

Australian Platypus Conservancy



**PLATYPUS POPULATION ASSESSMENT  
AND RECOMMENDED MANAGEMENT ACTIONS  
ALONG BROKEN CREEK**

**A REPORT TO GOULBURN BROKEN CMA**



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## Platypus Population Assessment and Recommended Management Actions along Broken Creek

### Background

Broken Creek has served as a conduit for irrigation-related water supply flows for more than 100 years, with water first sourced from the Broken River and more recently supplemented from Lake Mokoan. Based on records obtained at Casey's Weir gauging station, flows of 5-10 ML/day in winter and 50-120 ML/day were consistently directed down Broken Creek from 1972 to 2008. In practice, this resulted in a reliable year-round flow regime being experienced by fauna occupying the upper reaches of Broken Creek (downstream to Waggarandall Weir and for some distance beyond) for nearly the last four decades. It is believed that the amount of water released was probably sufficient to ensure that Reilly's Weir and Irvine's Weir were maintained as reliable aquatic habitats throughout this period. Farther downstream, much or all of the Broken Creek channel from Irvine's Weir to Katamatite is likely to have dried out regularly in summer (due to lack of substantial natural or manmade pools); gauging station records at Katamatite indicate that the creek failed to flow (most typically, for a period of 1-3 months) in each summer and/or early autumn since 1982. In the most extreme case, an absence of surface flow was recorded at Katamatite from February 2003 to March 2005 (G. Earl, pers. comm.).

The flow regime along Broken Creek changed markedly in the summer of 2009/10. This was due to development of the Tungamah stock and domestic supply pipeline, along with the impact of drought on the Broken River water supply system. Because of drought, there were no irrigation allocations in the Broken supply system, and hence no irrigation water deliveries to farms downstream of Casey's Weir. Following the pipeline's completion, only a relatively small number of farms between Waggarandall Weir and Katamatite continued to rely on the creek to supply stock and domestic water. These changes resulted in a reduced water supply flow being provided along the creek, with 3-15 ML/day released at Casey's Weir in 2009 (G. Earl, pers. comm.). While it had been predicted that the new (post-pipelining) flow regime would result in the creek becoming ephemeral downstream of Flynn's Weir, it had also been assumed that this would not cause a large proportion of the channel upstream of Katamatite to become dry for extended periods (Newall *et al.* 2009). However, this model did not allow for the additional impact of no irrigation allocations.

Unfortunately, the spring and early summer of 2009/10 were both exceptionally dry, and by the end of January water had already disappeared from most of the channel between Henry Road and Currie Lane, with depths of 20 centimetres or less recorded at five of eight sites inspected from Henry Road upstream to the Dookie-Devenish Road (S. Casanelia, Lower Broken Creek Field Assessment Results, 29 Jan-1 Feb 2010). At Irvine's Weir, three platypus were seen to be surviving in a remnant pool (measuring about 30 cm deep x 15 m long) associated with the weir. In the absence of summer precipitation, water temperature in the largest of the three remaining pools (measuring about 60 cm deep x 50-70 m long) was predicted to exceed 25°C by the end of February, resulting in the demise of most of the small aquatic invertebrates which comprise the platypus's food supply (R. Weber, *in litt.*).

The aim of this report is to help the GBCMA develop an informed and sensible plan for managing the platypus population in Broken Creek over the longer term, by (1) providing an overview of the distribution and regional significance of the Broken Creek platypus population, and (2) suggesting some management options that could be implemented to help protect the population.

For background information about platypus biology and specific platypus-related conservation guidelines, the reader is advised to consult the APC's web-site ([www.platypus.asn.au](http://www.platypus.asn.au)), which provides much more detail than can readily be accommodated in the current document.

## ***Distribution and Status of Platypus in the Broken River Basin***

### *Sources of Information*

To our knowledge, the only platypus live-trapping work that has been conducted to date in the Broken River catchment area was carried out in October-November 2003 along Boosey Creek, from Lake Rowan township to about 4 kilometres upstream of Katamatite. This survey was carried out prior to the completion of the Tungamah pipeline project which changed the flow regime along Boosey Creek from a highly reliable to seasonally ephemeral pattern. In brief, only one platypus was recorded, at a site located roughly 6 kilometres downstream of Tungamah weir. It was concluded that platypus occurred at best in low numbers along Boosey Creek; the location where the captured adult male was encountered (roughly 5 kilometres from Reilly's Weir via a manmade channel) suggests that the animal may actually have been a vagrant or short-term visitor originating in Broken Creek (Williams *et al.* 2004).

Additional information about the distribution of platypus in the Broken River Basin is available from written sightings reports provided to the Conservancy from the 1990s to 2010 by field biologists, natural resource managers and members of the public. A particularly large number of sightings was recorded from 2002 to 2004 as an outcome of phone interviews targeting long-time landholders owning extensive stream or river frontage. We consider this body of information to be highly reliable, i.e. based in all cases on first-hand information provided by persons who either observed platypus on more than one occasion at a given locality or were otherwise very familiar with the animal's appearance and habits.

### *Broken River*

Platypus populations appear to be widely distributed along Broken River, with sightings recorded since 2000 from Shepparton to as far upstream as Bridge Creek (Table 1). A large proportion of sightings reports (15/22, 68%) involved platypus observed on a regular or occasional basis over time. In our experience, there is a strong likelihood that these patterns reflect a reasonably high population size, though local population density is necessarily expected to vary with factors such as habitat quality, channel width and reliability of surface flow.

### *Tributaries apart from Broken Creek*

Since 2000, platypus have been reportedly seen in Lima East Creek (near Lima East), Ryans Creek (a short distance downstream of Loombah Weir) and Holland Creek (at locations distributed from the Broken River confluence to as far upstream as Wrightley) (Table 2). All reports (12/12) indicated that animals were observed on a regular or occasional basis. However, two (of three) landowners who recently provided information relating to the distribution of platypus along Holland Creek upstream of Tatong reported that all sightings ceased on their properties in the extremely dry summer of 2005/06 and no platypus have since been seen there (despite often looking for them). In both of these cases, isolated pools remained in the channel through the 2005/06 summer but were described as eventually becoming shallow and very stagnant.

According to Geoff Brennan (GBCMA Team Leader, Benalla), creeks that would be expected to potentially provide reliable platypus habitat in the Broken River basin (apart from Broken Creek) include the Holland/Spring Creek system (mainly upstream of Tatong), Ryans Creek (especially between McCall-Say Weir and Loombah Weir and directly downstream of Loombah Weir), perennially flowing parts of the Lima East/Lima Creek system, the upper catchment of the Warrenbayne Creek system and the upper reaches of Blue Range Creek.

He has also provided a rough preliminary estimate of the total lengths of channel in these systems which would potentially support platypus in a drought year, namely 105-125 km (based on an estimated 30-40 km of habitat along Holland and Spring Creeks, 10 km along Ryans Creek, 40-50 km along Lima East and Lima Creeks, 15 km in the Warrenbayne Creek system and 10 km along Blue Range Creek. Assuming that mean platypus carrying capacity in these areas is 1-2 adults or subadults/kilometre of channel (i.e. similar to the 1.3-2.1 adult or subadult platypus/km estimated to occupy two moderately degraded perennial streams located in the upper Yarra catchment near Healesville: Serena 1994, Gardner and Serena 1995), the total number of platypus across all five systems is predicted to include in the order of 105-250 individuals (though quite possibly less if challenged repeatedly by drought – see comments above regarding reduced platypus sightings since 2005 in Holland Creek).

#### *Broken Creek upstream of Katamatite*

Since 2000, platypus have been observed at Casey's Weir (4 reports), Irvine's Weir (1 report) and various locations distributed from Goorambat downstream to McLaughlin's Weir (7 reports) (Table 3). About the same proportion of informants reported seeing platypus on a repeated basis (9/13, 69%) as in the case of the Broken River, suggesting that in recent years a relatively substantial population occurred at least in that part of the channel located from Casey's Weir downstream to the Waggarandall area.

Platypus habitat quality at sites inspected by the authors in April 2010 at the upper end of Broken Creek (from Casey's Weir downstream to Waggarandall Weir) generally appeared to be good enough to support successful breeding by this species at most and possibly all locations (Table 4). Based on a reasonable but fairly conservative assumed population density of 1.5-2 platypus/kilometre, this section of Broken Creek (length = 40.2 km) is predicted to be able to support a permanent population of 60-80 adult or subadult animals if sufficient surface flow can be maintained through the year.

In contrast, five of eight sites inspected downstream of Waggarandall Weir were deemed to comprise suboptimal platypus habitat, defined as being occupied by low numbers of adult or subadult males and/or dispersing juveniles (< 0.5 platypus/km, based on Serena and Pettigrove 2005). Two of the three remaining sites (Reilly's Weir pool and the gauging weir pool at Gilmore's Bridge) should in theory provide reasonably good habitat for platypus as long as they contain enough water, though neither pool is likely to be large enough in its own right to support successful breeding. Unfortunately, both of these water bodies dried out entirely in the summer of 2009/10 (G. Earl and S. Casanelia, pers. comm.).

As described earlier in this document, Irvine's Weir retained some surface water through January 2010 (and was subsequently topped up by runoff from rainfall in February and March). Despite the dearth of native vegetation around its perimeter, the large surface dimensions of this weir mean that enough food (in the form of aquatic macro-invertebrates) might potentially be present to support one or more resident platypus. Alternatively, it is possible that the three platypus regularly seen by a local landholder in January 2010 (when the weir pool was coming close to drying out) may have been forced to concentrate their activity in this area due to the lack of surface water for a considerable distance both upstream and downstream.

#### *Broken Creek downstream of Katamatite*

Platypus have reportedly been seen downstream of Katamatite on only two occasions since 2000, at sites located approximately 6 km downstream of Fairman's Bridge near Picola, and at the Dip Bridge along the Nathalia-Katamatite Road. The Dip Bridge sighting involved an animal (presumed to be an unwary juvenile) that was observed being bludgeoned to death by youths armed with stones and lumps of wood.

The conclusion that platypus occur at best in very low numbers in this part of Broken Creek is supported by information provided by five long-time anglers or amateur naturalists based respectively in Katamatite (in the 1980s and 1990s) Numurkah (from 1992-2005), midway between Numurkah and Nathalia (since the 1950s), Nathalia (from 1973-2004) and on a property located downstream of Nathalia (since the 1950s). All of these persons agreed that they had never seen a live platypus (or heard of one being seen) downstream of Katamatite.

### **Conclusions**

1. Within the Broken River basin, a large and presumably secure platypus population is believed to inhabit the Broken River.
2. Populations elsewhere in the Basin all appear to be small and (based on observations made by landowners along Holland Creek) are likely to have contracted quite dramatically in size in the last five years.
3. The section of Broken Creek located upstream of Waggarandall Weir may well support the second biggest platypus populations within the Basin (i.e. after that occupying the Broken River proper) and is one of only two creek systems (along with Ryan's Creek) where there is potential for actively conserving platypus in years of extreme drought by releasing stored water to augment 'natural' summer flows. The Broken Creek population is also predicted to have conservation significance in a broader regional context, in having the potential to generate surplus juveniles that can migrate to the Murray River to augment local juvenile recruitment, particularly in the area between the Ovens and Goulburn River confluences.
4. The length of Broken Creek can logically be divided into four geographic units with respect to future platypus management:

*Casey's Weir to Waggarandall Weir.* Platypus appear to be widely established and reasonably abundant. Habitat quality for the species is generally rated as moderate; water is currently allocated to provide a water supply flow to local irrigators in summer.

*Downstream of Wagarrandall Weir to Irvine's Weir.* Reasonably recent platypus sightings are restricted to McLaughlin's and Irvine's Weirs. Habitat quality for the species is generally rated as suboptimal, i.e. unlikely to support breeding females. Nonetheless, the area is predicted to be occupied by platypus (especially subdominant males and surplus or dispersing juveniles) whenever adequate surface moisture is available. The quantity and persistence of surface water in summer currently depends on catchment runoff plus any surplus water that may overflow from Wagarrandall Weir. Substantial weir pools exist at McLaughlin's, Reilly's and Irvine's Weirs and probably held water quite reliably in the four decades prior to the development of the Tungamah pipeline (G. Earl, pers. comm.).

*Downstream of Irvine's Weir to Katamatite.* No platypus sightings reported to date. Habitat quality for the species is suboptimal; the area lacks substantial pools and probably would have routinely dried out in summer even before development of the Tungamah pipeline (G. Earl, pers. comm.).

*Katamatite to Murray River.* Very low incidence of platypus sightings; three of the four available reports involve animals found dead or seen to be killed. Managed flow ensures reliable water in the channel for 9 months of the year. However, outside weir pools, flows during winter depend on natural runoff and so vary from year to year (and can be zero). The apparent absence or near absence of platypus in this area may reflect habitat deficiencies and/or excessive mortality due to use of illegal nets, etc. that is hindering population establishment – too little is known to support the development of a more specific hypothesis.

## **Recommendations**

1. Include platypus on the list of important natural values identified for Broken Creek and the Broken River in relevant management documents, notably including the next version of the Goulburn Regional River Health Strategy (2005).
2. Aim to conserve and if possible enhance platypus numbers and reproductive success along Broken Creek from Casey's Weir to Waggarandal Weir by carrying out the following actions:
  - 2.1. Ensure that enough water is released at Casey's Weir in dry seasons to maintain a minimum water depth of 30 cm in at least 90% of the channel throughout the year.
  - 2.2. As previously recommended by Newall *et al.* (2009), map the distribution of existing natural pools in this reach. Establish a program to improve pool habitats (including by potentially deepening them) in relation to platypus and native fish. If a weir needs to be decommissioned, replace its associated pool by developing a comparable (or larger) pool or backwater elsewhere along the creek.
  - 2.3. As previously recommended by Cottingham *et al.* (2001), maintain efforts to control stock access to the creek, revegetate the banks with indigenous species and remove willows.
  - 2.4. Ensure that intake points on irrigation pumps (including those located along manmade channels connected to Broken Creek) are fitted with mesh guards to protect platypus (particularly small juveniles) from being sucked into or up against the intake and drowning.
  - 2.5. Be vigilant to the use of illegal aquatic traps and nets along Broken Creek that can drown platypus. Assist efforts to reduce (and ideally eliminate) deployment of such traps, e.g. through community education campaigns.
3. Aim to maintain reliable and productive summer refuge habitats for platypus (and other aquatic wildlife) at McLaughlin's and Reilly's Weirs, by carrying out the following actions:
  - 3.1. Investigate the feasibility of increasing the storage capacity of both weirs so they will hold enough water to maintain viable aquatic habitats through most summers, based solely on natural runoff and existing arrangements for releasing water from Casey's Weir.
  - 3.2. Designate an emergency environmental water reserve that can be released to top up these weir pools if required in exceptionally dry years.
  - 3.3. Consider adding large woody debris to the Reilly's Weir pool (and potentially also McLaughlin's Weir pool, which we have not had the opportunity to inspect recently) to improve habitat quality.
4. Investigate the potential for deepening a section of Irvine's Weir to provide a reliable summer refuge area for platypus and other aquatic wildlife. Such an arrangement will clearly need to be contingent on ensuring that water in the refuge area is not subject to private consumptive use during times of drought, and ideally will also be contingent on the owner agreeing to improve habitat quality by planting indigenous trees and shrubs around the refuge area's perimeter. (N.B. Any refuge area for platypus should include secure places for them to sleep - ideally in the form of burrows within a consolidated soil bank rising at least one metre above the water surface, but alternatively a selection of large hollow logs resting partly out of the water should be provided.)

5. Encourage CMA staff to routinely report platypus sightings made by themselves or their community contacts along Broken Creek. Develop a standard protocol for recording this information to help monitor any changes in the population's distribution over time.

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**Table 1.** Locations of platypus sightings (APC database) along Broken River.

<i>Year(s)</i>	<i>Sightings frequency</i>	<i>Location</i>
early 1970s	1 seen	near Goulburn R confluence
1980s-2003	fewer sightings over time	Nalinga (Violet Town-Nalinga Rd bridge)
1980s-2003	regularly seen	near Orrvale (west of Doyles Rd)
1990s-2004	regularly seen	c. 7 km downstream of Benalla
1990s-2006	occasionally seen	1 km downstream Swanpool-Tatong Rd
1999	regularly seen	near Barwite
1999	1 seen	near Barwite
2000-2003	3-4 netted in fish surveys	3 km west of Cosgrave South
2000-2003	2-3 netted in fish surveys	6-7 km downstream of Benalla
2000-2004	regularly seen while fishing	Benalla to Casey's Weir
2001	1 seen	near Holland Ck confluence
2001	1 seen	river channel in Benalla township
2002	1 seen	Shepparton (Murray St-Yarra Court)
2003	1 seen	just downstream of Lake Benalla
2003	regularly seen	in Lake Benalla and streams joining lake
2004	occasionally seen	billabong 7 km upstream of Benalla
2004	occasionally seen	in Lake Benalla behind showgrounds
2005	regularly seen	near Bridge Creek township
2005	occasionally seen	near Orrvale (1 km upstream Doyles Rd)
2005	regularly seen	in Lake Benalla
2007	regularly seen	in Lake Benalla
2008	1 found dead	in Benalla (under Ackerly Ave bridge)



**Table 2.** Locations of platypus sightings (APC database) along Holland Creek, Ryans Creek and Lima East Creek.

<i>Year(s)</i>	<i>Sightings frequency</i>	<i>Location</i>
<i>Holland Creek</i>		
1985-2005	regularly seen	c. 4 km upstream of Tatong
1999-2005	regularly seen	near Wrightley
2002	regularly seen	near Broken River confluence
2002	regularly seen	near Benalla-Tatong Rd bridge
2002	occasionally seen	near Broken River confluence
2002-2003	occasionally seen	near Wrightley
2007	occasionally seen	near Ryans Creek confluence
before 2005-2010	regularly seen	“Riverview” (downstream of Wrightley)
<i>Ryans Creek</i>		
1994-1996	occasionally seen	near Loombah Weir
1997	5 captured in fish survey	Loombah Weir
2000-2006	regularly seen	just downstream of Loombah Weir
<i>Lima East Creek</i>		
1980s-2005	occasionally seen	Lima East

**Table 3.** Locations of platypus sightings (APC database) along Broken Creek.

<i>Year(s)</i>	<i>Sightings frequency</i>	<i>Location</i>
<i>Upstream of Katamatite</i>		
1995-2002	regularly seen	Goorambat
1996	1 seen while fishing	near Goorambat
1996-2002	regularly seen	between Flynn and Nooramunga Rds
2002	1 seen	near Trewin’s Weir (Major’s Ck offtake)
2002	regularly seen	Casey’s Weir
2003	regularly seen	Casey’s Weir
2003	regularly seen	McLaughlin’s Weir
2003	regularly seen	Waggarandall Weir
2004	regularly seen	near Feldman Rd
2004	regularly seen	Casey’s Weir
2008	1 captured in fish survey	near South Boundary Rd
2008	1 seen	Casey’s Weir
2009-2010	regularly seen	Irvine’s Weir
<i>Downstream of Katamatite</i>		
1939	1 found dead after flood	Harris Bridge
c. 1961	1 found dead in drum net	Rice’s Weir
2003	1 seen	outfall from channel no. 12 near Picola
2004	1 seen killed by ‘louts’	Dip Bridge

**Table 4.** Summary of perceived platypus habitat values at 15 sites along Broken Creek, based on site assessments (by APC staff) conducted 15 April 2010. See Appendix 1 for photos of most of these sites, taken on the inspection date.

<i>Location</i>	<i>Platypus habitat value</i>
Casey's Weir	good: highly likely to support breeding females
Trewin's Weir	moderate: likely to support one (or possibly more) breeding female(s)
Flynn's Road	moderate: likely to support one (or possibly more) breeding female(s)
Boxwood Road	fairly poor (degraded by livestock access): may support a breeding female
Stony Creek Road	moderate: likely to support one (or possibly more) breeding female(s)
Boundary Road	moderate: likely to support one (or possibly more) breeding female(s)
Waggarandall Weir	moderate: likely to support one (or possibly more) breeding female(s)
St James Road	suboptimal (channel shallow): males/dispersing juveniles likely to utilise when conditions appropriate
Pelluebla Road	suboptimal (channel narrow, shallow, weed-choked): males/dispersing juveniles likely to utilise when conditions appropriate
Reilly's Weir	could provide excellent summer refuge area (if perennial)
Dickie's Road	suboptimal (channel very narrow): males/dispersing juveniles likely to utilise when conditions appropriate
Irvine's Weir	very large pool might (despite poor habitat quality) possibly support a breeding female; likely to regularly serve as a summer refuge area
Carmody Road	suboptimal (channel narrow, shallow): males/dispersing juveniles likely to utilise when conditions appropriate
End Wallden Road	suboptimal (c. 1 ha wetland, shallow and weedy): males/dispersing juveniles likely to utilise when conditions appropriate
Gilmore's Bridge	gauging weir pool could provide summer refuge area (if perennial)

**Appendix 1.** Photographs of sites along Broken Creek taken during habitat assessments by APC staff, 15 April 2010



Casey's Weir (above) and start of Broken Creek downstream of Casey's Weir (right)



Trewin's Weir – looking upstream from Trask Road bridge (left) and looking downstream (right)



Flynn's Road – looking upstream along fenced riparian zone (above) and downstream (right)



Boxwood Road – looking upstream (left) and downstream (above)



Boundary Road – looking upstream (left) and looking downstream (right)



Waggarandall Weir – looking upstream (above) and downstream (right)



St James Road – looking upstream (left) and downstream (right)



Pelluebla Road – looking upstream (left) and downstream (right)



Reilly's Weir – looking upstream from weir wall (left) and downstream from road (right)



Dickie's Road – looking upstream (left) and downstream (right)



Irvine's Weir – looking upstream (left) and downstream (right)



Gilmore's Bridge gauging station – looking upstream (left) and downstream (right)