

Electro-fishing Survey

Sandy Bay Rivulet

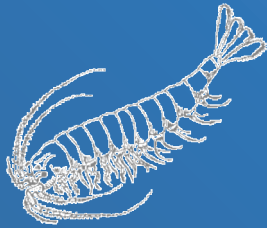
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Completed for:

The Friends of Sandy Bay Rivulet



By



The Waterbug Company Pty Ltd



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Cover Image: The fishway downstream of the Parliament Street crossing of Sandy Bay Rivulet.

Acknowledgements:

The Survey work was done with the assistance of Daniel Rhodes. Jonah Goldthorpe and Michelle Foale also assisted in the field and provided the images used in this report.

Context

Sandy Bay Rivulet was electro-fished previously in 2013. The survey was part of work associated with constructing a fish ladder under Parliament Street, which – at that stage – was culverted and a barrier to fish passage. Work shortly after also installed bio-baffles making the Parliament Street crossing less of an obstruction for fish. The 2013 Electro-fishing was conducted by Freshwater Systems, led by Dr Peter Davies. An additional outcome from this work was an interpretation sign in the adjacent park, which lists the fish in the rivulet. It was compiled with assistance from Freshwater Systems, and is paired with a flyer. Between them, these pieces of literature list the fish assemblage in the rivulet as:

- *Anguilla australis* (shortfin eel)
- *Pseudaphritis urvillii* (congolli, sandy, freshwater flathead)
- *Galaxias maculatus* (jollytail)
- *Galaxias truttaceus* (spotted galaxias)
- *Galaxias brevipinnis* (Climbing Galaxias)
- *Salmo trutta* (brown trout)

The three *Galaxias* species listed above can persist as landlocked populations, but usually require access to estuaries to spawn. They form the principal reason for the construction of the fish ladder and bio-baffles at the Parliament Street crossing.

Sampling Sites

Four sites were sampled. Initially these were going to be evenly spaced along the rivulet, but on the day of sampling it became apparent that the question of fish passage through the barriers at Parliament Street and The Southern Outlet was of more interest. Figure 1 shows the placement of the sampling sites in relation to the rest of the Sandy Bay Rivulet Catchment. Coordinates for these sites are listed in Table 1.

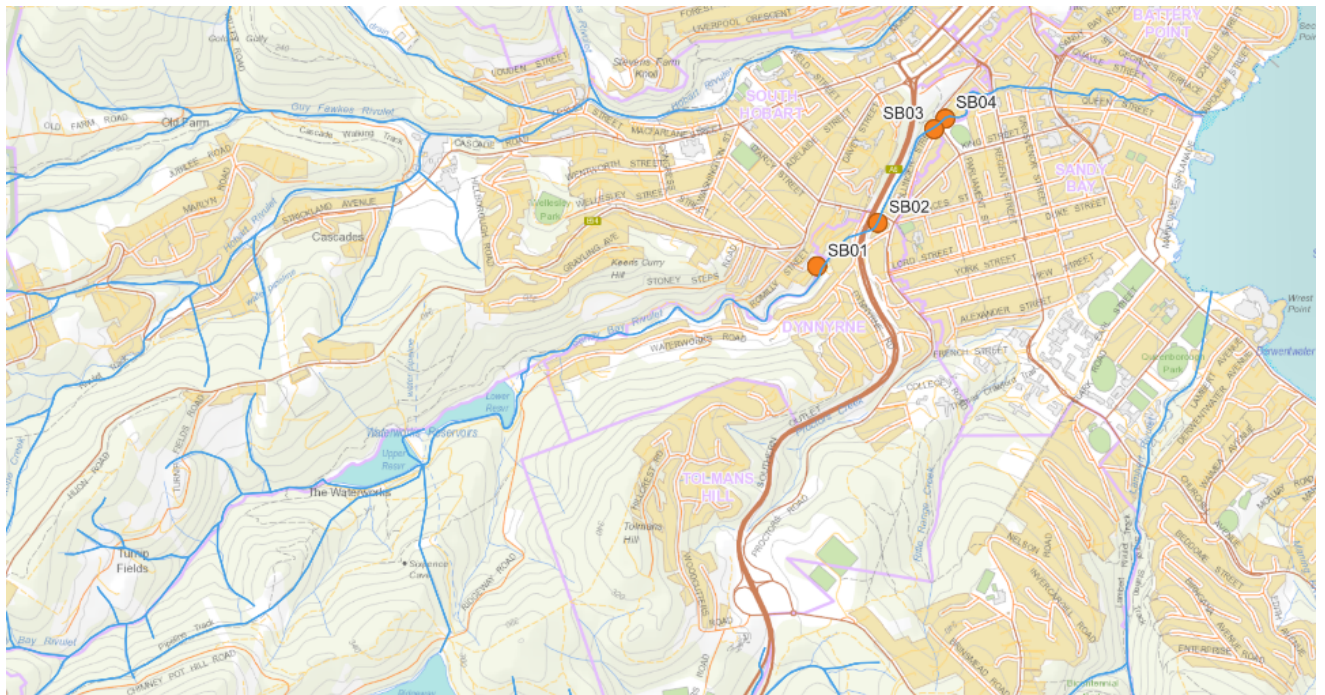


Figure 1 Four sites sampled as part of this survey. Context map is from LISTMAP Tasmania, Map assembled using QGIS.

Table 1 Coordinates for the sites sampled as part of the 2023 survey. Coordinate system is WGS 84

| Sitecode | Site name | Latitude | Longitude |
|----------|---------------------------------|--------------|-------------|
| SB01 | Upstream of Southern Outlet | -42.90030119 | 147.3130865 |
| SB02 | Downstream of Southern Outlet | -42.89857439 | 147.3163852 |
| SB03 | Upstream of Parliament Street | -42.89486753 | 147.3194334 |
| SB04 | Downstream of Parliament Street | -42.89444554 | 147.3200094 |

Sampling was conducted with a Smith-Root LR-20B backpack electro-fisher. Each site was sampled for a minimum of 20 minutes. Fish were batched into size classes to reduce handling times as fish in urban waterways are often unhealthy and more likely to respond poorly to sampling.

Survey Results

Five species of fish were recorded in this (2023) survey :

- *Anguilla australis* (shortfin eel)
- *Galaxias maculatus* (jollytail)
- *Galaxias truttaceus* (spotted galaxias)
- *Pseudaphritis urvillii* (congoli, sandy, freshwater flathead, tupong)
- *Salmo trutta* (brown trout)

Images of all these fish are in Appendix 1.

Table 2 shows the breakdown of size classes at each of the sites for the *Galaxias* spp. sampled. The survey didn't sample any *Galaxias brevipinnis* (Climbing Galaxias). Size classes are illustrated in Appendix 1.

Table 2 The size breakdown of the various fish species sampled at each of the sites. Size classes are: 1= juvenile, 2=intermediate, 3 =fully grown.

| Site | Size Class | | | |
|-------------------------------|------------|-----------|-----------|------------|
| Species | 1 | 2 | 3 | Totals |
| SB01 | 1 | 7 | 6 | 14 |
| <i>Galaxias maculatus</i> | 1 | 2 | 2 | 5 |
| <i>Galaxias truttaceus</i> | | 5 | 4 | 9 |
| SB02 | 43 | 8 | 12 | 63 |
| <i>Anguilla australis</i> | 2 | 1 | 1 | 4 |
| <i>Galaxias maculatus</i> | 37 | 5 | | 42 |
| <i>Galaxias truttaceus</i> | 4 | 1 | 1 | 6 |
| <i>Pseudaphritis urvillii</i> | | | 9 | 9 |
| <i>Salmo trutta</i> | | 1 | 1 | 2 |
| SB03 | 9 | 7 | 12 | 28 |
| <i>Anguilla australis</i> | 3 | 3 | | 6 |
| <i>Galaxias maculatus</i> | 5 | 3 | 2 | 10 |
| <i>Galaxias truttaceus</i> | 1 | 1 | 1 | 3 |
| <i>Pseudaphritis urvillii</i> | | | 9 | 9 |
| SB04 | 12 | 4 | 3 | 19 |
| <i>Galaxias maculatus</i> | 12 | 4 | 1 | 17 |
| <i>Galaxias truttaceus</i> | | | 1 | 1 |
| <i>Pseudaphritis urvillii</i> | | | 1 | 1 |
| Grand Total | 65 | 26 | 33 | 124 |

The Parliament Street crossing of Sandy Bay Rivulet was identified in 2013 as a barrier to fish passage, so a fish ladder was added (see cover for image). The Southern Outlet creates a barrier to fish passage (Figure 2).



Figure 2 the culvert under the Southern Outlet. The drop from the lip to the downstream pool was just over a meter at the time of sampling.

Figure 3 demonstrates the effect this has on local populations of *Galaxias maculatus*. Note the large number of small fish just downstream of the Southern Outlet crossing. These fish are unable to move upstream.

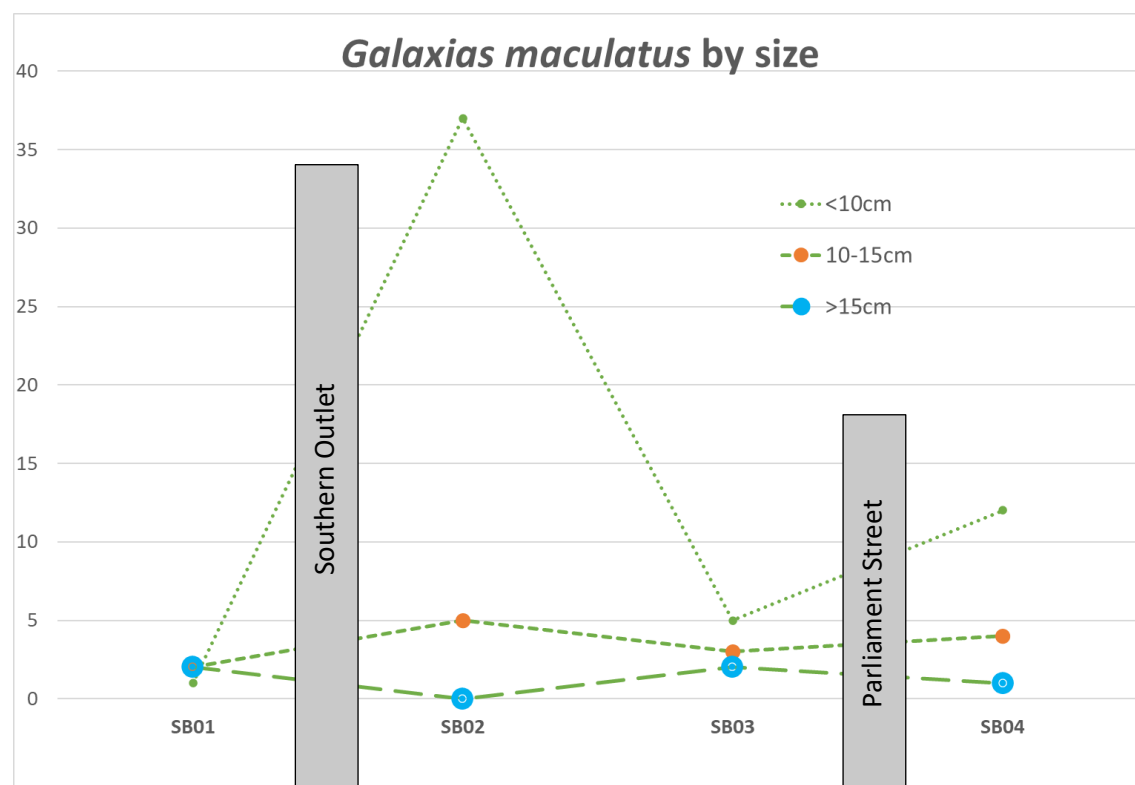


Figure 3 *Galaxias maculatus* numbers split by size class at the various sites along Sandy Bay Rivulet. Grey rectangles show the position of the rivulet crossings.

Figure 4 show the same for *Galaxias truttaceus*. The small numbers of fish sampled mean that this figure should be interpreted with caution. *G. truttaceus* shows similar patterns to *G. maculatus* but the most noticeable pattern while sampling was the dominance of a small number of very large fish upstream of the Southern outlet. These large fish had lesions on their skin despite being plump. This pattern is suggestive of a landlocked group of fish, stranded by the barrier present by the Southern Outlet and with their populations much reduced during the 2018 floods.

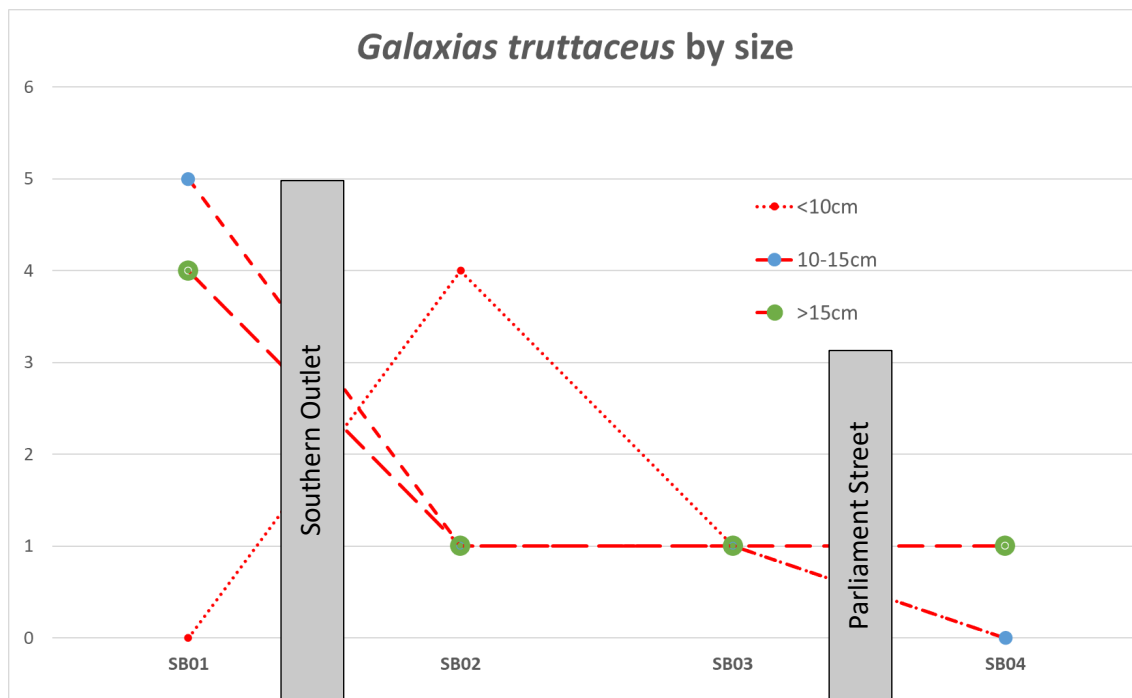


Figure 4 *Galaxias truttaceus* numbers split by size class at the various sites along Sandy Bay Rivulet. Grey rectangles show the position of the rivulet crossings.

Recommendation

This survey offers strong evidence that the culvert beneath the Southern Outlet is a barrier to fish passage. Modification of this structure to minimise the drop downstream of the culvert or perhaps introducing some sort of fish ladder would likely improve the chances of survival of fish populations in upstream sections of Sandy Bay Rivulet.

Bibliography:

Fulton, W. (1990), *Tasmanian Freshwater Fishes*, fauna of Tasmania handbook no.7, University of Tasmania. 80pp.

McDowall, R. M. (1996) *Freshwater Fishes of South-Eastern Australia*, 2nd ed. Reed Books, Sydney. 247pp.

Appendix 1.
Fish from Sandy Bay Rivulet



Galaxias maculatus (jollytail)

Size classes as referred to in the text:

- 1 = juvenile = <10cm
- 2 = intermediate = 10-15cm
- 3 = fully grown = >15cm



Galaxias truttaceus (spotted galaxias)

Size classes as referred to in the text:

- 1 = juvenile = <10cm
- 2 = intermediate = 10-15cm
- 3 = fully grown = >15cm



Pseudaphritis urvillii (congoli, sandy, freshwater flathead)



Anguilla australis (shortfin eel)



Salmo trutta (brown trout)