.	1	74	LCF	3				
4	"	3	SFE	1	278	TL	32				
5	"	3	SPP	2	59	TL	3				
6	"	3	EVAS. KEES.	1	60	CL	37				
7	"	4	B. TROUT	1	291	LKF	164				
8	"	4	EVAS. KEES.	1	28	CL	6				
9	"	4	SPP	3	41	TL	1				
10	"	5	EVAS. YARR.	1	35	CL	13				
11	"	6	B. TROUT	2	341	LKF	374				
12	"	6	BLACKFISH	1	37	TL	1				
13	"	6	SFE	2	205	TL	29				
14	"	6	EVAS. KEES.	1	11	CL	1				
15	"	6	EVAS. KEES.	1	15	CL	1				
16	"	4	SPP	4	41	TL	1				
17	"	8	BLACKFISH	2	129	TL	31				
18	DIRNET	9	SPP	1	30	TL	1				
19											
20											
21											
22											
23											
24											
25											

Gear codes: Electrofishers: BP-backpack, LB-large boat, MB-medium boat, SB-small boat. Other: BT-bait trap, S-seine net, P-panel net, F-fyke net, L-larval net. Length codes: TL-Total length, LCF-Length to Caudal Fork. Reproductive Condition: E-eggs discharging, S-sperm discharging, O-other (describe)

Health Codes (disease, parasite, deformities)

- D - Deformity (skeletal, eye, fins, asymmetric etc.)
- F - Fin condition poor (broken, eroded)
- G - Fungus
- L - Lernaea (only when notable)
- O - Other (e.g. gas bubble eye. IMPORTANT: describe and photograph)
- P - Other parasites (leech, lamprey, isopod)
- S - Lesions (raised or reddish skin or scales)
- T - Tumour (localised abnormal growth)
- U - Ulcer (skin is broken, crater like, redness)
- W - Wounds (e.g. bird strikes, hook wounds)

HABITAT RECORD Melbourne Water

Habitat page # (e.g. 1/3) 1 / 1

dd mm WY

02 / 05 / 23

Collector

S. Lavin

Helper 1

G. CLEMENTS

Helper 2

Waterbody BONVIV RIVER

Site code BUY 1161-3

Instructions

Mark circles with cross or fill in. Leave boxes blank if the item was not seen. Definitions for some items are on first sheet.

Operation #	1	2	3	4	5	6	7	8	9	10	Operation #
Substrate											Substrate
Bedrock	<input type="checkbox"/>	Bedrock									
Boulder (>120 mm)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Boulder (>120 mm)
Cobble (60-200 mm)	<input type="checkbox"/>	Cobble (60-200 mm)									
Gravel (2-60 mm)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Gravel (2-60 mm)
Sand (0.6-2 mm)	<input checked="" type="checkbox"/>	Sand (0.6-2 mm)									
Mid/silt (0.002-0.6 mm)	<input checked="" type="checkbox"/>	Mid/silt (0.002-0.6 mm)									
Clay (<0.002 mm)	<input type="checkbox"/>	Clay (<0.002 mm)									
Unknown	<input type="checkbox"/>	Unknown									
Plants											Plants
Native trees	<input checked="" type="checkbox"/>	Native trees									
Exotic trees	<input type="checkbox"/>	Exotic trees									
Native shrubs	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Native shrubs
Riparian grass	<input checked="" type="checkbox"/>	Riparian grass									
Floating macrophytes	<input type="checkbox"/>	Floating macrophytes									
Emergent macrophytes	<input checked="" type="checkbox"/>	Emergent macrophytes									
Submerged macrophytes	<input type="checkbox"/>	Submerged macrophytes									
Filamentous algae	<input type="checkbox"/>	Filamentous algae									
Suspended algae	<input type="checkbox"/>	Suspended algae									
Biofilms	<input checked="" type="checkbox"/>	Biofilms									
Cover											Cover
Rock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Rock
Timber	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Timber
Undercuts	<input checked="" type="checkbox"/>	Undercuts									
Leaf litter	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Leaf litter
Macrophytes	<input checked="" type="checkbox"/>	Macrophytes									
Mesohabitat											Mesohabitat
Pools	<input type="checkbox"/>	Pools									
Run	<input checked="" type="checkbox"/>	Run									
Riffle	<input checked="" type="checkbox"/>	Riffle									
Rapid	<input type="checkbox"/>	Rapid									
Backwater	<input type="checkbox"/>	Backwater									
Velocity (F, M, S, NF)	<u>M/F</u>	<u>M</u>	Velocity (F, M, S, NF)								
Average wetted width (m)	<u>5</u>	<u>5</u>	<u>5</u>	<u>7</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>5</u>	<u>5</u>	Average wetted width (m)
Average depth (m)	<u>0.5</u>	Average depth (m)									
Distance travelled (m)	<u>25</u>	Distance travelled (m)									

SITE MAP Melbourne Water

Site map page # (e.g. 1/2) _____ / _____

dd mm yy
____ / ____ / ____

Drawer _____

Site code _____
Waterbody _____

Instructions

Draw picture to help explain location, site details etc., if required or needed.

Comments:

BIOLOGICAL RECORD Melbourne Water

Biological page # (e.g. 1/5) 1 / 1

Collector	S. LAMIN	Site code	BWY-70608-3
Helper 1	G. CLEMENTS	Waterbody	BUNYIP RIVER
Helper 2			
dd mm yy	02/05/23		

Health Codes (disease, parasite, deformities)
 D - Deformity (skeletal, eye, fins, asymmetric etc.)
 F - Flin condition poor (broken, eroded)
 G - Fungus
 L - Lernaea (only when notable)
 O - Other (e.g. gas bubble eye. IMPORTANT: describe and photograph)
 P - Other parasites (leech, lamprey, isopod)
 S - Lesions (raised or reddish skin or scales)
 T - Tumour (localised abnormal growth)
 U - Ulcer (skin is broken, crater like, redness)
 W - Wounds (e.g. bird strikes, hook wounds)

Seq. #	Gear type	OP. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Health Codes	Sex	Repro. Cond.	Comment (and Tag #)
1	BP	1	G. MAC	1	64	LCF	2				
2	"	1	G. MAC	2	73	LCF	1				
3	"	2	G. MAC	3	75	LCF	3				
4	"	3	TUPONGA	1	149	TL	28				
5	"	3	TUPONGA	2	146	TL	30				
6	"	3	TUPONGA	3	111	TL	15				
7	"	3	TUPONGA	4	78	TL	6				
8	"	4	CARP	1	457	LCF	1276				
9	"	4	G. MAC	4	97	LCF	6				
10	"	4	SFE	1	105	TL	1				
11	"	5	G. MAC	5	70	LCF	2				
12	"	5	"	6	69	LCF	2				
13	"	5	"	7	70	LCF	2				
14	"	5	"	8	166	LCF	36				
15	"	5	"	9	133	LCF	11				
16	"	6	SFE	2	726	TL	-				
17	"	6	G. MAC	10	67	LCF	1				
18	"	6	G. MAC	11	59	LCF	1				
19	"	6	G. MAC	12	70	LCF	2				
20	"	6	G. MAC	13	52	LCF	1				
21	"	7	GRVILING	1	197	LCF	81				
22	"	8	SPP	1	41	TL	1				
23											
24											
25											

EFFORT AND CATCH RECORD Melbourne Water

Effort/catch pg # (e.g. 1/3) | | / | |

Gear codes

Electrofishers: BP – backpack, LB – large boat, MB – medium boat, SB – small boat
 Other: BT – bait trap, S – seine net, P – panel net, F – fyke net, L – larval net

Site code BWY-70608-3

Waterbody BONYIP RIVER

Collector J. LAMIN

Helper 1 G. CLEMENTS

Helper 2

dd mm yy

02/05/23

Operation #	Start Time (24hr)	End Time (24hr)	Date (dd/mm/yy)	Method	nets length (m) / start (sec)	mesh (mm) / end (sec)	Volts	pulses per sec	% duty cycle (range)	amps
1	12:50	13:05	2/5/23	BP	150	150	220	80 Hz	25	0.4
2	12:54	13:05	2/5/23	BP	150	300				
3	13:05	13:13	2/5/23	BP	300	450				
4	13:13	13:20	2/5/23	BP	450	600				
5	13:20	13:28	2/5/23	BP	600	750				
6	13:28	13:35	2/5/23	BP	750	900				
7	13:35	13:43	2/5/23	BP	900	1050				
8	13:43	13:50	2/5/23	BP	1050	1200				
9	14:00	14:00	2/5/23	DIPNET						
10	14:00	14:00	2/5/23	10 mins						

Species Code	#cght (#obs)								
<u>GALENIUS / HCU</u>	2	1	1	1	5	4			
<u>TUPONG</u>									
<u>CARP</u>									
<u>SHEATHIN EEL</u>				1					
<u>GRAYLING</u>				1					
<u>SOUTHERN BROWN PERCH</u>									
<u>No Fish</u>									

HABITAT RECORD Melbourne Water

Habitat page # (e.g. 1/3) 1 / 1

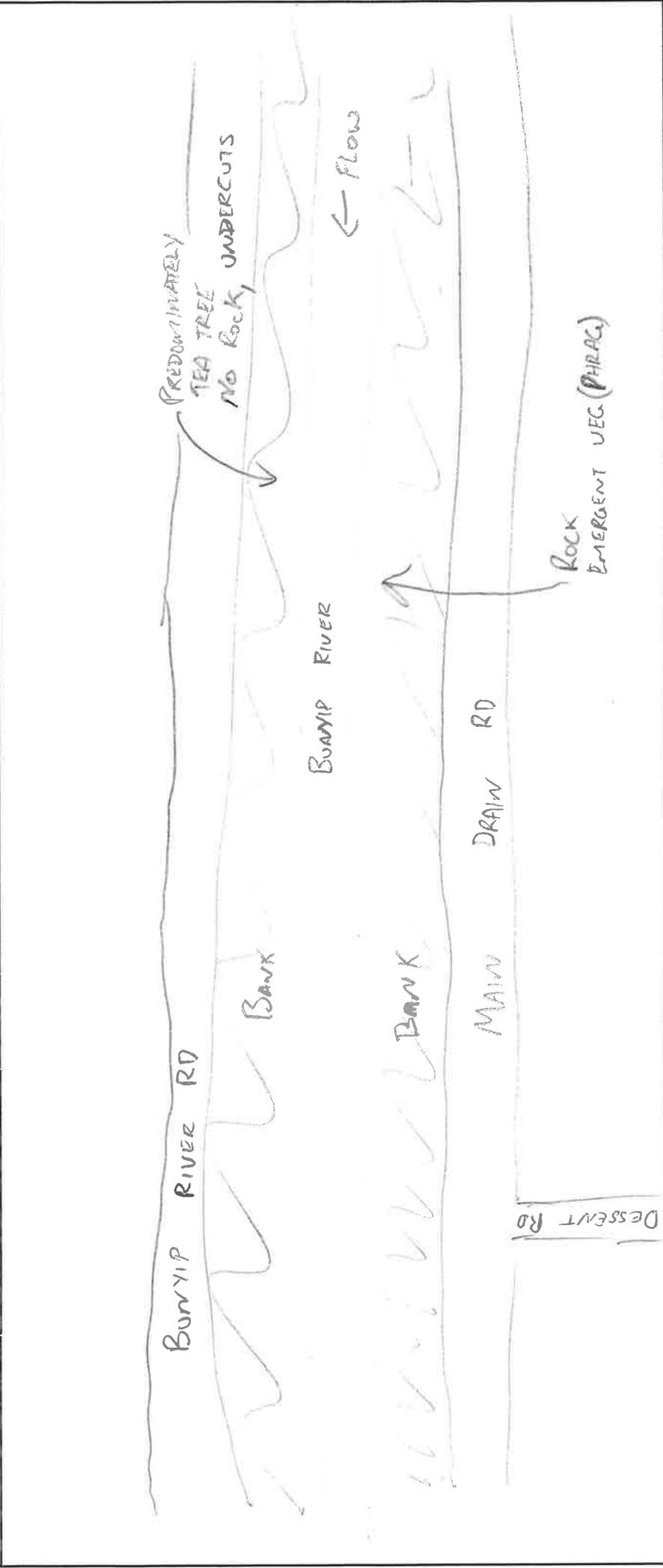
dd	mm	yy	Site code	Waterbody	Instructions
02	05	23	BNY-70608-3	Bonyip River	Mark circles with cross or fill in. Leave boxes blank if the item was not seen. Definitions for some items are on first sheet.
Collector			Helper 1		
S. LANTON			G. CLEMENTS		
Helper 2					

Operation #	1	2	3	4	5	6	7	8	9	10	Operation #
Substrate											
Bedrock	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Boulder (>120 mm)	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Cobble (60-200 mm)	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Gravel (2-60 mm)	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Sand (0.6-2 mm)	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Mid/silt (0.002-0.6 mm)	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Clay (<0.002 mm)	<input type="radio"/>										
Unknown	<input type="radio"/>										
Plants											
Native trees	<input checked="" type="radio"/>										
Exotic trees	<input type="radio"/>										
Native shrubs	<input checked="" type="radio"/>										
Riparian grass	<input checked="" type="radio"/>										
Floating macrophytes	<input type="radio"/>										
Emergent macrophytes	<input checked="" type="radio"/>										
Submerged macrophytes	<input type="radio"/>										
Filamentous algae	<input type="radio"/>										
Suspended algae	<input type="radio"/>										
Biofilms	<input checked="" type="radio"/>										
Cover											
Rock	<input checked="" type="radio"/>										
Timber	<input checked="" type="radio"/>										
Undercuts	<input type="radio"/>										
Leaf litter	<input type="radio"/>										
Macrophytes	<input checked="" type="radio"/>										
Mesohabitat											
Pools	<input type="radio"/>										
Run	<input checked="" type="radio"/>										
Riffle	<input type="radio"/>										
Rapid	<input type="radio"/>										
Backwater	<input type="radio"/>										
Velocity (F, M, S, NF)	M	M	M	M	M	M	M	M	M	M	M
Average wetted width (m)	6	6	6	6	6	6	6	6	6	6	6
Average depth (m)	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Distance travelled (m)	25	25	25	25	25	25	25	25	25	25	25

SITE MAP Melbourne Water

Site map page # (e.g. 1/2) 1 / 1

dd	mm	yy	Drawer	Site code	Instructions
02	10	23	JACKSON Laminar	BNY-7068-3	Draw picture to help explain location, site details etc., if required or needed.
				Waterbody	
				Bunyip River	



Comments: STEEP BANKS

BIOLOGICAL RECORD Melbourne Water

Biological page # (e.g. 1/5) 1 / 1

Collector J. LAMIN
 Site code CDC-10600-4
 Helper 1 G. CLEMENTS
 Waterbody CARDINA CRK
 Helper 2
 dd mm WY
03 / 05 / 23

Health Codes (disease, parasite, deformities)
 D - Deformity (skeletal, eye, fins, asymmetric etc.)
 F - Fin condition poor (broken, eroded)
 G - Fungus
 L - Lernaemia (only when notable)
 O - Other (e.g. gas bubble eye. IMPORTANT: describe and photograph)
 P - Other parasites (leech, lamprey, isopod)
 S - Lesions (raised or reddish skin or scales)
 T - Tumour (localised abnormal growth)
 U - Ulcer (skin is broken, crater like, redness)
 W - Wounds (e.g. bird strikes, hook wounds)

Seq. #	Gear type	OP. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Health Codes	Sex	Repro. Cond.	Comment (and Tag #)
1	BP	1	G. Mac	1	62	LCF	1				
2	"	M1	G. Mac	2	68	LCF	2				
3	"	#1	G. Mac	3	76	LCF	2				
4	"	1	SFE	1	526	TL	352				
5	"	2	SFE	2	512	TL	316				
6	"	2	G. MAC	4	83	LCF	3				
7	"	2	G. MAC	5	83	LCF	3				
8	"	2	G. MAC	6	74	LCF	2				
9	"	2	G. MAC	7	124	LCF	13				
10	"	3	G. MAC	8	74	LCF	1				
11	"	3	G. MAC	9	78	LCF	4				
12	"	3	G. MAC	10	70	LCF	2				
13	"	3	SFE	3	728	TL	-				
14	"	4	SFE	4	366	TL	83				
15	"	4	SPP	#1	68	TL	5				
16	"	4	SPP	2	31	TL	1				
17	"	4	G. MAC	11	72	LCF	2				
18	"	4	G. MAC	12	75	LCF	3				
19	"	4	G. MAC	13	81	LCF	3				
20	"	4	G. MAC	14	88	LCF	3				
21	"	4	G. MAC	15	75	LCF	2				
22	"	5	FHG	1	74	TL	5				
23	"	07	G. MAC	1	75	LCF	2				
24											
25											

HABITAT RECORD Melbourne Water

Habitat page # (e.g. 1/3) 1 / 1

dd mm WY
03 / 05 / 23

Collector J. LAMIN
Helper 1 G. CLEMENTS
Helper 2 _____

Site code CD-10600-4
Waterbody CARDINIA CREEK

Instructions
Mark circles with cross or fill in. Leave boxes blank if the item was not seen. Definitions for some items are on first sheet.

Operation #	1	2	3	4	5	6	7	8	9	10
Substrate										
Bedrock	<input type="checkbox"/>									
Boulder (>120 mm)	<input type="checkbox"/>									
Cobble (60-200 mm)	<input type="checkbox"/>									
Gravel (2-60 mm)	<input type="checkbox"/>									
Sand (0.6-2 mm)	<input checked="" type="checkbox"/>									
Mud/silt (0.002-0.6 mm)	<input checked="" type="checkbox"/>									
Clay (<0.002 mm)	<input type="checkbox"/>									
Unknown	<input type="checkbox"/>									
Plants										
Native trees	<input checked="" type="checkbox"/>									
Exotic trees	<input type="checkbox"/>									
Native shrubs	<input type="checkbox"/>									
Riparian grass	<input checked="" type="checkbox"/>									
Floating macrophytes	<input type="checkbox"/>									
Emergent macrophytes	<input checked="" type="checkbox"/>									
Submerged macrophytes	<input type="checkbox"/>									
Filamentous algae	<input type="checkbox"/>									
Suspended algae	<input type="checkbox"/>									
Biofilms	<input checked="" type="checkbox"/>									
Cover										
Rock	<input type="checkbox"/>									
Timber	<input checked="" type="checkbox"/>									
Undercuts	<input checked="" type="checkbox"/>									
Leaf litter	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Macrophytes	<input checked="" type="checkbox"/>									
Mesohabitat										
Pools	<input type="checkbox"/>									
Run	<input checked="" type="checkbox"/>									
Riffle	<input type="checkbox"/>									
Rapid	<input type="checkbox"/>									
Backwater	<input type="checkbox"/>									
Velocity (F, M, S, NF)	<u>M</u>									
Average wetted width (m)	<u>4</u>	<u>4</u>	<u>4</u>	<u>3</u>	<u>3</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>
Average depth (m)	<u>1</u>									
Distance travelled (m)	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>30</u>	<u>30</u>	<u>30</u>	<u>30</u>	<u>30</u>

dd mm yy
25 / 05 / 23

Collector S. Lamin
 Helper 1 SM. BENJIE
 Helper 2 _____

Site code CDX-7795-S
 Waterbody ARDINIA CEX

Health Codes (disease, parasite, deformities)
 D - Deformity (skeletal, eye, fins, asymmetric etc.)
 F - Fin condition poor (broken, eroded)
 G - Fungus
 L - Lernaea (only when notable)
 O - Other (e.g. gas bubble eye, IMPORTANT: describe and photograph)
 P - Other parasites (leech, lamprey, isopod)
 S - Lesions (raised or reddish skin or scales)
 T - Tumour (localised abnormal growth)
 U - Ulcer (skin is broken, crater like, redness)
 W - Wounds (e.g. bird strikes, hook wounds)

Gear codes: Electrofishers: BP-backpack, LB-large boat, MB-medium boat, SB-small boat; Other: BT-bait trap, S-seine net, P-panel net, F-Fyke net, L-larval net; Length codes: TL-Total length, LCF-Length to Caudal Fork; Reproductive Condition: E-eggs discharging, S-sperm discharging, O-other (describe)

Seq. #	Gear type	OP. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Health Codes	Sex	Repro. Cond.	Comment (and Tag #)
1	BP	3	SFE	1	594	TL	498				
2	"	3	G. MAC	1	94	LCF	7				
3	"	3	SPP	1	51	TL	#2				
4	"	4	SPP	2	49	TL	2				
5	"	5	SFE	2	570	TL	330				
6	"	5	E. KEES	1	18	CL	2				
7	"	6	KEORN	1	335	LCF	558				
8	"	7	SPP	3	68	TL	5				
9	"	7	SFE	3	381	TL	130				
10	"	7	SFE	4	237	TL	21				
11	"	8	G. MAC	2	92	LCF	5				
12	"	8	CARP	1	382	LCF	1035				
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

EFFORT AND CATCH RECORD Melbourne Water

Effort/catch pg # (e.g. 1/3) 1 / 1

Collector S. LAMIN Site code CDC-7795-S
 Helper 1 SM. DENIER Waterbody CARDINIA CREEK
 Helper 2 _____
 dd mm yy _____
25 / 05 / 23

Gear codes

Electrofishers: BP - backpack, LB - large boat, MB - medium boat, SB - small boat
 Other: BT - bait trap, S - seine net, P - panel net, F - fyke net, L - larval net

Operation #	Start	End	Start	End	Method	Mesh	Volts	pulses per sec	% duty cycle (range)	amps
Time (24hr)	Date (dd/mm/yy)				e/fish length (m) / start (sec) / end (sec)					
1	7:40	7:48	7:55	7:55	BP	0	180	80 Hz	75	0.3
2	7:48	7:55	7:55	7:55	BP	150	150	300		
3	7:55	8:03	8:03	8:03	BP	300	300	450		
4	8:03	8:10	8:10	8:10	BP	450	450	600		
5	8:10	8:18	8:18	8:18	BP	600	600	750		
6	8:18	8:25	8:25	8:25	BP	750	750	900		
7	8:25	8:33	8:33	8:33	BP	900	900	1050		
8	8:33	8:40	8:40	8:40	BP	1050	1050	1200		
9	8:40	8:45	8:45	8:45	BT					
10	8:45	8:55	8:55	8:55	BT					

Species Code	#cght (#obs)									
No FISH	()	()	()	()	()	()	()	()	()	()
GALANIAS MACULATUS										
SOUTHERN PYGMY PERCH										
RODFIN										
CARP										
SHORTFIN EEL										
LUASTACUS KERSHAWI										

Habitat page # (e.g. 1/3) 1 / 1

HABITAT RECORD Melbourne Water

dd mm yy <u>25 / 05 / 23</u>	Collector Helper 1 Helper 2	<u>S. LAMIN</u> <u>S.M. BEMNER</u>	Site code Waterbody	<u>CDL-7795-S</u> <u>CERDRIA CRK</u>	Instructions Mark circles with cross or fill in. Leave boxes blank if the item was not seen. Definitions for some items are on first sheet.
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	Operation #	1	2	3	4	5	Operation #	6	7	8	9	10
	Substrate						Substrate					
	Bedrock	<input type="checkbox"/>	Bedrock	<input type="checkbox"/>								
	Boulder (>120 mm)	<input type="checkbox"/>	Boulder (>120 mm)	<input type="checkbox"/>								
	Cobble (60-200 mm)	<input type="checkbox"/>	Cobble (60-200 mm)	<input type="checkbox"/>								
	Gravel (2-60 mm)	<input type="checkbox"/>	Gravel (2-60 mm)	<input type="checkbox"/>								
	Sand (0.6-2 mm)	<input checked="" type="checkbox"/>	Sand (0.6-2 mm)	<input checked="" type="checkbox"/>								
	Mid/silt (0.002-0.6 mm)	<input checked="" type="checkbox"/>	Mid/silt (0.002-0.6 mm)	<input checked="" type="checkbox"/>								
	Clay (<0.002 mm)	<input checked="" type="checkbox"/>	Clay (<0.002 mm)	<input checked="" type="checkbox"/>								
	Unknown	<input type="checkbox"/>	Unknown	<input type="checkbox"/>								
	Plants						Plants					
	Native trees	<input checked="" type="checkbox"/>	Native trees	<input checked="" type="checkbox"/>								
	Exotic trees	<input type="checkbox"/>	Exotic trees	<input type="checkbox"/>								
	Native shrubs	<input checked="" type="checkbox"/>	Native shrubs	<input checked="" type="checkbox"/>								
	Riparian grass	<input checked="" type="checkbox"/>	Riparian grass	<input checked="" type="checkbox"/>								
	Floating macrophytes	<input type="checkbox"/>	Floating macrophytes	<input type="checkbox"/>								
	Emergent macrophytes	<input checked="" type="checkbox"/>	Emergent macrophytes	<input checked="" type="checkbox"/>								
	Submerged macrophytes	<input type="checkbox"/>	Submerged macrophytes	<input type="checkbox"/>								
	Filamentous algae	<input type="checkbox"/>	Filamentous algae	<input type="checkbox"/>								
	Suspended algae	<input type="checkbox"/>	Suspended algae	<input type="checkbox"/>								
	Biofilms	<input checked="" type="checkbox"/>	Biofilms	<input checked="" type="checkbox"/>								
	Cover						Cover					
	Rock	<input type="checkbox"/>	Rock	<input type="checkbox"/>								
	Timber	<input checked="" type="checkbox"/>	Timber	<input checked="" type="checkbox"/>								
	Undercuts	<input checked="" type="checkbox"/>	Undercuts	<input checked="" type="checkbox"/>								
	Leaf litter	<input checked="" type="checkbox"/>	Leaf litter	<input checked="" type="checkbox"/>								
	Macrophytes	<input checked="" type="checkbox"/>	Macrophytes	<input checked="" type="checkbox"/>								
	Mesohabitat						Mesohabitat					
	Pools	<input type="checkbox"/>	Pools	<input type="checkbox"/>								
	Run	<input checked="" type="checkbox"/>	Run	<input checked="" type="checkbox"/>								
	Riffle	<input type="checkbox"/>	Riffle	<input type="checkbox"/>								
	Rapid	<input type="checkbox"/>	Rapid	<input type="checkbox"/>								
	Backwater	<input type="checkbox"/>	Backwater	<input type="checkbox"/>								
	Velocity (F, M, S, NF)	<u>S/M</u>	<u>M</u>	<u>M</u>	<u>M</u>	<u>M</u>	Velocity (F, M, S, NF)	<u>S/M</u>	<u>M</u>	<u>M</u>	<u>S/M</u>	<u>S/M</u>
	Average wetted width (m)	<u>4</u>	<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>	Average wetted width (m)	<u>3</u>	<u>3</u>	<u>3</u>	<u>4</u>	<u>3</u>
	Average depth (m)	<u>0.5</u>	<u>0.5</u>	<u>0.5</u>	<u>0.5</u>	<u>0.5</u>	Average depth (m)	<u>0.5</u>	<u>0.5</u>	<u>0.5</u>	<u>0.5</u>	<u>0.5</u>
	Distance travelled (m)	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	Distance travelled (m)	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>

SITE MAP Melbourne Water

Site map page # (e.g. 1/2) /

dd mm yy
/ /

Drawer

Site code
Waterbody

Instructions
Draw picture to help explain location, site details etc., if required or needed.

Comments:

BIOLOGICAL RECORD Melbourne Water

Biological page # (e.g. 1/5) 1 / 1

dd	mm	yy	Collector	Site code	Health Codes (disease, parasite, deformities)
08	/	05	S. LAMIN	DUG-31881-2	P - Other parasites (leech, lamprey, isopod) S - Lesions (raised or reddish skin or scales) T - Tumour (localised abnormal growth) U - Ulcer (skin is broken, crater like, redness) W - Wounds (e.g. bird strikes, hook wounds)
23			Helper 1	Waterbody	D - Deformity (skeletal, eye, fins, asymmetric etc.) F - Fin condition poor (broken, eroded) G - Fungus L - Lernaea (only when notable) O - Other (e.g. gas bubble eye. IMPORTANT: describe and photograph)
			Helper 2	DANDENONG CRK	I - Length to Caudal Fork. Reproductive Condition: E=eggs discharging, S=sperm discharging, O=other (describe)

Seq. #	Gear type	OP. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Health Codes	Sex	Repro. Cond.	Comment (and Tag #)
1	BP	1	G.MAC	1	92	LCF	3				
2	"	1	SFE	1	784	TL	895				
3	"	2	G.MAC	2	94	LCF	4				
4	"	2	CARP	1	258	LCF	890				
5	"	4	G.MAC	3	69	LCF	2				
6	"	4	SFE	2	594	TL	530				
7	"	6	G.MAC	4	73	LCF	3				
8	"	7	G.MAC	5	71	LCF	3				
9	"	7	G.MAC	6	82	LCF	6				
10	"	7	G.FISH	1	66	TL	85				S
11	"	7	SFE	3	316	TL	417				
12	"	8	G.MAC	7	74	LCF	4				
13	"	8	G.MAC	8	115	LCF	13				
14	"	9	GAMBO	1	22	TL	1				
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

HABITAT RECORD Melbourne Water

Habitat page # (e.g. 1/3) 1 / 1

Collector S. LAMIN

Helper 1 G. CLEMENTS

Helper 2

Site code DWG-31881-2

Waterbody DANDENONG CRK

Instructions

Mark circles with cross or fill in. Leave boxes blank if the item was not seen. Definitions for some items are on first sheet.

dd	mm	WY	1	2	3	4	5	6	7	8	9	10	Operation #
05	05	23											<u>Substrate</u>
													Bedrock
													Boulder (>120 mm)
													Cobble (60-200 mm)
													Gravel (2-60 mm)
													Sand (0.6-2 mm)
													Mid/silt (0.002-0.6 mm)
													Clay (<0.002 mm)
													Unknown
													<u>Plants</u>
													Native trees
													Exotic trees
													Native shrubs
													Riparian grass
													Floating macrophytes
													Emergent macrophytes
													Submerged macrophytes
													Filamentous algae
													Suspended algae
													Biofilms
													<u>Cover</u>
													Rock
													Timber
													Undercuts
													Leaf litter
													Macrophytes
													<u>Mesohabitat</u>
													Pools
													Run
													Riffle
													Rapid
													Backwater
													Velocity (F, M, S, NF)
													Average wetted width (m)
													Average depth (m)
													Distance travelled (m)

SITE MAP Melbourne Water

Site map page # (e.g. 1/2) /

dd mm yy
 / /

Drawer

Site code
Waterbody

Instructions
Draw picture to help explain location, site details etc., if required or needed.

Comments:

BIOLOGICAL RECORD Melbourne Water

Biological page # (e.g. 1/5) 1 / 2

dd	mm	yy	Collector	Site code	
01	/ 05	/ 23	J. Lamou G. Clements	DNG-13753-1	
			Helper 1	Waterbody	
			Helper 2	DANDENONG CREEK	

Seq. #	Gear type	OP. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Sex	Repro. Cond.	Comment (and Tag #)
1	FF-SP	1	FHG	1	74	TL	4			
2	"	2	GAMBO	1	52	TL	2			
3	"	2	GAL. MAC	1	61	LCF	3			
4	"	2	GAL. MAC	2	88	LCF	5			
5	"	3	FHG	2	66	TL	7			
6	"	3	SFE	1	350 ^{max}	TL	217			
7	"	3	GAL. MAC	3	273	LCF	47			
8	"	5	GAMBO	2	26	TL	1			
9	"	5	FHG	3	79	TL	4			
10	"	5	GAL. MAC	4	84	LCF	42			
11	"	6	GAL. MAC	5	75	LCF	42			
12	"	7	GAL. MAC	6	73	LCF	42			
13	"	8	GAMBO	3	13	TL	1			
14	"	8	GAMBO	4	22	TL	1			
15	"	8	GAMBO	5	32	TL	2			
16	"	8	G. FISH	1	86	LCF	13			
17	"	8	G. FISH	2	144	LCF	72			
18	DIPNET	9	GAMBO	1	13	TL	1			
19	"	9	GAMBO	2	26	TL	2			
20	"	9	"	3	15	TL	1			
21	"	9	"	4	18	TL	1			
22	"	9	"	5	23	TL	2			
23	"	9	"	6	22	TL	2			
24	"	9	"	7	20	TL	2			
25	"	9	"	8	20	TL	1			

Gear codes: Electrofishers: BP-backpack, LB-large boat, MB-medium boat, SB-small boat. Other: BT-bait trap, S-seine net, P-panel net, F-fyke net, L-larval net. Length codes: TL-Total length, LCF-Length to Caudal Fork. Reproductive Condition: E-eggs discharging, S-sperm discharging, O-other (describe)

Health Codes (disease, parasite, deformities)
 D - Deformity (skeletal, eye, fins, asymmetric etc.)
 F - Fin condition poor (broken, eroded)
 G - Fungus
 L - Lernaea (only when notable)
 O - Other (e.g. gas bubble eye. IMPORTANT: describe and photograph)
 P - Other parasites (leech, lamprey, isopod)
 S - Lesions (raised or reddish skin or scales)
 T - Tumour (localised abnormal growth)
 U - Ulcer (skin is broken, crater like, redness)
 W - Wounds (e.g. bird strikes, hook wounds)

BIOLOGICAL RECORD Melbourne Water

Biological page # (e.g. 1/5) 2 / 2

dd mm yy <u>01 / 05 / 23</u>	Collector <u>J. LAMIN</u>	Site code <u>DAG-13753-1</u>	Health Codes (disease, parasite, deformities) P - Other parasites (leech, lamprey, isopod) S - Lesions (raised or reddish skin or scales) T - Tumour (localised abnormal growth) U - Ulcer (skin is broken, crater like, redness) W - Wounds (e.g. bird strikes, hook wounds)
Helper 1 <u>G. CLEMENTS</u>	Waterbody <u>DANDENONG CREEK</u>		
Helper 2			

Gear codes: Electrofishers: BP-backpack, LB-large boat, MB-medium boat, SB-small boat. Other: BT-bait trap, S-seine net, P-panel net, F-fyke net, L-larval net. Length codes: TL-Total length, LCF-Length to Caudal Fork. Reproductive Condition: E-eggs discharging, S-sperm discharging, O-other (describe)

Seq. #	Gear type	OP. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Health Codes	Sex	Repro. Cond.	Comment (and Tag #)
1	DIPNET	9	GAMBO	9	19	TL	1				
2	"	9	"	10	25	TL	2				
3	"	9	"	11	24	TL	2				
4	"	9	"	12	18	TL	1				
5	"	9	"	13	16	TL	1				
6	"	9	"	14	17	TL	1				
7	"	9	"	15	21	TL	2				
8	"	9	"	16	21	TL	2				
9	"	9	"	17	23	TL	2				
10	"	9	"	18	25	TL	2				
11	"	9	"	19	19	TL	1				
12	"	9	"	20	20	TL	2				
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

HABITAT RECORD Melbourne Water

Habitat page # (e.g. 1/3) 1 / 1

dd 01 / 05 / 23
 mm / /
 yy / /

Collector J. LAMIN
 Helper 1 C. CLEMENTS
 Helper 2

Site code DWG-13753-1
 Waterbody DANDENONG CREEK

Instructions

Mark circles with cross or fill in. Leave boxes blank if the item was not seen. Definitions for some items are on first sheet.

Operation #	1	2	3	4	5	6	7	8	9	10	Operation #
Substrate											
Bedrock	<input type="checkbox"/>										
Boulder (>120 mm)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cobble (60-200 mm)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Gravel (2-60 mm)	<input type="checkbox"/>										
Sand (0.6-2 mm)	<input type="checkbox"/>										
Mid/silt (0.002-0.6 mm)	<input checked="" type="checkbox"/>										
Clay (<0.002 mm)	<input checked="" type="checkbox"/>										
Unknown	<input type="checkbox"/>										
Plants											
Native trees	<input checked="" type="checkbox"/>										
Exotic trees	<input type="checkbox"/>										
Native shrubs	<input checked="" type="checkbox"/>										
Riparian grass	<input checked="" type="checkbox"/>										
Floating macrophytes	<input type="checkbox"/>										
Emergent macrophytes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Submerged macrophytes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Filamentous algae	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Suspended algae	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Biofilms	<input checked="" type="checkbox"/>										
Cover											
Rock	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Timber	<input checked="" type="checkbox"/>										
Undercuts	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Leaf litter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Macrophytes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Mesohabitat											
Pools	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Run	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Riffle	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Rapid	<input type="checkbox"/>										
Backwater	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
Velocity (F, M, S, NF)	<u>8</u>	<u>M</u>	<u>M</u>	<u>S</u>	<u>S/NF</u>	<u>S/NF</u>	<u>S/NF</u>	<u>S</u>	<u>S</u>	<u>S</u>	
Average wetted width (m)	<u>5</u>	<u>4</u>	<u>4</u>	<u>5</u>	<u>7</u>	<u>8</u>	<u>8</u>	<u>7</u>	<u>5</u>	<u>2</u>	
Average depth (m)	<u>0.3</u>	<u>0.5</u>	<u>0.5</u>	<u>1</u>	<u>1.5</u>	<u>1.5</u>	<u>1.5</u>	<u>0.5</u>	<u>0.5</u>	<u>0.5</u>	
Distance travelled (m)	<u>25</u>	<u>15</u>									

SITE MAP Melbourne Water

Site map page # (e.g. 1/2) ____ / ____

dd mm yy
____ / ____ / ____

Drawer

Site code
Waterbody

Instructions
Draw picture to help explain location, site details etc., if required or needed.

Comments:

dd mm yy
22 / 05 / 23

Collector S. Lamvik
 Helper 1 Sm. Bennett
 Helper 2 _____

Site code AQT-4232-0
 Waterbody Diamond Creek

Health Codes (disease, parasite, deformities)
 D - Deformity (skeletal, eye, fins, asymmetric etc.)
 F - Fin condition poor (broken, eroded)
 G - Fungus
 L - Lesion (only when notable)
 O - Other (e.g. gas bubble eye, IMPORTANT: describe and photograph)
 P - Other parasites (leech, lamprey, isopod)
 S - Lesions (raised or reddish skin or scales)
 T - Tumour (localised abnormal growth)
 U - Ulcer (skin is broken, crater like, redness)
 W - Wounds (e.g. bird strikes, hook wounds)

Gear codes: Electrofishers: BP-backpack, LB-large boat, MB-medium boat, SB-small boat. Other: BT-bait trap, S-seine net, P-panel net, F-Fyke net, L-larval net. Length codes: TL-Total length, LCF-length to Caudal Fork. Reproductive Condition: E-eggs discharging, S-sperm discharging, O-other (describe)

Seq. #	Gear type	OP. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Health Codes	Sex	Repro. Cond.	Comment (and Tag #)
1	BP	1	SFE	1	386	TL	-				
2	"	1	G. Oena	1	68	TL	29				
3	"	1	G. Oena	2	62	TL	29				
4	"	2	SFE	2	683	TL	-				
5	"	9	G. Mac	1	90	LCF	5				
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

Habitat page # (e.g. 1/3) 1 / 1

HABITAT RECORD Melbourne Water

dd mm yy 22 / 05 / 23

Collector S. Lamm
 Helper 1 Sm. Benice
 Helper 2 _____

Site code A2T - 4232 - 0
 Waterbody Diamond Creek

Instructions
 Mark circles with cross or fill in. Leave boxes blank if the item was not seen.
 Definitions for some items are on first sheet.

Operation #	1	2	3	4	5	6	7	8	9	10
Substrate										Substrate
Bedrock	<input type="checkbox"/>	<input type="checkbox"/>								
Boulder (>120 mm)	<input type="checkbox"/>	<input type="checkbox"/>								
Cobble (60-200 mm)	<input type="checkbox"/>	<input type="checkbox"/>								
Gravel (2-60 mm)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sand (0.6-2 mm)	<input type="checkbox"/>	<input type="checkbox"/>								
Mid/silt (0.002-0.6 mm)	<input type="checkbox"/>	<input type="checkbox"/>								
Clay (<0.002 mm)	<input type="checkbox"/>	<input type="checkbox"/>								
Unknown	<input type="checkbox"/>	<input type="checkbox"/>								
Plants										Plants
Native trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>								
Exotic trees	<input type="checkbox"/>	<input type="checkbox"/>								
Native shrubs	<input checked="" type="checkbox"/>	<input type="checkbox"/>								
Riparian grass	<input checked="" type="checkbox"/>	<input type="checkbox"/>								
Floating macrophytes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergent macrophytes	<input checked="" type="checkbox"/>	<input type="checkbox"/>								
Submerged macrophytes	<input type="checkbox"/>	<input type="checkbox"/>								
Filamentous algae	<input type="checkbox"/>	<input type="checkbox"/>								
Suspended algae	<input type="checkbox"/>	<input type="checkbox"/>								
Biofilms	<input checked="" type="checkbox"/>	<input type="checkbox"/>								
Cover										Cover
Rock	<input type="checkbox"/>	<input type="checkbox"/>								
Timber	<input checked="" type="checkbox"/>	<input type="checkbox"/>								
Undercuts	<input checked="" type="checkbox"/>	<input type="checkbox"/>								
Leaf litter	<input type="checkbox"/>	<input type="checkbox"/>								
Macrophytes	<input checked="" type="checkbox"/>	<input type="checkbox"/>								
Mesohabitat										Mesohabitat
Pools	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>						
Run	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Riffle	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rapid	<input type="checkbox"/>	<input type="checkbox"/>								
Backwater	<input type="checkbox"/>	<input type="checkbox"/>								
Velocity (F, M, S, NF)	<u>M1</u>	<u>S</u>	<u>S</u>	<u>S</u>	<u>S</u>	<u>S</u>	<u>S</u>	<u>M1</u>	<u>S</u>	<u>S</u>
Average wetted width (m)	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>5</u>	<u>5</u>	<u>5</u>	<u>3</u>	<u>8</u>	<u> </u>
Average depth (m)	<u>0.8</u>	<u>0.8</u>	<u>0.6</u>	<u>0.5</u>	<u>0.8</u>	<u>0.8</u>	<u>0.8</u>	<u>0.5</u>	<u>0.8</u>	<u> </u>
Distance travelled (m)	<u>25</u>	<u>30</u>	<u> </u>							

SITE MAP Melbourne Water

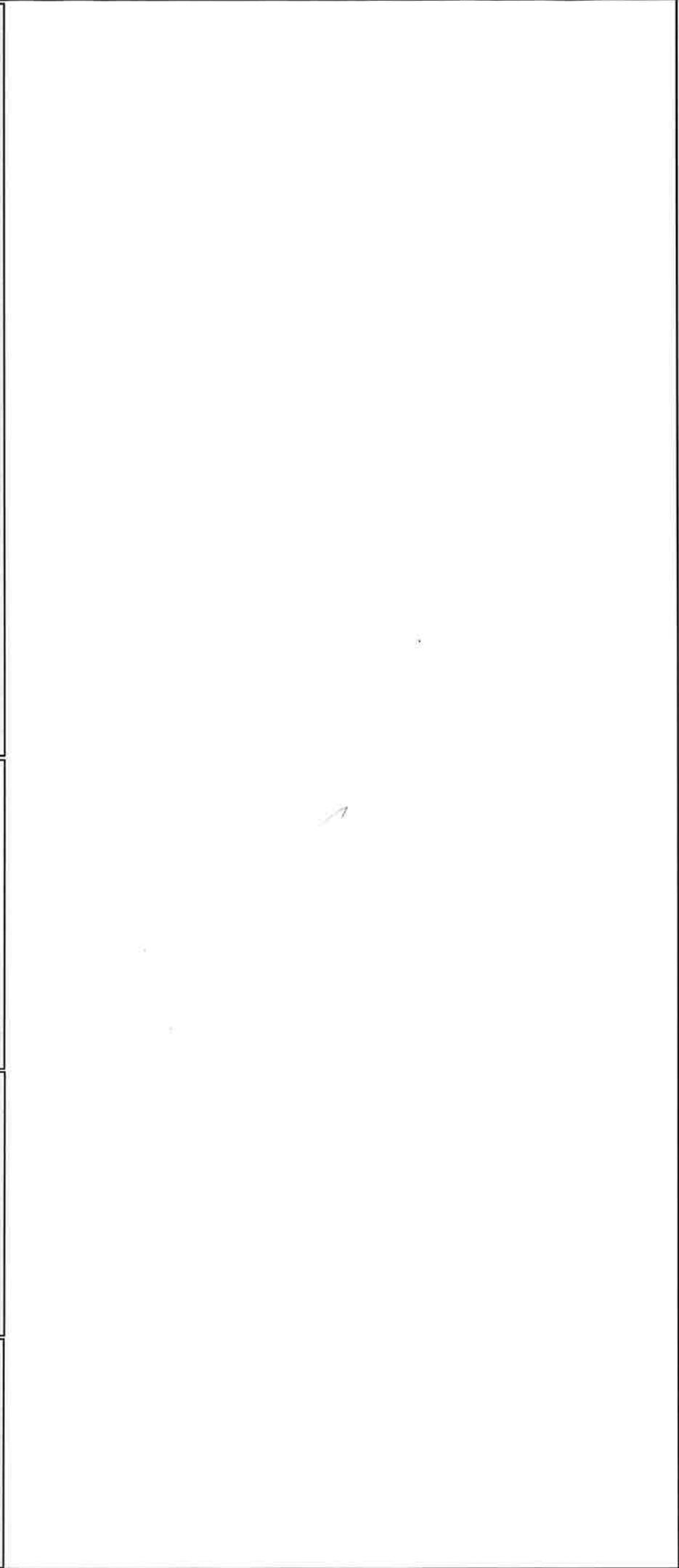
Site map page # (e.g. 1/2) /

dd mm yy
/ /

Drawer

Site code
Waterbody

Instructions
Draw picture to help explain location, site details etc., if required or needed.



Comments:

BIOLOGICAL RECORD Melbourne Water

Biological page # (e.g. 1/5) 1 / 2

Collector <u>J. Lamin</u> Helper 1 <u>G. CLEMENTS</u> Helper 2 _____	Site code <u>HDL-8764-3</u> Waterbody <u>HOPPOLES CREEK</u>	Health Codes (disease, parasite, deformities) D - Deformity (skeletal, eye, fins, asymmetric etc.) F - Fin condition poor (broken, eroded) G - Fungus L - Lernaea (only when notable) O - Other (e.g. gas bubble eye. IMPORTANT: describe and photograph) P - Other parasites (leech, lamprey, isopod) S - Lesions (raised or reddish skin or scales) T - Tumour (localised abnormal growth) U - Ulcer (skin is broken, crater like, redness) W - Wounds (e.g. bird strikes, hook wounds)
--	--	--

Seq. #	Gear type	OP. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Health Codes	Sex	Repro. Cond.	Comment (and Tag #)
1	BP	1	G. ORNA	1	51	TL	3				
2	"	1	G. ORNA	1	54	TL	3				
3	"	1	R. BLACKFISH	1	311	TL	308				
4	"	2	G. ORNA	3	59	TL	3				
5	"	2	G. ORNA	4	41	TL	1				
6	"	2	B. TROUT	1	110	LCE	14				
7	"	3	G. ORNA	5	43	TL	2				
8	"	3	G. ORNA	6	44	TL	2				
9	"	3	G. ORNA	7	57	TL	1				
10	"	3	R. BLACKFISH	2	272	TL	206				
11	"	4	R. BLACKFISH	3	373	TL	602				
12	"	4	G. ORNA	8	43	TL	1				
13	"	4	G. ORNA	9	39	TL	1				
14	"	5	R. BLACKFISH	4	381	TL	894				
15	"	5	R. BLACKFISH	5	302	TL	266				
16	"	5	B. TROUT	2	245	LDF	167				
17	"	6	R. BLACKFISH	6	250	TL	148				
18	"	6	B. TROUT	3	108	LEF	20				
19	"	6	EWS. YAAR.	1	45	CL	19				
20	"	7	G. ORNA	10	35	TL	1				
21	"	7	G. ORNA	11	47	TL	2				
22	"	7	G. ORNA	12	47	TL	2				
23	"	7	EWS. KEES.		40	LL	20				
24	"	7	EWS. KEES.		15	CL	2				
25	"	7	R. BLACKFISH	7	358	TL	481				

Gear codes: Electrofishers: BP-backpack, LB-large boat, MB-medium boat, SB-small boat. Other: BT-bait trap, S-seine net, P-panel net, F-fyke net, L-larval net. Length codes: TL-Total length, LCF-Length to Caudal Fork. Reproductive Condition: E-eggs discharging, S-sperm discharging, O-other (describe)

BIOLOGICAL RECORD Melbourne Water

Biological page # (e.g. 1/5) 2 / 2

dd mm yy <u>04 / 05 / 23</u>	Collector <u>J. LAMIN</u>	Site code <u>HDL-8964-3</u>	Health Codes (disease, parasite, deformities) D - Deformity (skeletal, eye, fins, asymmetric etc.) F - Fin condition poor (broken, eroded) G - Fungus L - Lernaea (only when notable) O - Other (e.g. gas bubble eye. IMPORTANT: describe and photograph)
Helper 1 <u>G. GLENNONS</u>	Waterbody <u>HOODLES CREEK</u>	P - Other parasites (leech, lamprey, isopod) S - Lesions (raised or reddish skin or scales) T - Tumour (localised abnormal growth) U - Ulcer (skin is broken, crater like, redness) W - Wounds (e.g. bird strikes, hook wounds)	

Gear codes: Electrofishers: BP-backpack, LB-large boat, MB-medium boat, SB-small boat. Other: BT-bait trap, S-seine net, P-panel net, F-fyke net, L-larval net. Length codes: TL-Total length, LCF-length to Caudal Fork. Reproductive Condition: E-eggs discharging, S-sperm discharging, O-other (describe)

Seq. #	Gear type	OP. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Health Codes	Sex	Repro. Cond.	Comment (and Tag #)
1	BP	8	R. BLACNFISH	8	365	TL	462				
2	"	8	E.WAS. YARR	2	34	CL	11				
3	"	8	G. ORNA	13	52	TL	2				
4	"	8	G. ORNA	14	64	TL	3				
5	BT	9	G. ORNA	1	36	TL	1				
6	"	9	G. ORNA	2	28	TL	1				
7	"	9	G. ORNA	3	30	TL	1				
8	"	9	G. ORNA	4	31	TL	1				
9	"	9	G. ORNA	5	34	TL	1				
10	"	9	G. ORNA	6	25	TL	1				
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

EFFORT AND CATCH RECORD Melbourne Water

Effort/catch pg # (e.g. 1/3) 1 / 1

Collector		Site code		Gear codes																			
S. LAMIN		HPL-8964-3		Electrofishers: BP - backpack, LB - large boat, MB - medium boat, SB - small boat Other: BT - bait trap, S - seine net, P - panel net, F - fyke net, L - larval net																			
Helper 1		Waterbody		1		2		3		4		5		6		7		8		9		10	
G. CREIGHTS		Hoddles Creek		:10:53		:11:00		:11:00		:11:15		:11:23		:11:30		:11:38		:11:45		:10:30		:11:55	
Date		Date		Date		Date		Date		Date		Date		Date		Date		Date		Date		Date	
(dd/mm/yy)		(dd/mm/yy)		(dd/mm/yy)		(dd/mm/yy)		(dd/mm/yy)		(dd/mm/yy)		(dd/mm/yy)		(dd/mm/yy)		(dd/mm/yy)		(dd/mm/yy)		(dd/mm/yy)		(dd/mm/yy)	
Method		Method		Method		Method		Method		Method		Method		Method		Method		Method		Method		Method	
e/fish		e/fish		e/fish		e/fish		e/fish		e/fish		e/fish		e/fish		e/fish		e/fish		e/fish		e/fish	
length (m) / start (sec)		length (m) / start (sec)		length (m) / start (sec)		length (m) / start (sec)		length (m) / start (sec)		length (m) / start (sec)		length (m) / start (sec)		length (m) / start (sec)		length (m) / start (sec)		length (m) / start (sec)		length (m) / start (sec)		length (m) / start (sec)	
mesh (mm) / end (sec)		mesh (mm) / end (sec)		mesh (mm) / end (sec)		mesh (mm) / end (sec)		mesh (mm) / end (sec)		mesh (mm) / end (sec)		mesh (mm) / end (sec)		mesh (mm) / end (sec)		mesh (mm) / end (sec)		mesh (mm) / end (sec)		mesh (mm) / end (sec)		mesh (mm) / end (sec)	
Volts		Volts		Volts		Volts		Volts		Volts		Volts		Volts		Volts		Volts		Volts		Volts	
pulses per sec		pulses per sec		pulses per sec		pulses per sec		pulses per sec		pulses per sec		pulses per sec		pulses per sec		pulses per sec		pulses per sec		pulses per sec		pulses per sec	
% duty cycle (range)		% duty cycle (range)		% duty cycle (range)		% duty cycle (range)		% duty cycle (range)		% duty cycle (range)		% duty cycle (range)		% duty cycle (range)		% duty cycle (range)		% duty cycle (range)		% duty cycle (range)		% duty cycle (range)	
amps		amps		amps		amps		amps		amps		amps		amps		amps		amps		amps		amps	
Species Code		Species Code		Species Code		Species Code		Species Code		Species Code		Species Code		Species Code		Species Code		Species Code		Species Code		Species Code	
GALANIAS ORNATUS		GALANIAS ORNATUS		GALANIAS ORNATUS		GALANIAS ORNATUS		GALANIAS ORNATUS		GALANIAS ORNATUS		GALANIAS ORNATUS		GALANIAS ORNATUS		GALANIAS ORNATUS		GALANIAS ORNATUS		GALANIAS ORNATUS		GALANIAS ORNATUS	
RIVER BLACKFISH		RIVER BLACKFISH		RIVER BLACKFISH		RIVER BLACKFISH		RIVER BLACKFISH		RIVER BLACKFISH		RIVER BLACKFISH		RIVER BLACKFISH		RIVER BLACKFISH		RIVER BLACKFISH		RIVER BLACKFISH		RIVER BLACKFISH	
BROWN TROUT		BROWN TROUT		BROWN TROUT		BROWN TROUT		BROWN TROUT		BROWN TROUT		BROWN TROUT		BROWN TROUT		BROWN TROUT		BROWN TROUT		BROWN TROUT		BROWN TROUT	
COASTALUS YARILLIENSIS		COASTALUS YARILLIENSIS		COASTALUS YARILLIENSIS		COASTALUS YARILLIENSIS		COASTALUS YARILLIENSIS		COASTALUS YARILLIENSIS		COASTALUS YARILLIENSIS		COASTALUS YARILLIENSIS		COASTALUS YARILLIENSIS		COASTALUS YARILLIENSIS		COASTALUS YARILLIENSIS		COASTALUS YARILLIENSIS	
EVASTAEUS KERSTAMI		EVASTAEUS KERSTAMI		EVASTAEUS KERSTAMI		EVASTAEUS KERSTAMI		EVASTAEUS KERSTAMI		EVASTAEUS KERSTAMI		EVASTAEUS KERSTAMI		EVASTAEUS KERSTAMI		EVASTAEUS KERSTAMI		EVASTAEUS KERSTAMI		EVASTAEUS KERSTAMI		EVASTAEUS KERSTAMI	
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				1		1		1															

HABITAT RECORD Melbourne Water

Habitat page # (e.g. 1/3) 1 / 1

dd mm yy
04 / 05 / 23

Collector S. LAMIN
Helper 1 G. CLEMENTS
Helper 2

Site code H02-8964-3
Waterbody YODDLES CRK

Instructions

Mark circles with cross or fill in. Leave boxes blank if the item was not seen. Definitions for some items are on first sheet.

Operation #	1	2	3	4	5	6	7	8	9	10	Operation #
Substrate											
Bedrock	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
Boulder (>120 mm)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>							
Cobble (60-200 mm)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>					
Gravel (2-60 mm)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>					
Sand (0.6-2 mm)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>					
Mid/silt (0.002-0.6 mm)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>					
Clay (<0.002 mm)	<input type="checkbox"/>										
Unknown	<input type="checkbox"/>										
Plants											
Native trees	<input checked="" type="checkbox"/>										
Exotic trees	<input type="checkbox"/>										
Native shrubs	<input checked="" type="checkbox"/>										
Riparian grass	<input checked="" type="checkbox"/>										
Floating macrophytes	<input type="checkbox"/>										
Emergent macrophytes	<input type="checkbox"/>										
Submerged macrophytes	<input type="checkbox"/>										
Filamentous algae	<input type="checkbox"/>										
Suspended algae	<input type="checkbox"/>										
Biofilms	<input checked="" type="checkbox"/>										
Cover											
Rock	<input type="checkbox"/>										
Timber	<input type="checkbox"/>										
Undercuts	<input type="checkbox"/>										
Leaf litter	<input type="checkbox"/>										
Macrophytes	<input type="checkbox"/>										
Mesohabitat											
Pools	<input checked="" type="checkbox"/>										
Run	<input checked="" type="checkbox"/>										
Riffle	<input type="checkbox"/>										
Rapid	<input type="checkbox"/>										
Backwater	<input type="checkbox"/>										
Velocity (F, M, S, NF)	S/M	M	S/M	S/M							
Average wetted width (m)	4	4	4	4	4	4	4	4	4	4	
Average depth (m)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Distance travelled (m)	25	25	25	25	25	25	25	25	25	25	

SITE MAP Melbourne Water

Site map page # (e.g. 1/2) ____ / ____

dd mm yy
____ / ____ / ____

Drawer

Site code
Waterbody

Instructions

Draw picture to help explain location, site details etc., if required or needed.

Comments:

Collector S. Lavin
 Helper 1 M. Le Feuvre
 Helper 2 _____

Site code LV6-29460-1
 Waterbody LAVN LANS RIVER

Health Codes (disease, parasite, deformities)
 D - Deformity (skeletal, eye, fins, asymmetric etc.)
 F - Fin condition poor (broken, eroded)
 G - Fungus
 L - Leimaea (only when notable)
 O - Other (e.g. gas bubble eye; IMPORTANT: describe and photograph)
 P - Other parasites (leech, lamprey, isopod)
 S - Lesions (faded or reddish skin or scales)
 T - Tumour (localised abnormal growth)
 U - Ulcer (skin is broken, crater like, redness)
 W - Wounds (e.g. bird strikes, hook wounds)

Gear codes: Electrofishers: BP-backpack; LB-large boat; MB-medium boat; SB-small boat. Other: BT-bait trap; S-seine net; P-panel net; F-Fyke net; L-larval net. Length codes: TL-Total length; LCF-length to Caudal Fork. Reproductive Condition: E-eggs discharging; S-sperm discharging; O-other (describe)

Seq. #	Gear type	OP. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Health Codes	Sex	Repro. Cond.	Comment (and Tag #)
1	BP	1	G. Macr	1	75	LCF	3				
2	"	1	TuPonv	1	169	TL	36				
3	"	2	TuPonv	2	213	TL	92				
4	"	2	SFE	1	431	TL	162				
5	"	3	TuPonv	3	138	TL	29				
6	"	3	TuPonv	4	90	TL	5				
7	"	3	TuPonv	5	99	TL	10				
8	"	3	SFE	2	282	TL	69				
9	"	3	SFE	3	243	TL	97				
10	"	3	SFE	4	260	TL	63				
11	"	3	SFE	5	230	TL	42				
12	"	4	TuPonv	6	121	TL	17				
13	"	4	TuPonv	7	118	TL	16				
14	"	4	TuPonv	8	178	TL	50				
15	"	4	TuPonv	9	112	TL	15				
16	"	4	TuPonv	10	114	TL	13				
17	"	4	G. Macr	2	83	LCF	4				
18	"	4	SFE	6	365	TL	44				
19	"	4	SFE	7	228	TL	47				
20	"	4	SFE	8	189	TL	7				
21	"	4	SFE	9	201	TL	13				
22	"	4	SFE	10	179	TL	8				
23	"	4	SFE	11	113	TL	2				
24	"	4	SFE	12	98	TL	1				
25	"	4	GAALING	1	225	TL	96				

BIOLOGICAL RECORD Melbourne Water

Biological page # (e.g. 1/5) 2 / 3

dd <u>26</u> / <u>05</u> / <u>23</u>	Collector <u>J. LAMPREY</u>	Site code <u>LAG-29460-1</u>	
mm <u>23</u>	Helper 1 <u>M. Le FEVRE</u>	Waterbody <u>LANG LANG RIVER</u>	
yy <u>23</u>	Helper 2		

Gear codes: Electrofishers: BP-backpack, LB-large boat, MB-medium boat, SB-small boat. Other: BT-bait trap, S-seine net, P-panel net, F-fyke net, L-larval net. Length codes: TL-Total length, LCF-Length to Caudal Fork, Reproductive Condition: E-eggs discharging, S-sperm discharging, O-other (describe)

Seq. #	Gear type	OP. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Health Codes	Sex	Repro. Cond.	Comment (and Tag #)
1	BP	5	SFE	13	90	TL	1				
2	"	5	SFE	14	165	TL	6				
3	"	5	SFE	15	117	TL	2				
4	"	5	SFE	16	107	TL	3				
5	"	5	SFE	17	98	TL	1				
6	"	5	SFE	18	126	TL	2				
7	"	5	SFE	19	135	TL	4				
8	"	5	SFE	20	94	TL	1				
9	"	5	SFE	21	178	TL	7				
10	"	5	SFE	22	105	TL	1				
11	"	5	SFE	23	113	TL	1				
12	"	5	TUPONA	11	114	TL	13				
13	"	5	TUPONA	12	194	TL	63				
14	"	5	TUPONA	13	163	TL	41				
15	"	5	TUPONA	14	179	TL	51				
16	"	5	TUPONA	15	93	TL	8				
17	"	6	TUPONA	16	119	TL	14				
18	"	6	TUPONA	17	128	TL	15				
19	"	6	SFE	24	125	TL	3				
20	"	6	SFE	25	143	TL	5				
21	"	6	SHORT LAMPREY	1	363	TL	50				
22	"	6	SHORT LAMPREY	2	431	TL	65				
23	"	6	SFE	26	87	TL	1				
24	"	6	SFE	27	126	TL	2				
25	"	6	SFE	28	94	TL	2				

BIOLOGICAL RECORD Melbourne Water

Biological page # (e.g. 1/5) 3 / 3

dd mm yy <u>26 / 05 / 23</u>	Collector <u>J. LAMION</u>	Site code <u>LVG-29460-1</u>	Health Codes (disease, parasite, deformities) P - Other parasites (leech, lamprey, isopod) S - Lesions (raised or reddish skin or scales) T - Tumour (localised abnormal growth) U - Ulcer (skin is broken, crater like, redness) W - Wounds (e.g. bird strikes, hook wounds)
Helper 1 <u>M. Le FEVRE</u>	Waterbody <u>Lava Lava River</u>	D - Deformity (skeletal, eye, fins, asymmetric etc.) F - Fin condition poor (broken, eroded) G - Fungus L - Lernaea (only when notable) O - Other (e.g. gas bubble eye. IMPORTANT: describe and photograph)	
Helper 2		E-eggs discharging, S-sperm discharging, O-other (describe)	

Gear codes: Electrofishers: BP-backpack, LB-large boat, MB-medium boat, SB-small boat. Other: BT-bait trap, S-seine net, P-panel net, F-fyke net, L-larval net. Length codes: TL-Total length, LCF-length to Caudal Fork. Reproductive Condition: E-eggs discharging, S-sperm discharging, O-other (describe)

Seq. #	Gear type	OP. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Health Codes	Sex	Repro. Cond.	Comment (and Tag #)
1	BP	6	SFE	29	98	TL	1				
2	BP	7	SFE	30	457	TL	-				
3	BP	7	SFE	31	702	TL	-				
4	"	7	G.MAC	3	70	LCF	2				
5	"	7	G.MAC	4	71	LCF	2				
6	"	8	Tupoua	18	151	TL	29				
7	"	8	G.MAC	5	63	LCF	1				
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

EFFORT AND CATCH RECORD Melbourne Water

Effort/catch pg # (e.g. 1/3) 1 / 1

Collector S. LAMM
 Helper 1 M. LE FEUVRE
 Helper 2

Site code LANG-29460-1
 Waterbody Lang Lang River

Gear codes
 Electrofishers: BP - backpack, LB - large boat, MB - medium boat, SB - small boat
 Other: BT - bait trap, S - seine net, P - panel net, F - fyke net, L - larval net

Operation #	Start	End	Method	Mesh	Volts	pulses per sec	% duty cycle (range)	amps
1	9:50	10:00	BP	150	300			
2	10:00	10:10	BP	150	300			
3	10:10	10:20	BP	300	450			
4	10:20	10:30	BP	450	600			
5	10:30	10:40	BP	600	750			
6	10:40	10:50	BP	750	900			
7	10:50	11:00	BP	900	1050			
8	11:00	11:10	BP	1050	1200			
9	9:40	11:20	BT					
10								

Species Code	#cght (#obs)							
TURONG	1 (1)	1 (1)	3 (2)	5 (1)	5 (3)	2 (2)	1 (1)	1 (1)
GALAXIAS MACULATUS	1	1	4 (2)	7 (3)	11 (2)	6 (1)	2	2
SPOCKING EEL				1		0 (1)		
AUSTRALIAN GRAYLING						2		
SHORT-HEADED LAMPREY								0 (1)
NO FISH								

Habitat page # (e.g. 1/3)

1 / 1

HABITAT RECORD Melbourne Water

dd mm yy
26 / 05 / 23

Collector
Helper 1 D. LAMIN
Helper 2 M. Le FEUVRE

Site code LMC-29460-1
Waterbody Lane Lane River

Mark circles with cross or fill in. Leave boxes blank if the item was not seen.
Definitions for some items are on first sheet.

Instructions

	1	2	3	4	5	6	7	8	9	10
Operation #	1	2	3	4	5	6	7	8	9	10
Substrate										
Bedrock	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boulder (>120 mm)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cobble (60-200 mm)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gravel (2-60 mm)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sand (0.6-2 mm)	<input checked="" type="checkbox"/>	<input type="checkbox"/>								
Mid/silt (0.002-0.6 mm)	<input checked="" type="checkbox"/>	<input type="checkbox"/>								
Clay (<0.002 mm)	<input type="checkbox"/>	<input type="checkbox"/>								
Unknown	<input type="checkbox"/>	<input type="checkbox"/>								
Plants										
Native trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>								
Exotic trees	<input type="checkbox"/>	<input type="checkbox"/>								
Native shrubs	<input type="checkbox"/>	<input type="checkbox"/>								
Riparian grass	<input checked="" type="checkbox"/>	<input type="checkbox"/>								
Floating macrophytes	<input type="checkbox"/>	<input type="checkbox"/>								
Emergent macrophytes	<input checked="" type="checkbox"/>	<input type="checkbox"/>								
Submerged macrophytes	<input checked="" type="checkbox"/>	<input type="checkbox"/>								
Filamentous algae	<input checked="" type="checkbox"/>	<input type="checkbox"/>								
Suspended algae	<input type="checkbox"/>	<input type="checkbox"/>								
Biofilms	<input checked="" type="checkbox"/>	<input type="checkbox"/>								
Cover										
Rock	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Timber	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Undercuts	<input type="checkbox"/>	<input type="checkbox"/>								
Leaf litter	<input type="checkbox"/>	<input type="checkbox"/>								
Macrophytes	<input checked="" type="checkbox"/>	<input type="checkbox"/>								
Mesohabitat										
Pools	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>							
Run	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Riffle	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rapid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Backwater	<input type="checkbox"/>	<input type="checkbox"/>								
Velocity (F, M, S, NF)	<u>M</u>	<u>M</u>	<u>F</u>	<u>F</u>	<u>F</u>	<u>F</u>	<u>M</u>	<u>S</u>	<u>S</u>	
Average wetted width (m)	<u>6</u>	<u>6</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>10</u>	<u>10</u>	<u>10</u>	
Average depth (m)	<u>1</u>	<u>1</u>	<u>0.5</u>	<u>0.5</u>	<u>0.5</u>	<u>0.5</u>	<u>1</u>	<u>1</u>	<u>1</u>	
Distance travelled (m)	<u>25</u>	<u>25</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>25</u>	<u>25</u>	<u>25</u>	
Substrate										
Bedrock	<input type="checkbox"/>	<input type="checkbox"/>								
Boulder (>120 mm)	<input type="checkbox"/>	<input type="checkbox"/>								
Cobble (60-200 mm)	<input type="checkbox"/>	<input type="checkbox"/>								
Gravel (2-60 mm)	<input type="checkbox"/>	<input type="checkbox"/>								
Sand (0.6-2 mm)	<input type="checkbox"/>	<input type="checkbox"/>								
Mid/silt (0.002-0.6 mm)	<input type="checkbox"/>	<input type="checkbox"/>								
Clay (<0.002 mm)	<input type="checkbox"/>	<input type="checkbox"/>								
Unknown	<input type="checkbox"/>	<input type="checkbox"/>								
Plants										
Native trees	<input type="checkbox"/>	<input type="checkbox"/>								
Exotic trees	<input type="checkbox"/>	<input type="checkbox"/>								
Native shrubs	<input type="checkbox"/>	<input type="checkbox"/>								
Riparian grass	<input type="checkbox"/>	<input type="checkbox"/>								
Floating macrophytes	<input type="checkbox"/>	<input type="checkbox"/>								
Emergent macrophytes	<input type="checkbox"/>	<input type="checkbox"/>								
Submerged macrophytes	<input type="checkbox"/>	<input type="checkbox"/>								
Filamentous algae	<input type="checkbox"/>	<input type="checkbox"/>								
Suspended algae	<input type="checkbox"/>	<input type="checkbox"/>								
Biofilms	<input type="checkbox"/>	<input type="checkbox"/>								
Cover										
Rock	<input type="checkbox"/>	<input type="checkbox"/>								
Timber	<input type="checkbox"/>	<input type="checkbox"/>								
Undercuts	<input type="checkbox"/>	<input type="checkbox"/>								
Leaf litter	<input type="checkbox"/>	<input type="checkbox"/>								
Macrophytes	<input type="checkbox"/>	<input type="checkbox"/>								
Mesohabitat										
Pools	<input type="checkbox"/>	<input type="checkbox"/>								
Run	<input type="checkbox"/>	<input type="checkbox"/>								
Riffle	<input type="checkbox"/>	<input type="checkbox"/>								
Rapid	<input type="checkbox"/>	<input type="checkbox"/>								
Backwater	<input type="checkbox"/>	<input type="checkbox"/>								
Velocity (F, M, S, NF)										
Average width (m)										
Average depth (m)										
Distance travelled (m)										

SITE MAP Melbourne Water

Site map page # (e.g. 1/2) /

dd mm yy
____/____/____

Drawer

Site code
Waterbody

Instructions
Draw picture to help explain location, site details etc., if required or needed.

Comments:

BIOLOGICAL RECORD Melbourne Water

Biological page # (e.g. 1/5) 1 / 2

dd mm yy <u>04 / 05 / 23</u>	Collector <u>S. LAMINA</u>	Site code <u>NCL-3576-4</u>	Health Codes (disease, parasite, deformities) <u>NEW CHUM CRK</u>
Helper 1	Helper 2	Waterbody	
			D - Deformity (skeletal, eye, fins, asymmetric etc.) F - Fin condition poor (broken, eroded) G - Fungus L - Lernaea (only when notable) O - Other (e.g. gas bubble eye. IMPORTANT: describe and photograph) P - Other parasites (leech, lamprey, isopod) S - Lesions (raised or reddish skin or scales) T - Tumour (localised abnormal growth) U - Ulcer (skin is broken, crater like, redness) W - Wounds (e.g. bird strikes, hook wounds)

Seq. #	Gear type	OP. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Health Codes	Sex	Repro. Cond.	Comment (and Tag #)
1	BP	1	G. ORNA	1	55	TL	2				
2	"	1	G. ORNA	2	73	TL	3				
3	"	1	G. ORNA	3	47	TL	2				
4	"	1	G. ORNA	4	75	TL	5				
5	"	1	FHG	1	66	TL	3				
6	"	2	G. ORNA	5	64	TL	2				
7	"	2	G. ORNA	6	54	TL	2				
8	"	2	G. ORNA	7	63	TL	2				
9	"	3	G. ORNA	8	57	TL	2				
10	"	3	G. ORNA	9	51	TL	2				
11	"	3	G. ORNA	10	53	TL	2				
12	"	3	G. ORNA	11	48	TL	1				
13	"	3	G. ORNA	12	60	TL	43				
14	"	3	G. ORNA	13	77	TL	5				
15	"	3	B. TROOT	1	351	TL	572				
16	"	4	G. ORNA	14	48	TL	1				
17	"	4	G. ORNA	15	45	TL	2				
18	"	5	G. ORNA	16	52	TL	1				
19	"	5	G. ORNA	17	56	TL	2				
20	"	5	G. ORNA	18	74	TL	5				
21	"	5	L. BLACKFISH	1	323	TL	443				
22	"	6	G. ORNA	19	77	TL	4				
23	"	7	G. ORNA	20	72	TL	3				
24	"	7	G. ORNA	21	45	TL	2				
25	"	7	G. ORNA	22	47	TL	2				

BIOLOGICAL RECORD Melbourne Water

Biological page # (e.g. 1/5) 2 / 2

dd mm yy <u>04 / 05 / 23</u>	Collector <u>J. LAMIA</u>	Site code <u>NCC-3576-4</u>	Health Codes (disease, parasite, deformities) D - Deformity (skeletal, eye, fins, asymmetric etc.) F - Fin condition poor (broken, eroded) G - Fungus L - Larvae (only when notable) O - Other (e.g. gas bubble eye. IMPORTANT: describe and photograph)
Helper 1 <u>G. CLEMENTS</u>	Waterbody <u>NEW CHUM CREEK</u>	P - Other parasites (leech, lamprey, isopod) S - Lesions (raised or reddish skin or scales) T - Tumour (localised abnormal growth) U - Ulcer (skin is broken, crater like, redness) W - Wounds (e.g. bird strikes, hook wounds)	
Helper 2		L - Larvae (only when notable) O - Other (e.g. gas bubble eye. IMPORTANT: describe and photograph)	

Gear codes: Electrofishers: BP-backpack, LB-large boat, MB-medium boat, SB-small boat. Other: BT-bait trap, S-seine net, P-panel net, F-fyke net, L-larval net. Length codes: TL-Total length, LCF-length to Caudal Fork. Reproductive Condition: E-eggs discharging, S-sperm discharging, O-other (describe)

Seq. #	Gear type	OP. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Health Codes	Sex	Repro. Cond.	Comment (and Tag #)
1	BP	7	G. ORNA	23	59	TL	3				
2	"	7	G. ORNA	24	51	TL	2				
3	"	7	G. ORNA	25	58	TL	3				
4	"	7	FHC	2	82	TL	6				
5	"	9	G. ORNA	26	60	TL	3				
6	"	8	G. ORNA	27	49	TL	2				
7	"	9	G. ORNA	28	48	TL	2				
8	"	8	G. ORNA	29	51	TL	3				
9	"	8	G. ORNA	30	47	TL	2				
10	"	8	G. ORNA	31	45	TL	2				
11	"	8	FHC	3	54	TL	3				
12	"	8	Eggs. Valet	1	27	CL	3				
13	BT	9	G. ORNA	1	48	TL	2				
14	"	9	G. ORNA	2	46	TL	2				
15	"	9	G. ORNA	3	43	TL	1				
16	"	9	G. ORNA	4	48	TL	2				
17	"	9	G. ORNA	5	45	TL	1				
18											
19											
20											
21											
22											
23											
24											
25											

HABITAT RECORD Melbourne Water

Habitat page # (e.g. 1/3) 1 / 1

dd mm yy
04 / 05 / 23

Collector S. LAMIN
Helper 1 G. CLARKE
Helper 2 _____

Site code NCL-3576-4
Waterbody NEW CHUM CREEK

Instructions

Mark circles with cross or fill in. Leave boxes blank if the item was not seen. Definitions for some items are on first sheet.

Operation #	1	2	3	4	5	6	7	8	9	10	Operation #
Substrate											Substrate
Bedrock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bedrock
Boulder (>120 mm)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Boulder (>120 mm)
Cobble (60-200 mm)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cobble (60-200 mm)
Gravel (2-60 mm)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Gravel (2-60 mm)								
Sand (0.6-2 mm)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sand (0.6-2 mm)								
Mid/silt (0.002-0.6 mm)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Mid/silt (0.002-0.6 mm)								
Clay (<0.002 mm)	<input type="checkbox"/>	Clay (<0.002 mm)									
Unknown	<input type="checkbox"/>	Unknown									
Plants											Plants
Native trees	<input checked="" type="checkbox"/>	Native trees									
Exotic trees	<input type="checkbox"/>	Exotic trees									
Native shrubs	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Native shrubs
Riparian grass	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Riparian grass
Floating macrophytes	<input type="checkbox"/>	Floating macrophytes									
Emergent macrophytes	<input type="checkbox"/>	Emergent macrophytes									
Submerged macrophytes	<input type="checkbox"/>	Submerged macrophytes									
Filamentous algae	<input type="checkbox"/>	Filamentous algae									
Suspended algae	<input type="checkbox"/>	Suspended algae									
Biofilms	<input checked="" type="checkbox"/>	Biofilms									
Cover											Cover
Rock	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Rock
Timber	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Timber								
Undercuts	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Undercuts
Leaf litter	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Leaf litter								
Macrophytes	<input type="checkbox"/>	Macrophytes									
Mesohabitat											Mesohabitat
Pools	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Pools
Run	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Run								
Riffle	<input type="checkbox"/>	Riffle									
Rapid	<input type="checkbox"/>	Rapid									
Backwater	<input type="checkbox"/>	Backwater									
Velocity (F, M, S, NF)	<u>4</u>	<u>4</u>	<u>4</u>	<u>M/F</u>	<u>M/F</u>	<u>M/F</u>	<u>M</u>	<u>M</u>	<u>M</u>	<u>S/M</u>	Velocity (F, M, S, NF)
Average wetted width (m)	<u>4</u>	<u>4</u>	<u>4</u>	<u>6</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	Average wetted width (m)
Average depth (m)	<u>0.5</u>	Average depth (m)									
Distance travelled (m)	<u>25</u>	Distance travelled (m)									

Biological page # (e.g. 1/5) 1 / 1

BIOLOGICAL RECORD Melbourne Water

Collector <u>S. Lamou</u>	Site code <u>PL-16938-4</u>	Health Codes (disease, parasite, deformities) D - Deformity (skeletal, eye, fins, asymmetric etc.) F - Fin condition poor (broken, eroded) G - Fungus L - Larvae (only when notable) O - Other (e.g. gas bubble eye; IMPORTANT: describe and photograph) P - Other parasites (leech, lamprey, isopod) S - Lesions (raised or reddish skin or scales) T - Tumour (localised abnormal growth) U - Ulcer (skin is broken, crater like, redness) W - Wounds (e.g. bird strikes, hook wounds)
Helper 1 <u>SM. Bemer</u>	Waterbody <u>RENTY RUEN</u>	
Helper 2 _____		

Gear codes: Electrofishers: BF-backpack, LB-large boat, MB-medium boat, SB-small boat. Other: BT-bait trap, S-seine net, P-panel net, F-fyke net, L-larval net. Length codes: TL-Total length, LCF-length to Caudal Fork. Reproductive Condition: E-eggs discharging, S-sperm discharging, O-other (describe)

Seq. #	Gear type	Op. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Health Codes	Sex	Repro. Cond.	Comment (and Tag #)
1	BP	1	SPP	1	60	TL	2				
2	"	1	SPP	2	57	TL	3				
3	"	1	SPP	3	52	TL	2				
4	"	2	SPP	4	48	TL	1				
5	"	2	SPP	5	54	TL	3				
6	"	2	SPP	6	52	TL	3				
7	"	2	SPP	7	54	TL	3				
8	"	3	Redfin	1	217	LCF	141				
9	"	3	SPP	8	52	TL	3				
10	"	3	SPP	9	55	TL	3				
11	"	4	SPP	10	56	TL	3				
12	"	5	SPP	11	48	TL	2				
13	"	5	SPP	12	49	TL	2				
14	"	6	Redfin	2	226	LCF	146				
15	"	6	SPP	13	54	TL	3				
16	"	6	SPP	14	52	TL	2				
17	"	6	SPP	15	59	TL	2				
18	"	7	SPP	16	42	TL	2				
19	"	7	SPP	17	45	TL	2				
20	"	8	SPP	18	45	TL	2				
21	"	8	SPP	19	35	TL	1				
22	"	8	SPP	20	34	TL	1				
23	"	8	SPP	21	34	TL	1				
24											
25											

Habitat page # (e.g. 1/3) 1 / 1

HABITAT RECORD Melbourne Water

dd mm yy 22 / 05 / 23

Collector S. Lomin
 Helper 1 Sm. Rennie
 Helper 2 _____

Site code PLE-16938-4
 Waterbody PLENTY RIVER

Instructions

Mark circles with cross or fill in. Leave boxes blank if the item was not seen.
 Definitions for some items are on first sheet.

Operation #	Substrate					Operation #	Substrate																																																				
	Bedrock	Boulder (>120 mm)	Cobble (60-200 mm)	Gravel (2-60 mm)	Sand (0.6-2 mm)		Mid/silt (0.002-0.6 mm)	Clay (<0.002 mm)	Unknown	Bedrock	Boulder (>120 mm)	Cobble (60-200 mm)	Gravel (2-60 mm)	Sand (0.6-2 mm)	Mid/silt (0.002-0.6 mm)	Clay (<0.002 mm)	Unknown																																										
1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>	6	<input type="checkbox"/>	7	<input type="checkbox"/>	8	<input type="checkbox"/>	9	<input type="checkbox"/>	10	<input type="checkbox"/>																																								
Plants																																																											
Native trees <input type="checkbox"/>																																																											
Exotic trees <input type="checkbox"/>																																																											
Native shrubs <input type="checkbox"/>																																																											
Riparian grass <input type="checkbox"/>																																																											
Floating macrophytes <input type="checkbox"/>																																																											
Emergent macrophytes <input type="checkbox"/>																																																											
Submerged macrophytes <input type="checkbox"/>																																																											
Filamentous algae <input type="checkbox"/>																																																											
Suspended algae <input type="checkbox"/>																																																											
Biofilms <input type="checkbox"/>																																																											
Cover																																																											
Rock <input type="checkbox"/>																																																											
Timber <input type="checkbox"/>																																																											
Undercuts <input type="checkbox"/>																																																											
Leaf litter <input type="checkbox"/>																																																											
Macrophytes <input type="checkbox"/>																																																											
Mesohabitat																																																											
Pools <input type="checkbox"/>																																																											
Run <input type="checkbox"/>																																																											
Riffle <input type="checkbox"/>																																																											
Rapid <input type="checkbox"/>																																																											
Backwater <input type="checkbox"/>																																																											
Velocity (F, M, S, NF) _____																																																											
Average wetted width (m) <u>8</u>																																																											
Average depth (m) <u>1</u>																																																											
Distance travelled (m) <u>25</u>																																																											

SITE MAP Melbourne Water

Site map page # (e.g. 1/2) /

dd mm yy
/ /

Drawer

Site code
Waterbody

Instructions
Draw picture to help explain location, site details etc., if required or needed.

Comments:

FISH SAMPLING RECORD – INSTRUCTIONS, WATER QUALITY & GENERAL DESCRIPTION Melbourne Water

Date sample began dd mm yy <u>2 / 5 / 23</u>	Collector <u>JACKSON LAYMAN</u> Helper 1 <u>GRIFFIN CLEMENTS</u> Helper 2	Site code <u>TAR-22-224-S</u> Waterbody <u>TARAGO RIVER</u> Location description: <u>PICNIC POINT RESERVE</u>	Sample # <u>1</u> Temp. (°C) <u>13.1</u> pH <u>7.58</u> Cond. (µS.cm) <u>706.2</u> Turb. (NTU) <u>13.7</u> Secchi (m) <u>—</u> D.O. (mg/L) <u>9.72</u> D.O. (%sat) <u>94.2</u>	Bottom depth (m) <u>1</u> Date & Time of Sampling <u>2 / 5 / 23</u> : <u>10</u> : <u>00</u> Platypus Seen <input type="radio"/> Not seen <input checked="" type="radio"/>																							
Instructions and tips IMPORTANT: Do not leave a site without checking that all data has been collected. Please take care and time when filling out the forms. Mark circles with a cross or leave blank if not seen. Water Quality and General Description Sheet *Complete water quality at least twice at each surveyed reach. River/estuary sampling: surface water (~0.2m) at the most representative part of survey reach – 2 nd sample if environment substantially changes along reach. Wetland sampling: depth profile at the deepest part of surveyed reach (0.2m, 1m, 2m, ...so on until the bottom) *Record date and time for observations. Biological Record *Record counts of all individuals caught for each species. * Measure every individual length, weight, health codes, sex, and reproductive condition until 30 individuals per species and per gear type (electro, bait) have been measured. Try to capture the shortest and longest individual within these 30 individuals. After the 30th individual, no measurements are required, just total counts. *Fish records and counts can also include fish seen and accurately identified, but not caught – but these are to be recorded these separately (as 'observed' not 'caught'). Crustaceans (yabbies, crayfish, sirrimp) and platypus are also to be recorded and identified to genus, when necessary/possible. *Separate 'Condition' codes with a "/" and always provide a brief description when using the "O" (Other) code. You may record the number of abnormalities in brackets. I.e. If a fish has, 1 wound, 6 Larvae and bubble eye: W (1) / L (6) / O (bubble eye). *Record Larvae when a notable number are present. This is defined as: if fish <100 mm total length, report any Larvae; if fish >100 mm total length, report if more than 3 Larvae. Effort and Catch Record Sheet *Please record a start time, end time, and method for every operation. *Where data for an operation are the same as the previous operation, some fields can be left blank. This applies to the start date, end date, net length, net mesh and electrofishing setting fields. *Record every operation individually for electrofishing. If there are 10 unbaited bait traps, pool all together (Method B±0). * Species code is a combination of the first four letters of the fish's genus and species (i.e. Tupong, <i>Pseudaphritis urvillii</i> , code is PSEUJRVI). Habitat Record * Record data for the area within waterbody banks. * The difference between a tree and a shrub is that a tree is at least 5cm in diameter at a point 1m above the ground. Shrubs usually have many small stems rising from the base. * Mesohabitat definitions: Pool (deep, wide, slow), Run (moderate depth, width and velocity, with an unbroken surface), Riffle (shallow, fast, broken surface), Rapid (turbulent, fast, steep), Backwater (separate from main channel, low flow). * Velocity definitions are: F=Fast (>0.5m/s), M=Moderate, S=Slow (<0.1m/s), NF=No flow (stagnant). * Submerged macrophytes have both roots and leaves underwater. Emergent macrophytes are rooted underwater but some leaves are either out of the water or floating. Floating macrophytes are not rooted to the substrate. * Biofilm is the coat of green/brown slime (consisting of microorganisms) covering rocks, plants etc. Filamentous algae are fine, thin threads of algae normally attached to plants, rocks etc. Suspended algae are non attached and floating. * Wetted width refers to the average wetted channel width.																											
Conditions <table border="0" style="width:100%;"> <tr> <td style="border-bottom: 1px solid black;"><u>Waterbody</u></td> <td style="border-bottom: 1px solid black;"><u>Weather</u></td> </tr> <tr> <td>Stream <input checked="" type="radio"/></td> <td>Sunny <input type="radio"/></td> </tr> <tr> <td>Channel <input type="radio"/></td> <td>Cloudy <input type="radio"/></td> </tr> <tr> <td>Floodplain <input type="radio"/></td> <td>Rainy <input type="radio"/></td> </tr> <tr> <td>Lake <input type="radio"/></td> <td>Other <input type="radio"/></td> </tr> <tr> <td>Storage <input type="radio"/></td> <td>Tidal <input type="radio"/></td> </tr> <tr> <td>Farm dam <input type="radio"/></td> <td>Yes <input type="radio"/></td> </tr> <tr> <td>Billabong <input type="radio"/></td> <td>No <input checked="" type="radio"/></td> </tr> <tr> <td>Estuary <input type="radio"/></td> <td>Flow <input type="radio"/></td> </tr> <tr> <td>Wetland (Pa) <input type="radio"/></td> <td>No flow <input type="radio"/></td> </tr> <tr> <td>Wetland (La) <input type="radio"/></td> <td>Flowing <input checked="" type="radio"/></td> </tr> <tr> <td>Wetland (Es) <input type="radio"/></td> <td></td> </tr> </table> Pa=Palustrine, La=Lacustrine, Es=Estuarine			<u>Waterbody</u>	<u>Weather</u>	Stream <input checked="" type="radio"/>	Sunny <input type="radio"/>	Channel <input type="radio"/>	Cloudy <input type="radio"/>	Floodplain <input type="radio"/>	Rainy <input type="radio"/>	Lake <input type="radio"/>	Other <input type="radio"/>	Storage <input type="radio"/>	Tidal <input type="radio"/>	Farm dam <input type="radio"/>	Yes <input type="radio"/>	Billabong <input type="radio"/>	No <input checked="" type="radio"/>	Estuary <input type="radio"/>	Flow <input type="radio"/>	Wetland (Pa) <input type="radio"/>	No flow <input type="radio"/>	Wetland (La) <input type="radio"/>	Flowing <input checked="" type="radio"/>	Wetland (Es) <input type="radio"/>		Sampling Coordinates Upstream - <u>38.08376</u> <u>145.81341</u> Downstream - <u>38.08304</u> <u>145.81194</u>
<u>Waterbody</u>	<u>Weather</u>																										
Stream <input checked="" type="radio"/>	Sunny <input type="radio"/>																										
Channel <input type="radio"/>	Cloudy <input type="radio"/>																										
Floodplain <input type="radio"/>	Rainy <input type="radio"/>																										
Lake <input type="radio"/>	Other <input type="radio"/>																										
Storage <input type="radio"/>	Tidal <input type="radio"/>																										
Farm dam <input type="radio"/>	Yes <input type="radio"/>																										
Billabong <input type="radio"/>	No <input checked="" type="radio"/>																										
Estuary <input type="radio"/>	Flow <input type="radio"/>																										
Wetland (Pa) <input type="radio"/>	No flow <input type="radio"/>																										
Wetland (La) <input type="radio"/>	Flowing <input checked="" type="radio"/>																										
Wetland (Es) <input type="radio"/>																											
Comments																											

Biological page # (e.g. 1/5) 1 / 1 **BIOLOGICAL RECORD** Melbourne Water

dd mm W	02 / 05 / 23	Collector	S. LAMIN	Site code	TAR-22224-S
		Helper 1	G. CLEMENTS	Waterbody	TARAGO RIVER
		Helper 2			

Seq. #	Gear type	OP. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Health Codes	Sex	Repro. Cond.	Comment (and Tag #)
1	BP	1	SFE	1	352	TL	111				
2	"	1	TUPONGA	1	250	TL	177				
3	"	1	G.MAC	1	75	LCF	2				
4	"	2	SFE	2	368	TL	127				
5	"	2	EDAS. KEOS.	1	60	CL	49				
6	"	2	G.MAC	2	66	LCF	2				
7	"	2	G.MAC	3	77	LCF	3				
8	"	3	TUPONGA	2	88	TL	4				
9	"	3	G.MAC	4	83	LCF	4				
10	"	4	G.MAC	5	65	LCF	1				
11	"	4	G.MAC	6	63	LCF	2				
12	"	4	SFE	3	125	TL	2				
13	"	5	TUPONGA	3	82	TL	5				
14	"	6	G.MAC	7	72	LCF	2				
15	"	6	G.MAC	8	84	LCF	2				
16	"	6	G.MAC	9	69	LCF	2				
17	"	6	TUPONGA	4	244	TL	148				
18	"	7	G.MAC	10	76	LCF	4				
19	"	7	G.MAC	11	70	LCF	3				
20	"	7	G.MAC	12	81	LCF	5				
21	"	7	G.MAC	13	73	LCF	3				
22	"	7	G.MAC	14	68	LCF	2				
23	"	7	CARP	1	161	LCF	100				
24	"	8	G.MAC	15	63	LCF	2				
25	"	8	G.MAC	16	62	LCF	2				
26	UBT	9	G.MAC	17	82	LCF	3				

Gear codes: Electrofishers: BP-backpack, LB-large boat, MB-medium boat, SB-small boat. Other: BT-bait trap, S-seine net, P-panel net, F-fyke net, L-larval net. Length codes: TL-Total length, LCF-length to Caudal Fork. Reproductive Condition: E-eggs discharging, S-sperm discharging, O-other. (describe)

Health Codes (disease, parasite, deformities)
 D - Deformity (skeletal, eye, fins, asymmetric etc.)
 F - Fin condition poor (broken, eroded)
 G - Fungus
 L - Larvae (only when notable)
 O - Other (e.g. gas bubble eye. IMPORTANT: describe and photograph)

P - Other parasites (leech, lamprey, isopod)
 S - Lesions (raised or reddish skin or scales)
 T - Tumour (localised abnormal growth)
 U - Ulcer (skin is broken, crater like, redness)
 W - Wounds (e.g. bird strikes, hook wounds)

EFFORT AND CATCH RECORD Melbourne Water

Effort/catch pg # (e.g. 1/3) 1 / 1

Collector		Site code		Gear codes									
S. LAMIN		TAR-2222A-S		Electrofishers: BP - backpack, LB - large boat, MB - medium boat, SB - small boat									
Helper 1 G. CLEMENTS		Waterbody TARAGO RIVER		Other: BT - bait trap, S - seine net, P - panel net, F - fyke net, L - larval net									
Helper 2													
dd	mm	yy	Operation #	1	2	3	4	5	6	7	8	9	10
02	10	23	Time (24hr)	:0:15	:0:23	:0:30	:0:30	:0:45	:0:53	:1:00	:1:08	:1:08	:1:05
			Start										
			End	:0:23	:0:30	:0:30	:0:45	:0:53	:1:00	:1:08	:1:15	:1:25	:1:25
			Date (dd/mm/yy)	2/5/23	2/5/23	2/5/23	2/5/23	2/5/23	2/5/23	2/5/23	2/5/23	2/5/23	2/5/23
			Method	BP	BP	BP	BP	BP	BP	BP	BP	BT	
			nets length (m) / start (sec)	0	150	300	450	600	750	900	1050	80 mics	
			mesh (mm) / end (sec)	150	300	450	600	750	900	1050	1200	X10 NETS	
			Volts	200									
			pulses per sec	80Hz									
			% duty cycle (range)	35%									
			amps	0.4									
Species Code	#ight (#obs)	#ight (#obs)	#ight (#obs)	#ight (#obs)	#ight (#obs)	#ight (#obs)	#ight (#obs)	#ight (#obs)	#ight (#obs)	#ight (#obs)	#ight (#obs)	#ight (#obs)	#ight (#obs)
GALANIAS MACU	1	2	1	2	1	2	1	3	1	5	2	1	1
TOPONG	1	1	1	1	1	1	1	1	1	1	1	1	1
SFE	1	1	1	1	1	1	1	1	1	1	1	1	1
EUASTACUS KERSHAWI	1	1	1	1	1	1	1	1	1	1	1	1	1
CARP	1	1	1	1	1	1	1	1	1	1	1	1	1

HABITAT RECORD Melbourne Water

Habitat page # (e.g. 1/3) 1 / 1

dd mm WY
02 / 05 / 23

Collector J. LAMIN
Helper 1 G. CLEMENTS
Helper 2

Site code TAR-2224-5
Waterbody TARAGO RIVER

Instructions

Mark circles with cross or fill in. Leave boxes blank if the item was not seen. Definitions for some items are on first sheet.

Operation #	1	2	3	4	5	6	7	8	9	10	Operation #
<u>Substrate</u>											
Bedrock	<input type="checkbox"/>	<input type="checkbox"/>									
Boulder (>120 mm)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cobble (60-200 mm)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Gravel (2-60 mm)	<input checked="" type="checkbox"/>	<input type="checkbox"/>									
Sand (0.6-2 mm)	<input checked="" type="checkbox"/>	<input type="checkbox"/>									
Mid/silt (0.002-0.6 mm)	<input checked="" type="checkbox"/>	<input type="checkbox"/>									
Clay (<0.002 mm)	<input type="checkbox"/>	<input type="checkbox"/>									
Unknown	<input type="checkbox"/>	<input type="checkbox"/>									
<u>Plants</u>											
Native trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>									
Exotic trees	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
Native shrubs	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Riparian grass	<input checked="" type="checkbox"/>	<input type="checkbox"/>									
Floating macrophytes	<input type="checkbox"/>	<input type="checkbox"/>									
Emergent macrophytes	<input type="checkbox"/>	<input type="checkbox"/>									
Submerged macrophytes	<input type="checkbox"/>	<input type="checkbox"/>									
Filamentous algae	<input type="checkbox"/>	<input type="checkbox"/>									
Suspended algae	<input type="checkbox"/>	<input type="checkbox"/>									
Biofilms	<input checked="" type="checkbox"/>	<input type="checkbox"/>									
<u>Cover</u>											
Rock	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Timber	<input checked="" type="checkbox"/>	<input type="checkbox"/>									
Undercuts	<input checked="" type="checkbox"/>	<input type="checkbox"/>									
Leaf litter	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					
Macrophytes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					
<u>Mesohabitat</u>											
Pools	<input type="checkbox"/>	<input type="checkbox"/>									
Run	<input checked="" type="checkbox"/>	<input type="checkbox"/>									
Riffle	<input type="checkbox"/>	<input type="checkbox"/>									
Rapid	<input type="checkbox"/>	<input type="checkbox"/>									
Backwater	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Velocity (F, M, S, NF)	6	8	5	8	8	8	8	4	8	8	
Average wetted width (m)	1	1	1	1	1	1	1	1	1	1	
Average depth (m)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
Distance travelled (m)	25	25	25	25	25	25	25	25	25	25	

SITE MAP Melbourne Water

Site map page # (e.g. 1/2) /

dd mm yy
____ / ____ / ____

Drawer

Site code
Waterbody

Instructions

Draw picture to help explain location, site details etc., if required or needed.

Comments:

BIOLOGICAL RECORD Melbourne Water

Biological page # (e.g. 1/5) 1 / 1

Collector J. LAMIN Site code W0Y-8964-3
 Helper 1 G. CLEMENTS Waterbody WOODS VALLEY CRK
 Helper 2 _____

Health Codes (disease, parasite, deformities)
 D - Deformity (skeletal, eye, fins, asymmetric etc.)
 F - Fin condition poor (broken, eroded)
 G - Fungus
 L - Larvae (only when notable)
 O - Other (e.g. gas bubble eye. IMPORTANT: describe and photograph)
 P - Other parasites (leech, lamprey, isopod)
 S - Lesions (raised or reddish skin or scales)
 T - Tumour (localised abnormal growth)
 U - Ulcer (skin is broken, crater like, redness)
 W - Wounds (e.g. bird strikes, hook wounds)

Gear codes: Electrofishers, BP-backpack, LB-large boat, MB-medium boat, SB-small boat. Other: BT-bait trap, S-seine net, P-panel net, F-fyke net, L-larval net. Length codes: TL-Total length, LCF-length to Caudal Fork. Reproductive Condition: E-eggs discharging, S-sperm discharging, O-other (describe)

Seq. #	Gear type	OP. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Health Codes	Sex	Repro. Cond.	Comment (and Tag #)
1	RP	1	R. TROUT	1	241	TL	121				
2	"	1	EWAS. KEES.	1	40	CL	16				
3	"	1	G. ORNA	1	53	TL	1				
4	"	2	G. ORNA	2	50	TL	1				
5	"	3	G. ORNA	3	69	TL	2				
6	"	3	G. ORNA	4	41	TL	1				
7	"	4	EWAS. KEES.	2	23	CL	5				
8	"	5	G. ORNA	5	56	TL	2				
9	"	5	G. ORNA	6	57	TL	22				
10	"	5	G. ORNA	7	46	TL	2				
11	"	6	R. TROUT	2	239	TL	150				
12	"	6	G. ORNA	8	40	TL	1				
13	"	6	G. ORNA	9	44	TL	1				
14	"	6	EWAS. KEES	3	33	CL	13				
15	"	7	G. ORNA	10	54	TL	3				
16	"	7	G. ORNA	11	48	TL	2				
17	"	7	EWAS. KEES	4	20	CL	4				
18	"	8	G. ORNA	12	49	TL	1				
19	"	8	G. ORNA	13	46	TL	2				
20	"	8	EWAS. KEES	5	18	CL	4				
21	BT	8	G. ORNA	14	54	TL	2				
22	BT	9	G. ORNA	1	55	TL	2				
23											
24											
25											

EFFORT AND CATCH RECORD Melbourne Water

Effort/catch pg # (e.g. 1/3) 1 / 1

Collector		Site code		Gear codes									
S. LAMINA		W0Y-8964-3		Electrofishers: BP - backpack, LB - large boat, MB - medium boat, SB - small boat Other: BT - bait trap, S - seine net, P - panel net, F - fyke net, L - larval net									
Helper 1		Waterbody											
G. CLEMENTS		Woodi Waterloch Cox											
Helper 2													
dd	mm	yy	Operation #	1	2	3	4	5	6	7	8	9	10
04	05	23	Time (24hr)	13:15	13:23	13:30	13:38	13:45	13:53	14:00	14:08	15:10	
			Date (dd/mm/yy)	13/23	14/23	15/23	15/23	15/23	15/23	15/23	15/23	15/23	15/23
			Method	BP	BP	BP	BP	BP	BP	BP	BP	BT	
			effish length (m) / start (sec)	0	150	300	450	600	750	900	1050	140-400	
			mesh (mm) / end (sec)	150	300	450	600	750	900	1050	1200	X10 NETS	
			Volts	220									
			pulses per sec	1042									
			% duty cycle (range)	25									
			amps	0.4									
			Species Code										
			G. ORNATUS	1	1	2	1	3	2	2	2	1	
			Rainbow Trout										
			LUMBRICUS TERRESTRIS										

HABITAT RECORD Melbourne Water

Habitat page # (e.g. 1/3) 1 / 1

dd mm yy

04 / 05 / 23

Collector

S. LARSEN

Helper 1

G. CLEMENTS

Helper 2

Site code

W07-8964-3

Waterbody

W001 VALLECK CREEK

Instructions

Mark circles with cross or fill in. Leave boxes blank if the item was not seen. Definitions for some items are on first sheet.

Operation #	1	2	3	4	5	6	7	8	9	10	Operation #
Substrate											
Bedrock	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Boulder (>120 mm)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cobble (60-200 mm)	<input type="checkbox"/>										
Gravel (2-60 mm)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Sand (0.6-2 mm)	<input checked="" type="checkbox"/>										
Mid/silt (0.002-0.6 mm)	<input checked="" type="checkbox"/>										
Clay (<0.002 mm)	<input checked="" type="checkbox"/>										
Unknown	<input type="checkbox"/>										
Plants											
Native trees	<input checked="" type="checkbox"/>										
Exotic trees	<input type="checkbox"/>										
Native shrubs	<input checked="" type="checkbox"/>										
Riparian grass	<input checked="" type="checkbox"/>										
Floating macrophytes	<input type="checkbox"/>										
Emergent macrophytes	<input checked="" type="checkbox"/>										
Submerged macrophytes	<input type="checkbox"/>										
Filamentous algae	<input type="checkbox"/>										
Suspended algae	<input type="checkbox"/>										
Biofilms	<input checked="" type="checkbox"/>										
Cover											
Rock	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Timber	<input checked="" type="checkbox"/>										
Undercuts	<input checked="" type="checkbox"/>										
Leaf litter	<input checked="" type="checkbox"/>										
Macrophytes	<input checked="" type="checkbox"/>										
Mesohabitat											
Pools	<input type="checkbox"/>										
Run	<input checked="" type="checkbox"/>										
Riffle	<input type="checkbox"/>										
Rapid	<input type="checkbox"/>										
Backwater	<input type="checkbox"/>										
Velocity (F, M, S, NF)	M	F/M	M	M	M	M	M	M	M	M	
Average wetted width (m)	5	5	5	5	5	5	5	5	5	5	
Average depth (m)	0.8	0.8	0.8	0.8	1	1	1	1	0.8	0.8	
Distance travelled (m)	35	35	35	35	35	35	35	35	35	35	

SITE MAP Melbourne Water

Site map page # (e.g. 1/2) 1 / 1

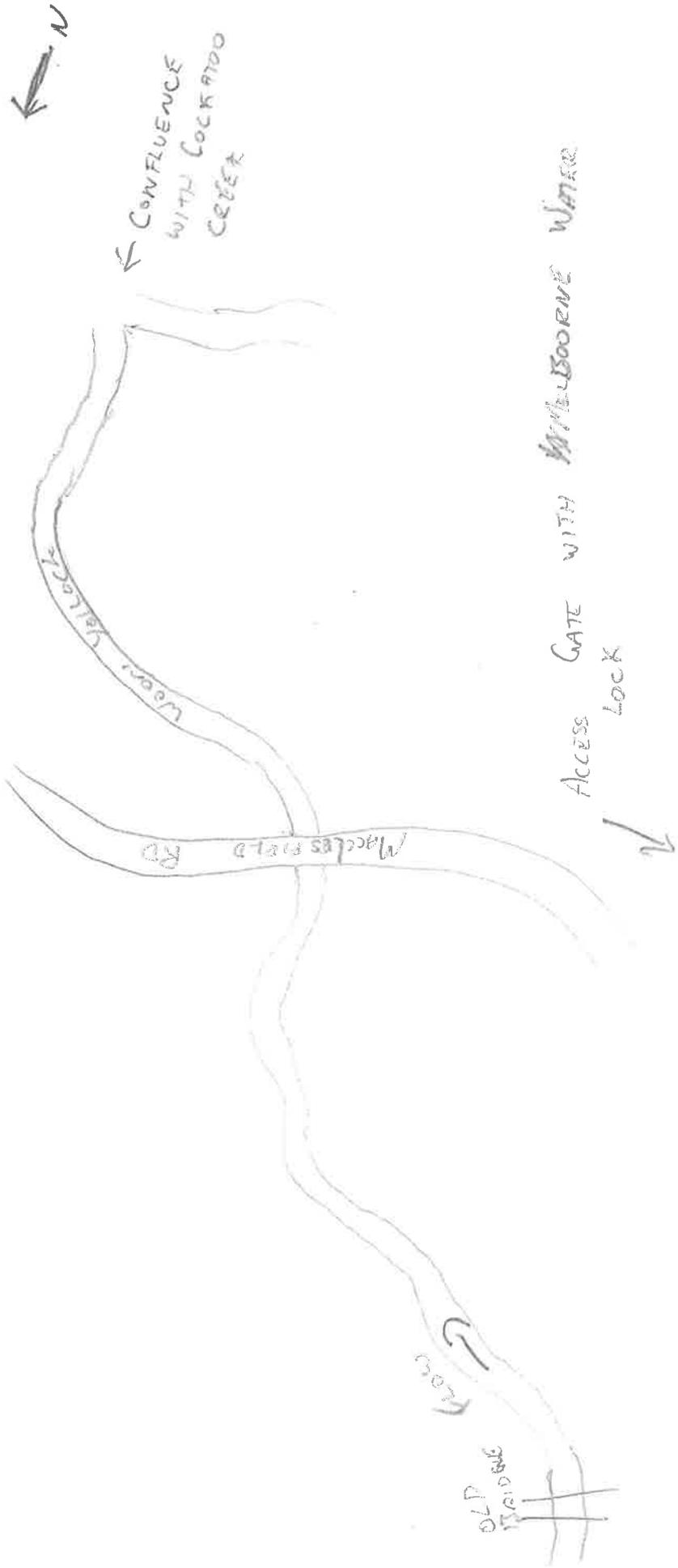
dd mm yy
04 / 05 / 23

Drawer J. Lamin

Site code W07-8964-3
Waterbody Woozei Yallock Creek

Instructions

Draw picture to help explain location, site details etc., if required or needed.



Comments: ALL STEEP BANKS, MANY DEEP SECTIONS BUT EASY ENOUGH ACCESS AS AREA IS

NOT OVERGROWN.

BIOLOGICAL Melbourne Water

Biological page # (e.g. 1/5) 1 / 1

Collector	DI	Site code	YAR-4233-7
Helper 1	ML	Waterbody	Yarr
Helper 2	SG		
dd mm yy	28 / 04 / 23		

Gear codes: Electrofishers: BP-backpack, IB-large boat, MB-medium boat, SB-small boat. Other: BT-bait trap, S-seine net, P-panel net, F-fyke net, L-larval net. Length codes: TL-Total length, LCF-Length to Caudal Fork, Reproductive Condition. E-eggs discharging, S-sperm discharging, O-other (describe)

Seq. #	Gear type	OP. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Health Codes	Sex	Repro. Cond.	Comment (and Tag #)
1	EF	4	BF	1	52290	TL350	394	Health			
2		5	SFE		1400mm			Health			
3		5	BF		52197	TL225	113	F			Fin wip tail fin
4		4	BF		5249	TL58	3	Health			
5		4	BF		52199	TL168	84	Health			
6		2 (001)	BE Eggs			W-100					
7		6	SFE (055)			W-200					
8		8	"			W-400					
9		8	"			W-200					
10		19	SFE (055)			W-200					
11		19	RBF		52142	TL162	42	Health			
12		10	RBF		5294	TL119	12	"			
13		10	BT		5208	W232	154	"			
14			VSC		5243	CL					
15			Y"		5233	CL					
16			"		5228	CL					
17			"								
18											
19											
20											
21											
22											
23											
24											
25											

Melbourne Water

EFFORT AND CATCH

Effort/catch pg # (e.g. 1/3) 1 / 1

Collector DI Site code YAR-423B-7 Gear codes _____
 Helper 1 ML Waterbody THWA Electrofishers: BP – backpack, LB – large boat, MB – medium boat, SB – small boat
 Helper 2 SG Other: BT – bait trap, S – seine net, P – panel net, F – fyke net, L – larval net

Operation #	1		2		3		4		5		6		7		8		9		10			
	Time (24hr)	Start	End																			
Date (dd/mm/yy)																						
nets length (m) / start (sec)																						
mesh (mm) / end (sec)																						
Volts																						
pulses per sec																						
% duty cycle (range)																						
amps																						
Species Code																						
#cght (#obs)																						
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Melbourne Water

HABITAT

Habitat page # (e.g. 1/3) 1 / 1

Site code YAK-4213-7
 Waterbody YAKA

Collector DJ
 Helper 1 MAL
 Helper 2 BR

dd mm WY
28 / 04 / 23

Instructions

Mark circles with cross or fill in. Leave boxes blank if the item was not seen. Definitions for some items are on first sheet.

Operation #	1	2	3	4	5	6	7	8	9	10
Substrate	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
Bedrock	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
Boulder (>120 mm)	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
Cobble (60-200 mm)	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
Gravel (2-60 mm)	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
Sand (0.6-2 mm)	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
Mid/silt (0.002-0.6 mm)	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
Clay (<0.002 mm)	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
Unknown	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plants										
Native trees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Exotic trees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Native shrubs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Riparian grass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Floating macrophytes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergent macrophytes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Submerged macrophytes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Filamentous algae	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Suspended algae	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Biofilms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cover										
Rock	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
Timber	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Undercuts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Leaf litter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Macrophytes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mesohabitat										
Pools	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
Run	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
Riffle	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
Rapid	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
Backwater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Velocity (F, M, S, NF)										
Average wetted width (m)		<u>0.19</u>	<u>0.4</u>	<u>0.6</u>	<u>0.4</u>	<u>0.4</u>	<u>0.4</u>	<u>0.4</u>	<u>1.0</u>	<u>1.05</u>
Average depth (m)		<u>0.25</u>								
Distance travelled (m)		<u>41.00</u>								

Same for all, habitat consistent

SITE MAP Melbourne Water

Site map page # (e.g. 1/2) 1 / 1

dd mm WY 20 / 04 / 23

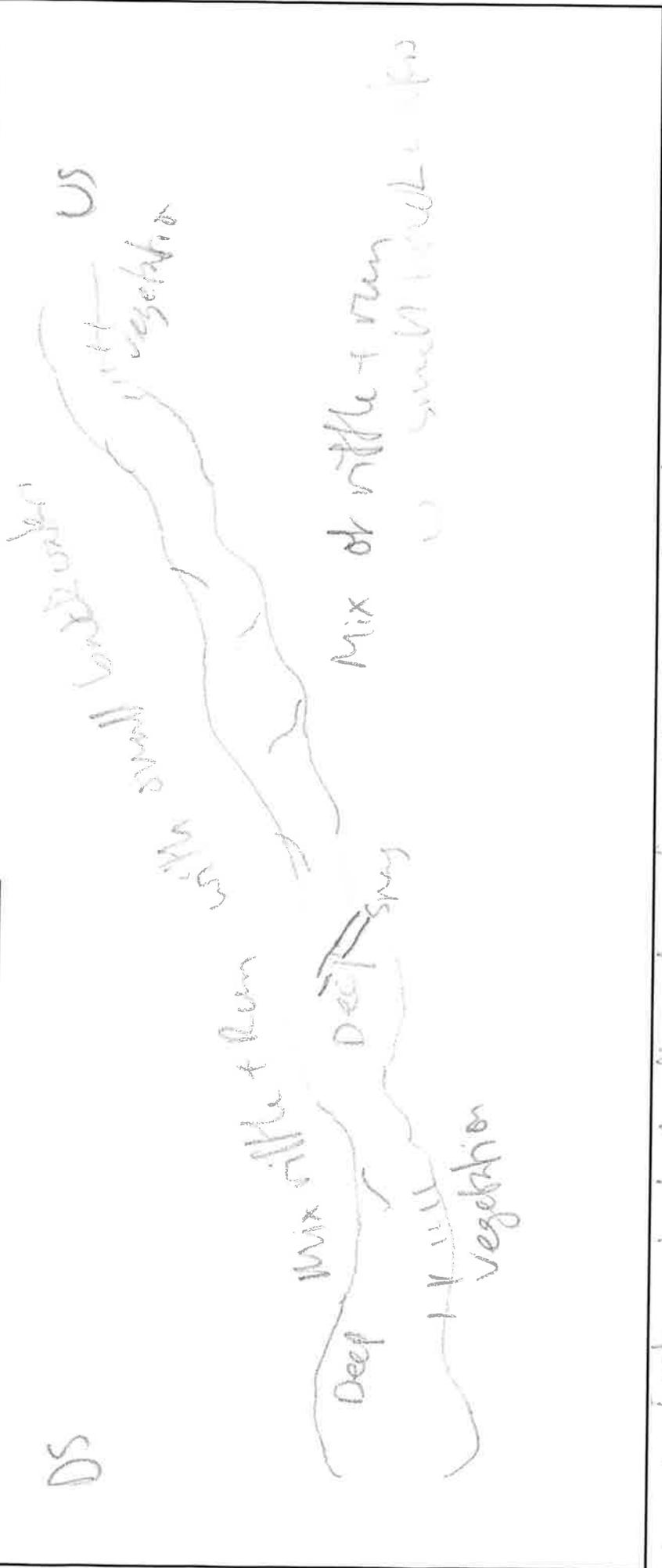
Drawer ML

Site code YAR-42313-7

Waterbody Yarra

Instructions

Draw picture to help explain location, site details etc., if required or needed.



Comments: Evidence of high flow release from the dam, lots of vegetation removed, and snags washed downstream. Some very large logs jams.

Biological page # (e.g. 1/5) 1 / 2 **BIOLOGICAL RECORD** Melbourne Water

dd	mm	W	Collector	Site code	Health Codes (disease, parasite, deformities)
<u>01</u>	<u>05</u>	<u>23</u>	<u>J. LAMIN</u>	<u>VAR-334049-3</u>	P - Other parasites (leech, lamprey, isopod) S - Lesions (raised or reddish skin or scales) T - Tumour (localised abnormal growth) U - Ulcer (skin is broken, crater like, redness) W - Wounds (e.g. bird strikes, hook wounds)
			Helper 1	Waterbody	
			<u>G. CLEMENTS</u>	<u>YARRA RIVER</u>	
			Helper 2		D - Deformity (skeletal, eye, fins, asymmetric etc.) F - Fin condition poor (broken, eroded) G - Fungus L - Lernaea (only when notable) O - Other (e.g. gas bubble eye. IMPORTANT: describe and photograph)

Gear codes: Electrofishers: BP-backpack, LB-large boat, MB-medium boat, SB-small boat. Other: BT-bait trap, S-seine net, P-panel net, F-fyke net, L-larval net. Length codes: TL-Total length, LCF-length to Caudal Fork. Reproductive Condition: E-eggs discharging, S-sperm discharging, O-other (describe)

Seq. #	Gear type	OP. #	Species Code	Fish #	Length (mm)	Length code	Weight (g)	Health Codes	Sex	Repro. Cond.	Comment (and Tag #)
1	BP	1	G.MAC	1	113	LCF	10				
2	"	1	"	2	47	"	3				
3	"	1	"	3	84	"	10				
4	"	1	"	4	64	"	7				
5	"	1	"	5	109	"	13				
6	"	1	"	6	84	"	10				
7	"	1	"	7	47	"	2				
8	"	1	FHG	1	67	TL	4				
9	"	2	G.MAC	8	80	LCF	3				
10	"	2	G.MAC	9	98	"	5				
11	"	2	"	10	92	"	5				
12	"	2	"	11	92	"	5				
13	"	2	"	12	95	"	6				
14	"	2	"	13	131	"	18				
15	"	2	"	14	116	"	11			F	
16	"	2	"	15	101	"	8				
17	"	2	SFE	1	384	TL	128				
18	"	2	"	2	619	TL	-				
19	"	3	G.MAC	16	116	LCF	6				
20	"	3	"	17	89	"	3				
21	"	3	"	18	87	"	3				
22	"	3	"	19	48	"	1				
23	"	3	"	20	128	"	10				
24	"	3	"	21	54	"	2				
25	"	4	"	22	102	"	6				

EFFORT AND CATCH RECORD Melbourne Water

Effort/catch pg # (e.g. 1/3) 1 / 1

Collector		Site code		Gear codes											
J. LAMIN		YAR-374049-3		Electrofishers: BP - backpack, LB - large boat, MB - medium boat, SB - small boat Other: BT - bait trap, S - seine net, P - panel net, F - fyke net, L - larval net											
Helper 1		Waterbody													
C. CLEMENTS		YARDA RIVER													
Helper 2															
dd	mm	yy													
01	05	23													
Operation #	Start	End	1	2	3	4	5	6	7	8	9	10			
Time (24hr)	11:58	12:05	12:05	12:15	12:15	12:28	12:28	12:35	12:43	12:43	12:50	12:50			
Date (dd/mm/yy)	1/5/23	1/5/23	1/5/23	1/5/23	1/5/23	1/5/23	1/5/23	1/5/23	1/5/23	1/5/23	1/5/23	1/5/23			
Method	BP	BP	BP	BP	BP	BP	BP	BP	BP	BP	BP	BP			
e ^{fish} length (m) / start (sec)	0	150	300	450	600	750	900	1050	1050	1050	1050	1050			
mesh (mm) / end (sec)	220	4042	2516	0.3											
Volts															
pulses per sec															
% duty cycle (range)															
amps															
Species Code	#cght (#obs)	#cght (#obs)	#cght (#obs)	#cght (#obs)	#cght (#obs)	#cght (#obs)	#cght (#obs)	#cght (#obs)	#cght (#obs)	#cght (#obs)	#cght (#obs)	#cght (#obs)	#cght (#obs)	#cght (#obs)	
GALANIAS MACUL	7 (2)	8 (5)	6 (1)	5 ()	8 (2)	3 ()	4 ()	2 ()	2 ()	2 ()	1 ()	1 ()			
SHORTFIN EEL	(2)	2	(1)	2											
FLATHEAD GODDEON	1				2		1								
YELLOWFIN GOBY															
ESTUARY PERCH															
No FISH															

HABITAT RECORD Melbourne Water

Habitat page # (e.g. 1/3) 1 / 1

dd mm yy	<u>01 / 05 / 23</u>	Collector	<u>S. LAMIN</u>	Site code	<u>YAR-374049-3</u>
Helper 1	<u>G. CLEMENTS</u>	Waterbody	<u>YARRA RIVER</u>	Instructions Mark circles with cross or fill in. Leave boxes blank if the item was not seen. Definitions for some items are on first sheet.	
Helper 2					

Operation #	1	2	3	4	5	6	7	8	9	10	Operation #
Substrate											Substrate
Bedrock	<input type="checkbox"/>	Bedrock									
Boulder (>120 mm)	<input checked="" type="checkbox"/>	Boulder (>120 mm)									
Cobble (60-200 mm)	<input checked="" type="checkbox"/>	Cobble (60-200 mm)									
Gravel (2-60 mm)	<input type="checkbox"/>	Gravel (2-60 mm)									
Sand (0.6-2 mm)	<input type="checkbox"/>	Sand (0.6-2 mm)									
Mid/silt (0.002-0.6 mm)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Mid/silt (0.002-0.6 mm)				
Clay (<0.002 mm)	<input type="checkbox"/>	Clay (<0.002 mm)									
Unknown	<input type="checkbox"/>	Unknown									
Plants											Plants
Native trees	<input checked="" type="checkbox"/>	Native trees									
Exotic trees	<input checked="" type="checkbox"/>	Exotic trees									
Native shrubs	<input checked="" type="checkbox"/>	Native shrubs									
Riparian grass	<input checked="" type="checkbox"/>	Riparian grass									
Floating macrophytes	<input type="checkbox"/>	Floating macrophytes									
Emergent macrophytes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Emergent macrophytes				
Submerged macrophytes	<input type="checkbox"/>	Submerged macrophytes									
Filamentous algae	<input checked="" type="checkbox"/>	Filamentous algae									
Suspended algae	<input type="checkbox"/>	Suspended algae									
Biofilms	<input checked="" type="checkbox"/>	Biofilms									
Cover											Cover
Rock	<input checked="" type="checkbox"/>	Rock									
Timber	<input checked="" type="checkbox"/>	Timber									
Undercuts	<input type="checkbox"/>	Undercuts									
Leaf litter	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Leaf litter					
Macrophytes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Macrophytes				
Mesohabitat											Mesohabitat
Pools	<input type="checkbox"/>	Pools									
Run	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Run
Riffle	<input checked="" type="checkbox"/>	Riffle									
Rapid	<input type="checkbox"/>	Rapid									
Backwater	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Backwater				
Velocity (F, M, S, NF)	<u>M</u>	<u>S</u>	<u>M</u>	<u>M</u>	<u>M</u>	<u>M/S</u>	<u>S</u>	<u>M</u>	<u>M/S</u>	<u>M/S</u>	Velocity (F, M, S, NF)
Average wetted width (m)	<u>15</u>	<u>15</u>	<u>15</u>	<u>15</u>	<u>15</u>	<u>20</u>	<u>20</u>	<u>15</u>	<u>20</u>	<u>20</u>	Average wetted width (m)
Average depth (m)	<u>1</u>	Average depth (m)									
Distance travelled (m)	<u>25</u>	Distance travelled (m)									

SITE MAP Melbourne Water

Site map page # (e.g. 1/2) ____ / ____

dd mm yy
____ / ____ / ____

Drawer _____

Site code _____
Waterbody _____

Instructions

Draw picture to help explain location, site details etc., if required or needed.

Comments:
