KING PARROT CREEK FISH SURVEYS 2016

Methods

In April 2016, five sites in King Parrot Creek between Kerrisdale and Flowerdale were surveyed for Macquarie perch (Figure 1, Table 1). Sites were selected based on previous surveys. Fish were collected at each site using backpack electrofishing and single wing fyke netting. Backpack electrofishing methods followed the Sustainable Rivers Audit protocol[1]. Fyke netting consisted of ten single wing fyke nets (5 mm mesh) set overnight at each site, with an approximate soak time of 18 hours. Floats were used at the cod end of each net to ensure that any mammals or turtles captured would be safely held until release. Additionally, platypus rings were used at the cod end of five nets per site to allow an escape passage for any captured mammals (Figure 2). An external t-bar tag and internal PIT tag was given to Macquarie perch individuals greater than 200 mm total length. A small fin clip was taken from 30 Macquarie perch of various sizes for genetic analysis. All fish were released at the site of capture after being measured for total length (mm) and weight (g).

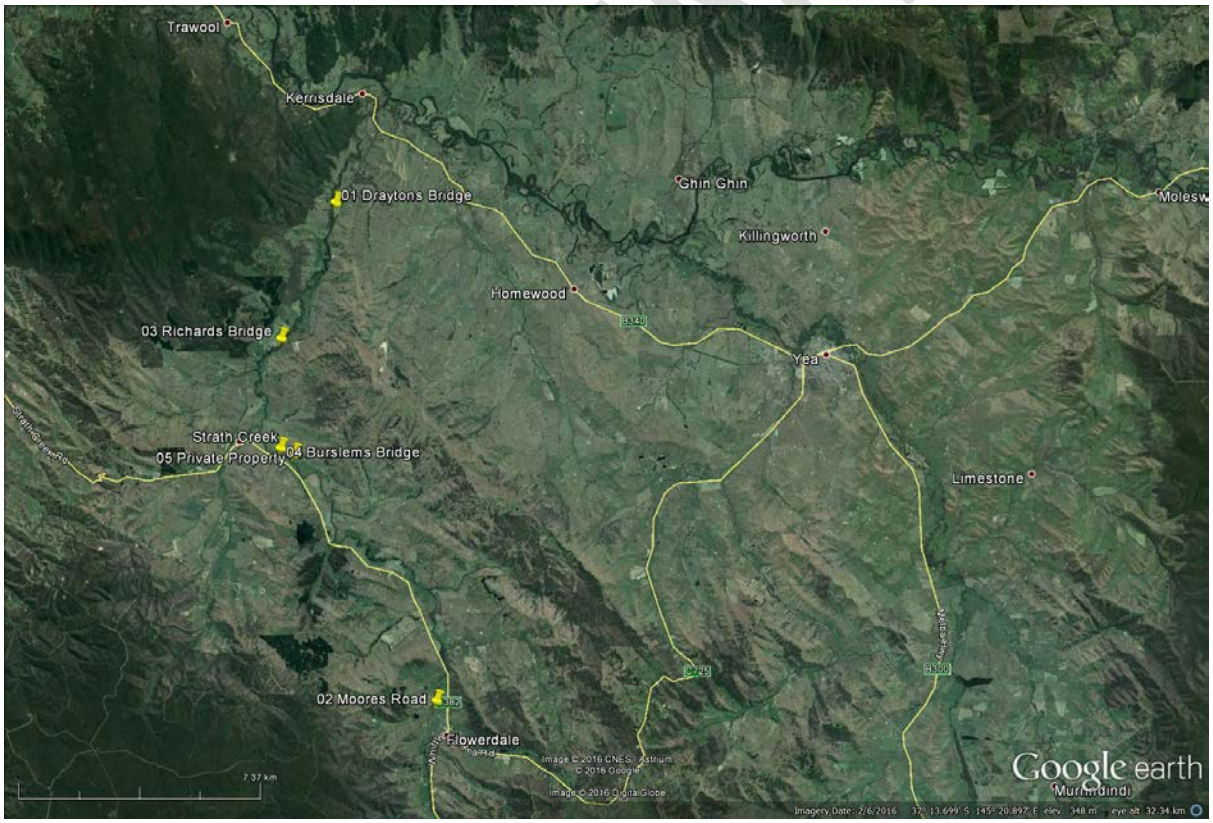

Figure 1. Map of survey sites in King Parrot Creek (Table 2)

[1] MDBC. (2007). Sustainable Rivers Audit Protocols: Approved Manual for Implementation Period 4: 2007-2008. Murray-Darling Basin Commission, Canberra.

Table 1. Locations of fish surveys in King Parrot Creek, April 2016

Site	Location	Date/s sampled	Gear type
01	Draytons Bridge on Fairview Road, Kerrisdale	07 April 2016	Fyke netting (x10)
		05 April 2016	Backpack electrofishing
02	Moores Road, Flowerdale	05 April 2016	Fyke netting (x10)
		08 April 2016	Backpack electrofishing
03	Richards Bridge on King Parrot Creek Road, Strath Creek	07 April 2016	Fyke netting (x10)
		05 April 2016	Backpack electrofishing
04	Burslems Bridge on upper King Parrot Creek Road, Strath Creek	06 April 2016	Fyke netting (x10)
		13 April 2016	Backpack electrofishing
05	Private Property – Callandoon, off Broadford-Flowerdale Road, Strath Creek	06 April 2016	Fyke netting (x10)
		13 April 2016	Backpack electrofishing

Figure 2. Fyke net set with a float and platypus ring at the cod end

Results

- A total of 502 fish, representing six native and four introduced species, were collected during surveys of King Parrot Creek. Other fauna also collected include platypus, common long-neck turtles and yabbies (Table 2).
- The most abundant species captured was Macquarie perch (*Macquaria australasica N* = 266) followed by Flat-headed gudgeon (*Philypnodon grandiceps N* = 65). Whilst a large number of fish, including Macquarie perch, were collected, the total number collected was lower than last year and likely reflective of extended period of low flows effecting fish survival or fish passage.
- Macquarie perch were collected from all five sites surveyed. Individuals ranged in size from 50 - 337 mm total length (average = 142 mm total length) (Figure 3). Two dominant size classes occurred. 64% of Macquarie perch collected were between 100 and 160 mm total length, while young of year (50 – 89 mm) accounted for 21% of the total Macquarie perch catch (Figure 4). Young of year were collected at all five sites. The low abundances of adult Macquarie perch is perhaps reflective of two years of low Summer flows (Figure 5).
- The size range of the juvenile Macquarie perch captured is indicative of strong recruitment in the 2013, 2014 and 2015 Spring spawning periods. This recruitment pattern follows the results of other populations throughout Victoria, including the Yea River, Sevens Creek and Hughes Creek (Goulburn Broken catchment); Lake Dartmouth and Yarra River.
- Six Macquarie perch (>250mm) were recaptured from past surveys (Table 3). All were recaptured at the site they were initially tagged. Three individuals were recaptured at Draytons Bridge (Site 01); one individual tagged in 2013 and two in 2015. One Macquarie perch was recaptured at Moores Road (Site 02) and was tagged in 2015. Two Macquarie perch were recaptured at Richards Bridge (Site 03) and were tagged in 2015. The five Macquarie perch that were tagged in 2015 have grown between 30 to 53 mm. The Macquarie perch that was tagged in 2014 has grown 59 mm. Whilst recapture rates are extremely low, these results (also evident in the Hughes Creek) suggest Macquarie perch have displayed strong site fidelity in recent years. This is likely due to the extremely low flow conditions experienced in the system during recent years providing limited opportunity for longitudinal dispersal. Conversely, the majority of tagged Macquarie perch have not been recaptured, which might also suggest high rates of emigration out of sites to areas not surveyed, high mortality rates or simply, low sampling detection rates.
- Carp were last collected in annual surveys in 2012 and this is the first time Eastern Gambusia have been collected in these annual surveys.
- King Parrot Creek has experienced low water flows since Spring 2015. Local residents in Strath Creek and Kerrisdale mentioned that King Parrot Creek ceased to flow over Summer and flows had only recommenced a week prior to surveys. Low water flows were evident during the surveys. Some habitats that were too deep to survey via backpack electrofishing in prior years were able to be accessed and surveyed. At Draytons Bridge, some locations where fyke nets had been set in previous years were too shallow and some habitat that Macquarie perch previously occupied was no longer inundated by water (Figure 6). Some riffle habitats barely had any flow to connect deeper pools and refuge areas (Figure 6). It's important to maintain fish passage where possible to facilitate access of Macquarie perch to refuge areas.
- Illegal weirs, like the rock weir at Moores Road, Flowerdale (Figure 7), are a barrier to fish passage. It may be worthy in the future to generate a catalogue or map of illegal barriers along King Parrot Creek, considering there is apparently quite a few, to inform management of Macquarie Perch in low water flows, and also to target community education about barriers to fish passage with nearby residents.
- Understanding of the location and condition of deeper refuge areas within the existing Macquarie perch range in King Parrot Creek, also in relation to the location of illegal weirs and other barriers, is important, particularly if a fish rescue operation is needed.
- Next year's monitoring outcomes are likely to be very informative of the effect of cease to flow periods on Macquarie perch survival and reproductive output. Such information would guide minimum summer baseflows and water extraction thresholds.

Table 2. Species collected, abundance (*N*) and size range (total length, mm) per site surveyed in King Parrot Creek, April 2016

	SITE											
Species	**01**		**02**		**03**		**04**		**05**		**TOTAL**	
	N	Range (mm)	*N*	Range (mm)	*N*	Range (mm)	*N*	Range (mm)	*N*	Range (mm)	***N***	**Range (mm)**
Macquarie perch ***Macquaria australasica***	72	50 - 337	13	72 - 264	46	75 - 272	47	70 - 335	89	55 - 252	**266**	**50 - 337**
River blackfish ***Gadopsis marmoratus***	-	-	7	163 - 207	-	-	11	125 - 265	16	80 - 218	**34**	**80 - 265**
Two-spined blackfish ***Galdopsis bispinosus***	-	-	5	92 - 256	-	-	-	-	-	-	**5**	**92 - 256**
Mountain Galaxias ***Galaxias olidus***	1	91	16	40 - 63	1	62	4	65 - 90	2	76 - 88	**24**	**40 - 91**
Southern pygmy perch ***Nannoperca australias***	-	-	-	-	-	-	-	-	16	40 - 63	**16**	**40 - 63**
Flat-headed gudgeon ***Philypnodon grandiceps***	-	-	-	-	35	8 - 80	5	40 - 79	25	20 - 60	**65**	**8 - 80**
Brown trout * ***Salmo trutta***	3	208 - 221	13	90 - 325	17	104 - 317	5	89 - 252	1	195	**39**	**89 - 325**
Rainbow trout * ***Oncorhynchus mykiss***	-	-	1	110	3	87 - 120	2	85 - 102	-	-	**6**	**85 - 120**
Carp * ***Cyprinus carpio***	-	-	-	-	1	248	-	-	-	-	**1**	**248**
Eastern Gambusia * ***Gambusia holbrooki***	-	-	-	-	2	45 - 46	-	-	-	-	**2**	**45 - 46**
Yabby ***Cherax destructor***	19	11- 26	4	15 - 31	7	14 - 26	8	10 - 28	7	9 – 26	**45**	**9 - 31**
Platypus ***Ornithorhynchus anatinus***	-	-	-	-	-	-	-	-	1	-	**1**	**-**
Common long-neck turtle ***Chelodina longicollis***	2	185 - 200	1	200	1	193	8	155 - 200	1	190	**13**	**155 - 200**
TOTAL	**97**		**60**		**113**		**90**		**142**		**502**	

***** Introduced species

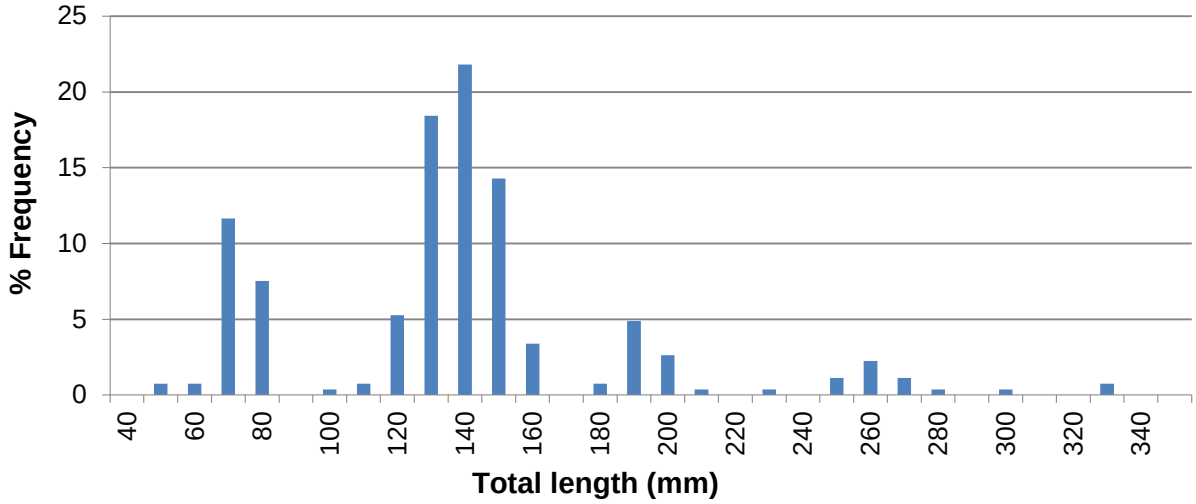

Figure 3. Size frequency histogram (% of occurrence) of Macquarie perch captured in King Parrot Creek, April 2016

Figure 4. A young of year Macquarie perch

Figure 5. A recaptured adult Macquarie perch. It was tagged with an internal PIT in 2015 at Site 02 Moores Road (212 mm total length) and was recaptured in 2016 at the same location (264 mm total length)

Figure 6. Low water flows were particularly obvious at Draytons Bridge

Figure 7. Barriers to fish passage hinder habitat connectivity and restrict fish access to refuge areas

Table 3. Macquarie perch recaptured in King Parrot Creek in April 2016, including site code (see Table 1) and total length (mm) since initial year tagged.

FISH (PIT number)	INITIAL TAGGING Year, Site code, Total length (mm)	RECAPTURE Year, Site code, Total length (mm)	RECAPTURE Year, Site code, Total length (mm)
0951120000000483	2015, 01, 235	2016, 01, 265	
0000000178693884	2013, 01, 278	2015, 01, 332	2016, 01, 337
0951120000000287	2015, 01, 230	2016, 01, 283	
0951120000000543	2015, 02, 212	2016, 02, 264	
0951120000000277	2015, 03, 216	2016, 03, 254	
0951120000000137	2015, 03, 230	2016, 03, 272	