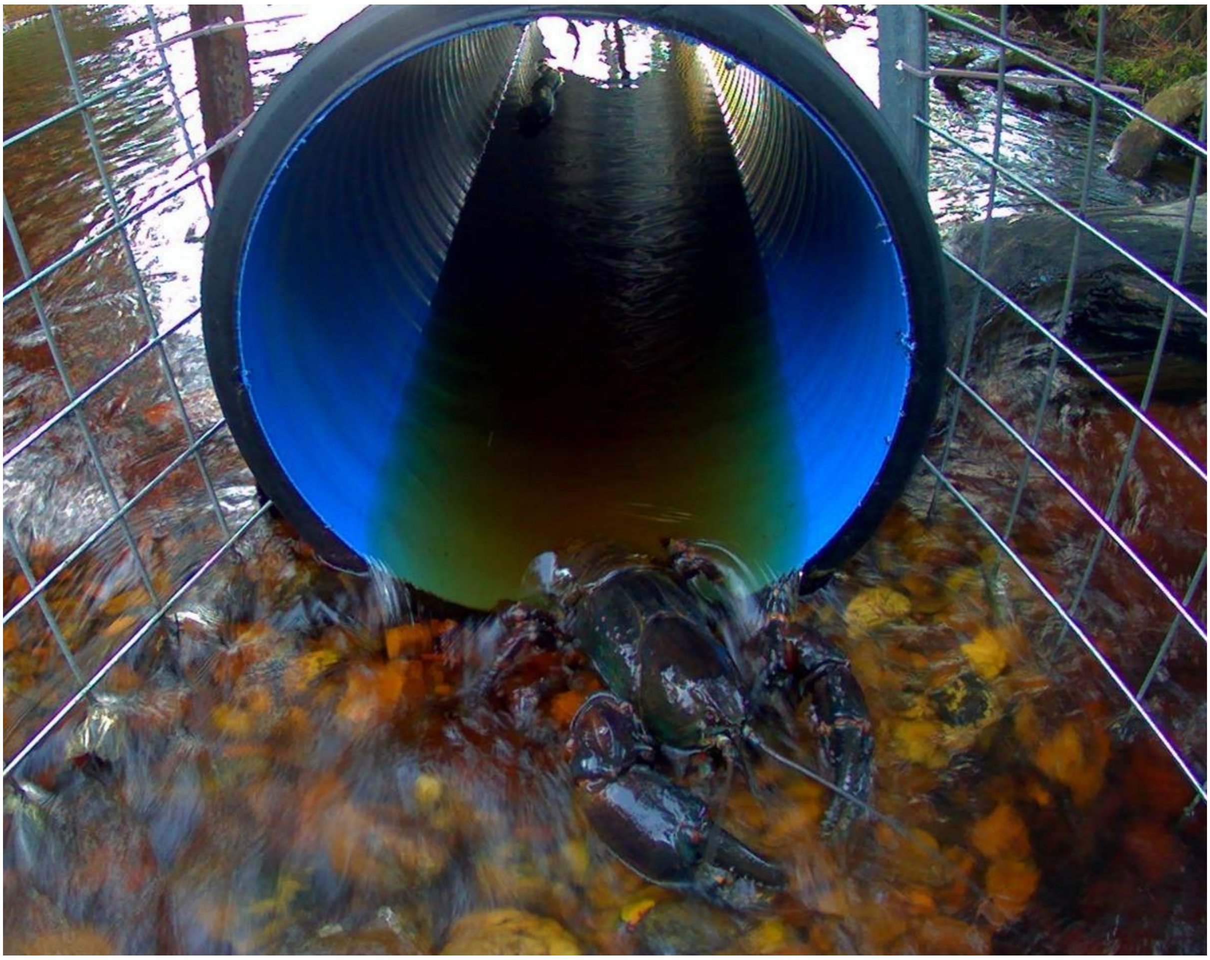
Mount Roland
LAND CARE

So why did the Giant Freshwater Crayfish cross the road?

New findings from a Mount Roland Land Care study

July 2025



Summary

A recent project carried out by Mount Roland Land Care (funded by Landcare Australia) has provided new insights into the use of under-road culverts by the Giant Freshwater Crayfish (GFC). For years, GFC – the largest freshwater invertebrate in the world, living only in northern Tasmania – have been seen slowly making their way across roads in order to avoid culverts, with predictable consequences. Such casualties are particularly concerning because the species is already listed on the IUCN Red List of Threatened Species.

To our knowledge there is no published evidence of a GFC ever using a culvert. Indeed, it is a widely held view in Tasmania that GFC will simply not use culverts. The aim of the project was to gather evidence about GFC use of culverts and to determine if this view is correct.

Using microchip scanning and remote camera technology, MRLC volunteers have documented – we believe for the first time – that GFC will use culverts in certain circumstances. Specifically, the study establishes that GFC will use round, plastic culverts for downstream travel but are unable to use unmodified plastic culverts for upstream travel against water flow. While further trials are necessary, we suggest that plastic culverts with appropriate modifications may enable GFC upstream travel against a modest flow.

Our Trial Sites

Between April and June 2025, we established four trial sites with the aim of learning more about GFC use of culverts.

Trial Site 1 – Mock Culvert Placed In-Stream. Circular Head Municipality.

At our first study site, we placed a 2.9 m length, 525 mm diameter, round, corrugated plastic culvert with a smooth PVC interior in a stream section. Courtesy of the prior work of Todd Walsh, the stream is known to be inhabited by micro-chipped GFC. River-stone substrate was placed inside the culvert to a depth of less than 5cm. The water depth inside the culvert was variable but no more than 10 cm. We then monitored the culvert over a four-week period, using a microchip scanner inserted under the culvert, and cameras positioned to show both the upstream and downstream entrances to the culvert. 1.2m long mesh fences at approx. 45 degrees were created at both ends of the culvert, to effectively narrow the waterway and more closely replicate an actual culvert situated under a road. However, passage around these fences was still possible, with the stream freely flowing outside the funnels on both sides.

Results

A number of GFC were observed to move in a *downstream* direction through the culvert [Pictures 1 and 2]. Traverse of the culvert was observed to take between a few seconds and up to 13 mins. The GFC appeared to move easily and quickly into the culvert, occasionally lingering inside the culvert near its middle.

We have no observations that GFC were moving, or even attempting to move, of their own volition *upstream* through the culvert. There is footage, however, of GFC moving upstream outside the culvert and the fences, close to the river edge [Picture 3].

GFC movements during this trial are recorded in Table 1.

Table 1. Summary of Recordings of GFC Movements in and around the Mock Culvert.

Date and Time	Time Spent in Culvert	Recorded on Scanner	Recorded on Cameras
25/4 10.41am	13 min.	N	Y. Travelling downstream.
25/4 1.27pm	?	N	Y – upstream camera only. Small GFC travelling downstream.
25/4 4.59pm	1 min.	N	Y. Travelling downstream.
27/4 8.27am	_	N	Y. GFC travelling upstream outside of culvert.
28/4 7.38am	-	N	Y. GFC travelling upstream outside of culvert.
29/4 8.33am	1 min 18 sec	N	Y. Travelling downstream.
29/4 5.30pm	-	N	Y. GFC travelling upstream outside of culvert.
1/5 9.47pm	10 sec*	Y – Male 2kg approx.	N
5/5 1.55am	3 sec*	Y – Male 1.2kg approx.	N
8/5 7.01pm	17 sec*	Y – Male 2.1kg approx.	N
9/5 9.18pm	13 sec*	Y – Male. Same individual as on 8/5.	N
* in these four cases, the time stated is the time in proximity to the scanner. The time in the culvert may have been longer. The direction of travel is unknown.			

When our expert, Todd Walsh, physically placed a GFC in the downstream end of the culvert, the GFC moved in an upstream direction through the culvert when the stone substrate base was present. This exercise was repeated later in the study when the stone substrate had been washed away. In this case the GFC was unable to gain purchase on the slippery bottom of the culvert: despite attempting to gain access he was repeatedly washed back out. Both of these episodes were captured by our cameras [Pictures 4 and 5].

Comment

Our observations show that GFC will move downstream through a culvert. Our suggestion is that with low water level and flow rate, GFC will move upstream through a culvert when a grippy substrate is present. However, an un-modified smooth, round culvert with similar water level and flow is an impediment to GFC attempting to travel upstream - the GFC is unable to gain sufficient traction to enable movement against the water flow.

Further study is needed to more fully understand the effects of varying water flow and depth, and substrate modifications, on GFC of different sizes as they attempt upstream movement.

Trial Sites 2 – 4 Modifications of Existing Culverts. Kentish Municipality.

At our other study locations, we are investigating additional problems and solutions for GFC use of existing culverts. One common problem is a perched culvert, where the culvert base at outfall is higher than the water level below. In these circumstances, we previously observed the GFC are unable to gain access to the culvert when travelling upstream. As a trial, we have designed and installed "ladders" made of different materials to see whether crayfish will climb up to the lip and enter the culvert.

We are also trialing different modifications to the inside of existing culverts to help crayfish when moving upstream. These could be retro-fitted in situations where an existing culvert presents a barrier to upstream movement.

Our trials with culvert modifications at sites two to four were hampered by extremely dry conditions during the first half of 2025, with little or no water flow during our trial period. We will continue to monitor these culverts and their modifications through the winter of 2025 and beyond, to see whether and to what extent they meet our project aims.

GFC Behaviour

We also believe that further use of monitoring equipment at our first trial site has potential to deepen understanding of the habits of the species more generally. For instance, all the scanned GFC moving through the culvert were mature males over 1kg. Why would that be the case? In consultation with Todd Walsh, we speculate that the males were travelling to seek mates. We believe that further trials have the capacity to shed light on this and other aspects of GFC behaviour. Additional recording of factors such as water temperature, air pressure, time of day/night, and lunar cycles will potentially provide more insights into the behaviour of GFC.

Conclusion and Further Trials

At this stage, our trials have confirmed that GFC will use a round, plastic culvert containing a stone substrate base for downstream travel. This base closely mimics the natural stream bed. It is suggested that GFC will also use such a "bedded-down" culvert when travelling upstream against a modest flow. However, in similar flow conditions, it appears impossible for them to move upstream through a bare, un-modified plastic culvert.

A primary objective in our continuing trials is to identify solutions which will assist GFC with their upstream movement through culverts. The solution must:

- be easy and cheap to install
- cause no adverse environmental impact
- not impede water flow
- be durable even through flood events.

The solution could be pre-fitted to a new culvert (perhaps even during manufacture) or retro-fitted to an existing culvert.

Our trials will also continue with other kinds of existing culverts (such as box concrete culverts) and modifications to both the entry and the interior.

We are mindful of the fact that other aquatic creatures, such as platypus, eels, fish, and rakali may experience similar problems with culvert use, and we believe our project also has relevance to them.

Notes:

1. Todd Walsh has permits to catch and release GFC for study purposes.

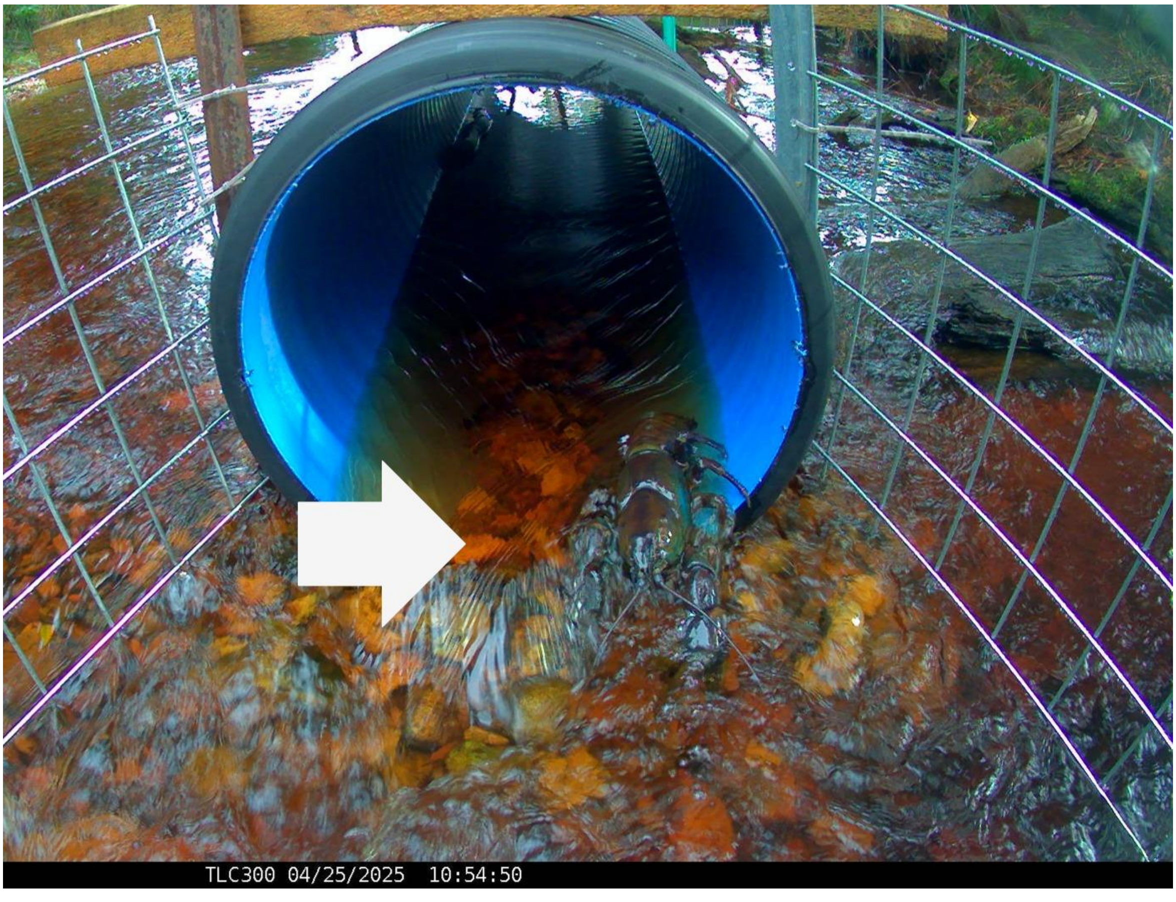
Threatened Fauna Permit	TFA 24202	Catch, tag, possess Genetic samples 60 GFC 10 tricornis & franklinii	NRE	21/10/2024	20/10/2025
Wildlife Display Permit	2500780	Display 3 GFC	NRE	21/04/2025	21/10/2025
IFS Exemption Permit	D25-50981	Astacopsis species	IFS	1/04/2025	31/03/2026

2. MRLC has chosen not to identify our study locations in order to protect GFC populations.
3. For the same reason, the landowners are not identified, even though they have been enthusiastic supporters of the project and an inspiration to us all.

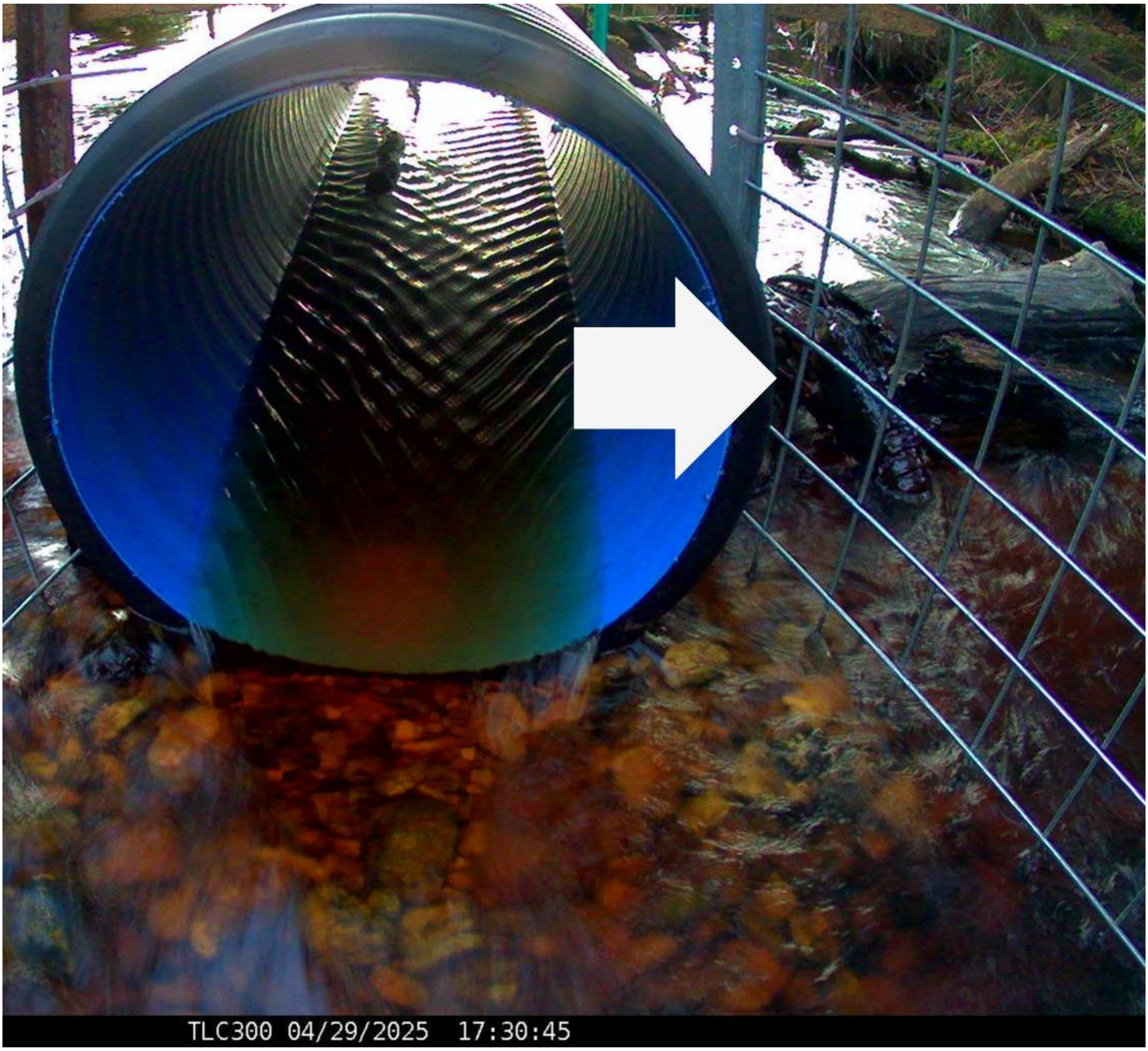
Mount Roland Land Care thanks Landcare Australia, Kentish Council, and the land-owners. We also extend special thanks to Todd Walsh for his assistance throughout this project. Additionally, we thank Fiona Marshall, Alastair Richardson, and Simon Roberts for sharing their expertise. We especially thank our wonderful volunteers who donated hundreds of hours of their time to make this project happen.

Picture 1. GFC Entering a Culvert Heading Downstream:

Picture 2: GFC Exiting a Culvert Heading Downstream:



Picture 3. GFC Bypassing Culvert When Heading Upstream:



Picture 4. Placed GFC Successfully Moving Upstream Inside a Culvert on Stone Base:

Picture 5. Placed GFC Unable to Gain Traction on Bare Culvert Base when Heading Upstream: