

Inland Fisheries Service

River Derwent Tagged Trout Trial
2021 to 2023



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Introduction

The River Derwent is situated in the south east corner of Tasmania and flows through the city of Hobart. It begins in the Central Highlands at Lake St Clair and stretches over 200km before eventually flowing into Storm Bay and the Tasman Sea. The estuary portion (influenced by tide) of the river starts approximately at New Norfolk. At some lower reaches, the river is nearly 3 km wide, making it the widest river in Tasmania, with a catchment area of approximately 9,000 km² (DEP 2020). The average depth in the area of interest from Bridgewater to New Norfolk varies from 1 to 5 m. The River Derwent and its tributaries is managed as a wild trout fishery and sustained through natural recruitment. Sea-run and resident brown trout are a prime target, with small numbers of rainbow trout and Atlantic salmon present. The most productive months to fish the River Derwent are from August until November, when resident and sea run trout chase migratory whitebait. The estuarine section of the river is described as the best black bream fishery in Australia. The habitat in the section of the river from Bridgewater to New Norfolk is a mixture of silt, reef, and cobble with patches of aquatic vegetation and macrophyte.

The Inland Fisheries Service (IFS) has attended meetings held by the Bridgewater Anglers' Association Inc (BAA) over the past few years. Club members have expressed concern at the apparent lack of trout in the upper Derwent Estuary, specifically in the area north of the Bridgewater Bridge. Recent discussions with BAA members about historical stockings of the River Derwent has led to this trial being undertaken.

The River Derwent is influenced by agriculture, animal farming, industry, development, and waste water, all of which have a direct impact on water quality. Consequently the upper Derwent Estuary is prone to excess algal growth, potentially influencing catch rates.

The IFS agreed to trial stocking trout into this section of the estuary in 2021 and 2022. Wild adult trout were used instead of fry, to decrease the level of natural mortality. The aim of the trial was to release tagged fish of catchable size to determine the return to anglers.

Survey Methodology

First release (2021-22)

Four hundred brown trout were tagged and released in two events. On 19 July 2021, 173 brown trout were collected from the spawning trap at Lake King William, and on 27 July 2021, 227 brown trout were collected from a spawning trap at Arthurs Lake. All fish were weighed, measured, their sex determined, and individually tagged with a single green t-bar tag. All fish were released near Green Island (512469E, 5266831N) on the day they were tagged and collected. The average weight and length of all 400 trout was 477 g and 347 mm respectively, consisting of 323 females and 77 males (Appendix 1). The largest fish released measured 468 mm, while the smallest fish was 255 mm (Appendix 1). The average condition factor was 1.13 k (Fair), with a minimum of 0.81 k (Poor) and maximum of 1.50 k (good) (Appendix 1).

Second release (2022-23)

On 1 July 2022, 400 brown trout, under 400 mm, were collected from the spawning traps at Arthurs Lake. All fish were weighed, measured, their sex determined and tagged individually with a single white T-bar tag.

All fish in this release were stripped of eggs and milt beforehand, to encourage them to stay in the stocked area. The average weight and length of fish from Arthurs Lake was 533 g and 364 mm respectively, consisting of 269 females and 131 males (Appendix 2). The largest fish released measured 400 mm, while the smallest fish was 230 mm (Appendix 2). The average condition factor was 1.08 k (Fair), with a minimum of 0.68 k (Poor) and maximum of 1.71 k (excellent) (Appendix 2). The fish were held in the spawning traps at Arthurs Lake for three days to allow recovery and then released near Green Island.

Recapture of tagged trout

Communications plan was developed which included a web story encouraging anglers to report tagged fish captures (Figure 1 and 2).

River Derwent tagged trout research

Published on July 29, 2021



A tagged wild adult brown trout being released into the River Derwent

We recently tagged 400 wild adult brown trout and released them into the River Derwent above Bridgewater. Each trout has a single green tag with a four-digit number. We are going to use these fish to investigate the movements and growth of brown trout in the River Derwent. They will also tell us how easy the trout are to catch.

For the next two years, if you catch one of these fish with a green tag, please tell us. Let us know the tag number, where you caught the fish, its length and weight.

Report tagged fish by email to infish@ifs.tas.gov.au or phone 1300 INFISH (130 463 474)

There is no need to release these fish, we just want to know if you catch one.

We are also keen to know how many other untagged trout are caught. If you fish the River Derwent for trout, please contact us and we will send you an IFS Tasmanian Inland Recreational Anglers Logbook. You can record your catch.

Now, do not confuse these tagged fish with the [Tasmanian Tagged Trout Promotion](#) fish, which have orange tags. The fish with orange tags are worth \$2000 each to the lucky angler who catches them. There are three fish with orange tags in the River Derwent.

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Figure 1. A screenshot of the website article detailing the first release (2021-22) of tagged trout into the River Derwent, posted on the IFS website

River Derwent tagged trout research - continued

Published on July 12, 2022



The wild brown trout involved in the River Derwent research have a white tag this year

For the 2022-23 angling season, we are continuing the tagged brown trout study in the River Derwent. Another 400 tagged wild adult brown trout have been released in the Dromedary area. This year each of the trout have a single white coloured tag with a four digit number.

We will continue to investigate the movements and growth of brown trout in the River Derwent. It will also tell us how easy the trout are to catch.

We would like anglers to report the capture of these tagged fish, noting the tag number, location captured and if possible the length and weight of the fish. We are also keen to know how many other untagged trout are caught. There is no requirement to keep or release these fish, we just want to know if you catch one, along with the tag number and location.

Report tagged fish via email: infish@ifs.tas.gov.au OR phone 1300 INFISH (130 463 474)

Last season 21 of the 400 tagged trout were reported. These brown trout had a single green coloured tag with a four digit number. We are also interested if you catch one these fish, so please record the same details as listed above.

See the link below for the results summary of last seasons tagged trout study:

[River Derwent trout study update \(ifs.tas.gov.au\)](https://ifs.tas.gov.au/river-derwent-trout-study-update)

For each green/white tag that is returned, your name will go into the draw for a Shimano graphite fishing rod and reel combo.

Please do not confuse these tagged fish with the Tasmanian Tagged Trout Promotion (another three have been released in the River Derwent), of which the tags are orange. These fish are worth \$2000 each to the lucky angler.

Please look out for the new FREE Angler Diary which will be added to the Infish App, 2.0 at the start of the brown trout season. We are interested in both tagged and untagged brown trout, so even if you haven't caught a tagged trout, recording your fishing information in the Angler Diary is great way of improving your fishing and will help us with managing the Tasmanian trout fishery!

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Figure 2. A screenshot of the website article detailing the second release (2022-23) of tagged trout into the River Derwent, posted on the IFS website

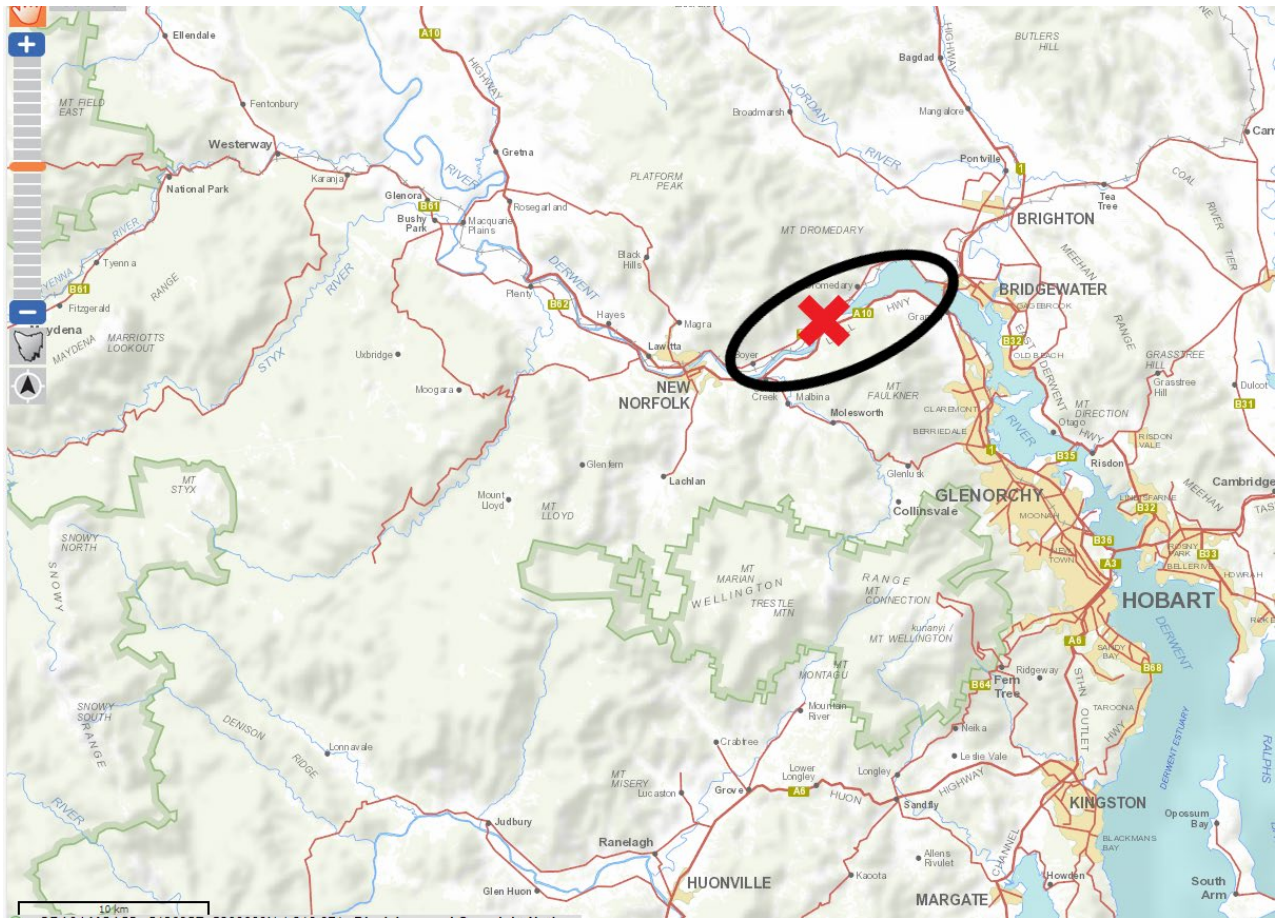


Figure 3. Map of the whole River Derwent. Note: Red cross denotes the release point of the tagged trout near Green Island, black oval denotes the area of concern (relating to low trout catch rates) north of the Bridgewater Bridge

Results

First release (2021-22)

Of the 400 tagged trout, 22 (6%) were recaptured by 20 anglers. The 22 tagged trout recaptured were in the size range of 330 to 470 mm, with no trout under 330 mm caught (Appendix 3). One angler caught three tagged fish, another caught two, and all other remaining anglers caught one tagged fish each. One tagged trout was caught twice during September by two different anglers, 18 days apart. The majority of recaptured tagged fish were caught within two months after release (Table 1), with very low numbers caught after that. The longest time at liberty for a tagged trout was 350 days, while the shortest time was 11 days (Table 2). Of the 22 tagged trout recaptured, 17 were caught upstream of the release point, three were caught downstream and two caught at the release site (Table 2, Figure 4 and 5). On average, the straight-line distance travelled by the recaptured tagged fish between the release site and recapture location was 8 km, with the majority of fish caught from the release location near Green Island, upstream to New Norfolk (Table 2). The furthest upstream movement of a tagged fish from the release site was 57 km, which was caught below Meadowbank Dam, while the furthest downstream movement was 5.7 km, with the fish recaptured at Bridgewater (Table 2, Figure 4 and 5).

Table 1. Monthly recaptures of tagged brown trout from the River Derwent for the first release event (2021-22)

	July	August	September	October	January	March	June	July	Total
No. of recaptured trout	Released	11	5	1	2	1	1	1	22

Table 2. Capture details of the 22 tagged trout recaptured from the first release event (2021-22)

Origin	Release date	Recapture date	Days at Liberty	Approx. distance between recapture and release location (km)	Original Length	Original Weight	Sex	Tag	Recapture Location	Wild trout caught	Landbased or Boat
Arthurs	27/07/2021	7/08/2021	11	6	334	370	F	3692	Boyer	3	Boat
Arthurs	27/07/2021	7/08/2021	11	6	356	480	M	3752	Boyer	0	Boat
Arthurs	27/07/2021	8/08/2021	12	6	430	760	M	3658	Boyer	0	Boat
Arthurs	27/07/2021	8/08/2021	12	9	468	980	M	3738	New Norfolk	6	Landbased
Arthurs	27/07/2021	9/08/2021	13	0	415	720	M	3842	Green Island	1	Landbased
King William	19/07/2021	13/08/2021	25	10	335	440	F	3626	New Norfolk	0	Boat
Arthurs	27/07/2021	14/08/2021	18	5	430	720	M	3726	Boyer	1	Boat
Arthurs	27/07/2021	22/08/2021	26	0	340	430	F	3864	Green Island	4	Landbased
King William	19/07/2021	22/08/2021	34	10	380	650	F	3643	New Norfolk	2	Landbased
Arthurs	27/07/2021	27/08/2021	31	9	379	620	F	3911	New Norfolk	0	Landbased
Arthurs	27/07/2021	29/08/2021	33	3	358	520	F	3815	Dromedary	6	Boat
Arthurs	27/07/2021	1/09/2021	36	12	370	520	M	3760	New Norfolk	5	Boat
Arthurs	27/07/2021	11/09/2021	46	6	351	400	M	3718	Bridgewater	1	Landbased
Arthurs	27/07/2021	13/09/2021	48	4	335	500	F	3660	Dromedary	3	Boat
King William	19/07/2021	15/09/2021	58	6	332	420	F	3862	Boyer	0	-
Arthurs	27/07/2021	16/09/2021	51	10	355	520	F	3863	New Norfolk	6	Boat
2nd Recapture	1/09/2021	19/09/2021	18	6				3760	Boyer	0	Landbased
Arthurs	27/07/2021	13/10/2021	78	4	375	530	M	3825	Boyer	1	Boat
Arthurs	27/07/2021	2/01/2022	159	57	362	570	F	3910	Meadowbank	9	Landbased
King William	19/07/2021	4/01/2022	169	12	370	570	F	3841	New Norfolk	0	Boat
King William	19/07/2021	29/03/2022	253	17	340	490	F	3910	Hayes	0	Landbased
Arthurs	27/07/2021	10/06/2022	318	2	362	590	F	3740	Dromedary	0	Landbased
Arthurs	27/07/2021	12/07/2022	350	2	338	400	F	3685	Dromedary	1	Boat

Note: Wild trout caught refers to any untagged trout caught during the fishing trip when the tagged fish was recaptured.

Of the 20 individual anglers who caught a tagged trout they also reported catching a total of 49 untagged (wild) brown trout and two Atlantic salmon (Table 2) on the days they caught a tagged trout. Of the 22 tagged fish recaptured, 12 were caught from a boat, while 10 were caught by land-based anglers (Table 2).

Tagged trout recaptured were caught by a range of methods, which includes bait (worms, pretty fish, and grubs), spinning with soft plastics and trolling lures (hardbodies and Tassie Devils). Recaptured tagged fish were kept by some anglers, while others chose to release them. There were also a range of reports of tagged fish being in poor condition while others reported fish in good condition.

While lengths and weights of fish were provided by some anglers, there was a mixture of actual and estimated measurements with varying degrees of accuracy, these records were therefore not included. Given the short time frames at liberty for most recaptures, the comparison of lengths and weights between release and recapture were not meaningful, consequently they were not assessed.

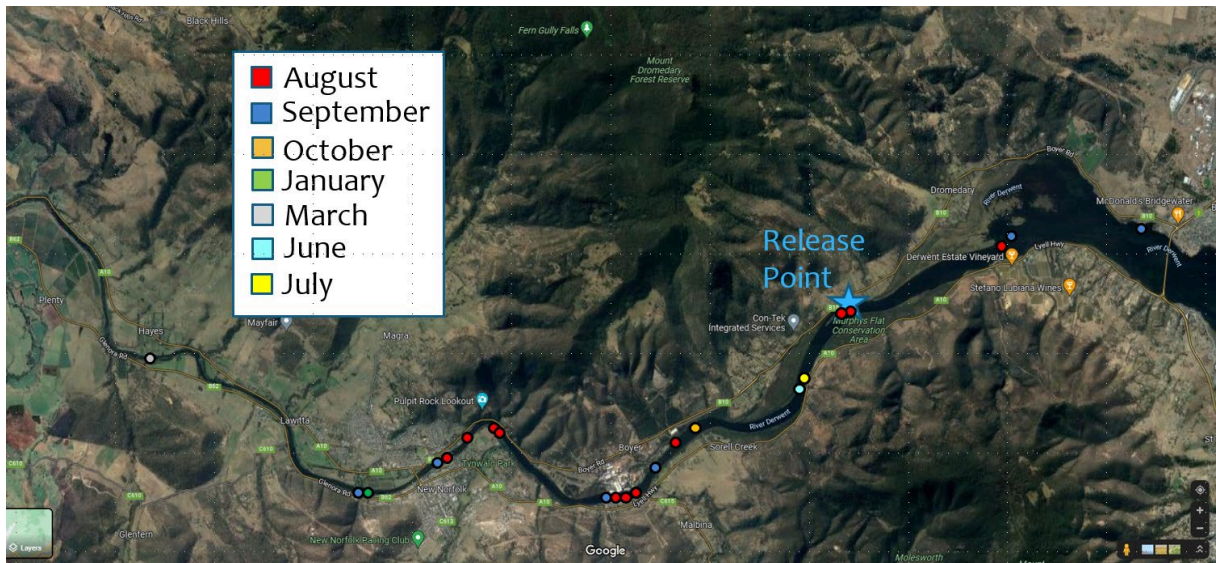


Figure 4. Monthly recaptures of tagged brown trout in the River Derwent (August 2021 to July 2022) after the first release

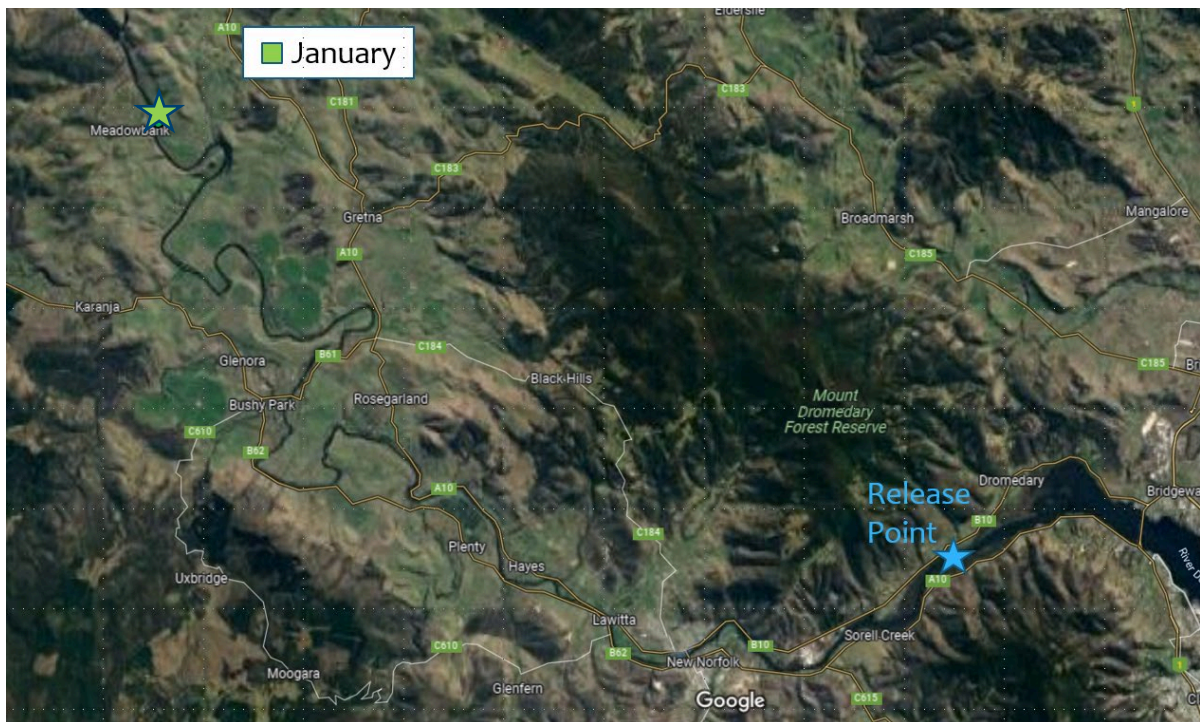


Figure 5. Monthly recaptures of tagged brown trout in the River Derwent (January 2022) after the first release, highlighting the recapture of a tagged trout 57km upstream at Meadowbank

Second release (2022-23)

Of the 400 tagged trout, 30 (8%) were recaptured by 25 anglers. The 30 tagged trout recaptured were in the size range of 345 to 400 mm (Appendix 4). Three tagged fish caught by three anglers, had no tag number recorded. Of these three, only one was included in the total summary that had sufficient supporting data. The other two anglers reported catching a tagged fish with no other information. Four anglers recaptured two tagged fish, one angler recaptured five tagged fish, while all other anglers caught one tagged fish each.

Table 3. Monthly recaptures of tagged brown trout from the River Derwent for the second release event (2022-23)

	July	July	August	September	September*	Total
No. of recaptured trout	Released	9	13	7	1	30

*September 2023

Table 4. Capture details of the 30 tagged trout recaptured from the second release event (2022-23)

Origin	Release date	Recapture date	Days at Liberty	Approx. distance between recapture and release location (km)	Length	Weight	Sex	Tag	Recapture Location	Wild trout caught	Landbased or Boat
Arthurs	1/07/2022	2/07/2022	1	0	-	-	-	-	Dromedary	12	Landbased
Arthurs	1/07/2022	8/07/2022	7	0	370	630	F	3549	Dromedary	0	Landbased
Arthurs	1/07/2022	24/07/2022	23	1	370	510	F	3373	Sorell Creek	0	Landbased
Arthurs	1/07/2022	24/07/2022	23	2	379	510	f	3480	Dromedary	0	Landbased
Arthurs	1/07/2022	24/07/2022	23	2	386	590	F	3414	Dromedary	1	Landbased
Arthurs	1/07/2022	29/07/2022	28	2	370	610	F	3619	Dromedary	2	Boat
Arthurs	1/07/2022	31/07/2022	30	6	345	490	f	3491	Boyer	0	Boat
Arthurs	1/07/2022	31/07/2022	30	1	360	510	F	3512	Sorell Creek	3	Boat
Arthurs	1/07/2022	31/07/2022	30	2	360	460	F	3683	Sorell Creek	1	Boat
Arthurs	1/07/2022	31/07/2022	30	1	375	550	F	3505	Dromedary	13	Boat
Arthurs	1/07/2022	3/08/2022	33	1	375	570	F	3576	Dromedary	0	Boat
Arthurs	1/07/2022	6/08/2022	36	12	380	570	M	3740	New Norfolk	1	Boat
Arthurs	1/07/2022	6/08/2022	36	16	391	640	F	3749	Hayes	0	Landbased
Arthurs	1/07/2022	6/08/2022	36	14	398	640	F	3710	Lawitta	3	Landbased
Arthurs	1/07/2022	7/08/2022	37	10	368	520	F	3454	Old Beach	0	Landbased
Arthurs	1/07/2022	7/08/2022	37	3	377	450	F	3761	Dromedary	0	Boat
Arthurs	1/07/2022	7/08/2022	37	11	390	630	M	3401	New Norfolk	5	Boat
Arthurs	1/07/2022	12/08/2022	42	12	349	450	f	3487	New Norfolk	9	Boat
Arthurs	1/07/2022	12/08/2022	42	12	372	580	F	3369	New Norfolk	0	Boat
Arthurs	1/07/2022	12/08/2022	42	12	399	720	f	3485	New Norfolk	0	Boat
Arthurs	1/07/2022	13/08/2022	43	0	400	580	M	3739	Dromedary	0	Boat
Arthurs	1/07/2022	29/08/2022	59	11	355	520	M	3613	New Norfolk	0	Boat
Arthurs	1/07/2022	29/08/2022	59	14	372	550	F	3411	Lawitta	5	Boat
Arthurs	1/07/2022	3/09/2022	64	0	380	650	F	3311	Dromedary	3	Landbased
Arthurs	1/07/2022	9/09/2022	70	2	345	470	F	3532	Dromedary	1	Landbased
Arthurs	1/07/2022	9/09/2022	70	0	399	630	M	3531	Dromedary	3	Boat
Arthurs	1/07/2022	13/09/2022	74	3	400	580	M	3675	Dromedary	0	Boat
Arthurs	1/07/2022	19/09/2022	80	3	385	570	m	3428	Dromedary	0	Landbased
Arthurs	1/07/2022	24/09/2022	85	7	375	550	F	3473	Boyer	5	Boat
Arthurs	1/07/2022	29/09/2022	90	10	380	590	F	3625	New Norfolk	1	Boat
Arthurs	1/07/2022	23/09/2023	449	2	380	600	F	3371	Dromedary	0	Boat

Like 2021-22, the majority of recaptured tagged fish were caught within the first two months after release, with slightly less caught in the third month (Table 3). The longest time at liberty for a tagged trout was 449 days, while the shortest time was one day (Table 4). Of the 30 tagged trout recaptured, 21 were caught upstream of the release point, five were caught downstream, and five caught at the release site (Table 4 and Figure 6 and 7). On average, the straight-line distance travelled by the recaptured tagged fish between the release site and recapture location was 6 km, with the majority of fish caught from the release location at Dromedary upstream to New Norfolk (Table 4). The furthest upstream movement of a tagged fish from the release site was 16 km to Windsor Corner at Hayes, while the furthest downstream movement was 10 km to Old Beach (Table 4, Figure 6 and 7).

The 25 individual anglers who caught a tagged trout, also reported catching a total of 68 untagged wild brown trout (Table 4). Of the 30 tagged fish recaptured, 20 were caught from a boat, while 11 were caught by land-based anglers (Table 4).

Tagged trout were caught by a range of methods including, bait (sandies), spinning (soft plastics and hard bodies), trolling lures (hard bodies, Tassie Devils, and wobblers), and wet flies. Of the 30 fish recaptured, 18 were kept and 12 released. There were also a range of reports of tagged fish being in poor condition while others reported fish in good condition. Lengths and weights of fish provided by some anglers, was a mixture of actual and estimated measurements with varying degrees of accuracy, these records were therefore not included. Given the short time frames at liberty for most recaptures, the comparison of lengths and weights between release and recapture were not meaningful, consequently they were not assessed.



Figure 6. Monthly recaptures of tagged brown trout in the River Derwent (July 2022 to September 2023) after the second release

*September 2023

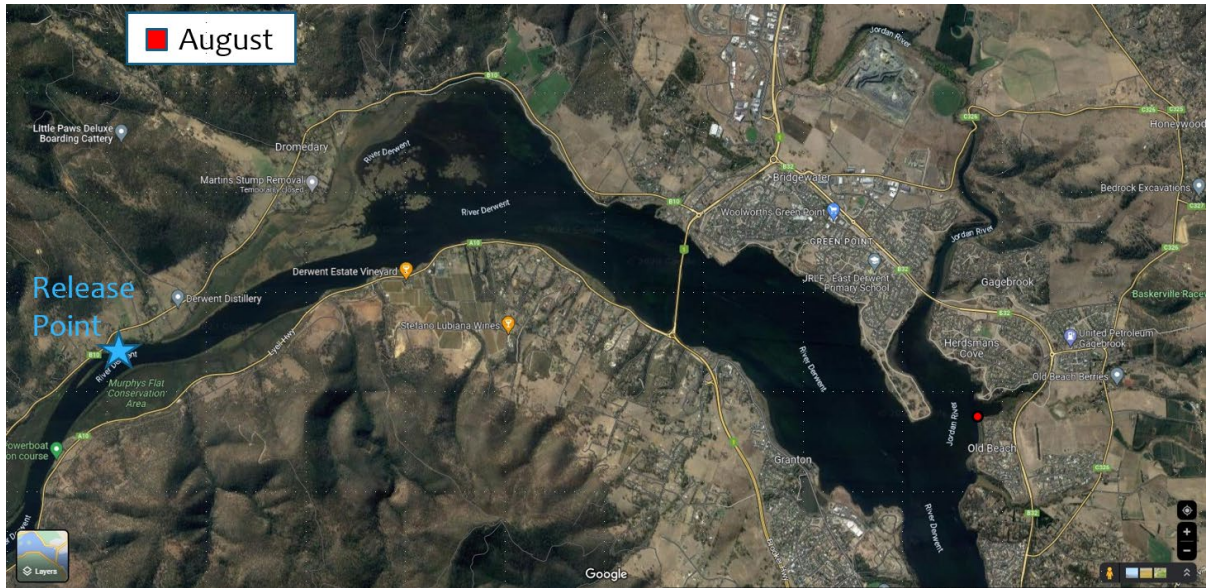


Figure 7. Monthly recaptures of tagged brown trout in the River Derwent (August 2022) after the second release, highlighting the recapture of a tagged trout 10km downstream at Old Beach

Discussion

The proportion of tagged trout recaptured by anglers for both release events was relatively low, with 6 per cent for the first event and 8 per cent for the second event. The low recapture rate could be due to the large size of the River Derwent system, therefore the fish are able to disperse quickly over a large area of water. The highest concentration of angling effort is from New Norfolk to the Bridgewater Bridge. The higher catch rates of trout in the first two months is likely due to their increased catchability after release, and time for dispersal. Late winter and spring are traditionally ideal times to fish for trout, in particular sea run brown trout as they move up the river chasing annual migrations of whitebait, lamprey and elvers. As the run of these prey species finishes, catch rates generally decline, therefore the decrease in recapture rates of tagged trout later in the year is due to decreased fishing effort.

The higher catch rate of recently released fish in a water which has a small population of resident trout, means the tagged trout should make up a higher proportion of the catch. For every tagged trout, there were two untagged brown trout caught during the same fishing trip. To better understand how the trial improved the overall catch for anglers, a detailed record of all fish caught through the season is required.

Additional creel data collected by IFS fisheries officers and fishing club competition data for 2021-23 showed that 380 untagged brown trout were caught by anglers with no tags reported. This suggests a large trout population in the River Derwent and that the tagged fish have not significantly contributed to the overall catches of anglers.

The majority of recaptured tagged trout were caught upstream of the release location. This could be due to a number of factors. The furthest movement by a tagged trout was 57 km upstream, while the longest time at liberty was 449 days. It is likely that the tagged trout dispersed quite widely throughout the river system and therefore the likelihood of capture decreases over time.

There was no significant difference in catch rates between the two releases with no apparent advantage stripping and holding fish for three days.

The most likely reason for poor anglers catches in the river above Bridgewater, is seasonal algal blooms. This can cause severe oxygen depletion, which can then adversely affect fish and aquatic vegetation (DEP 2020). There have been numerous fish kills reported in the River Derwent. In the summer of 2015-16 and 2016-17 dense macroalgal blooms occurred, resulting in smothering rafts of decaying algae (DEP 2020). Thousands of juvenile barracouta (*Thyrsites atun*) were found dead as a result (DEP 2020). These environmental factors can negatively influence trout densities at certain times of the year. The reported lower catches of trout in these sections of the river is likely due to these environmental factors. Stocking additional fish into the River Derwent Estuary is unlikely to significantly increase catch rates for anglers.

Recommendations

- Future stocking of trout into the River Derwent is not supported.
- Monitor angling effort and harvest in the River Derwent through angler feedback, creel checks, IFS Angler Diary and the IFS annual postal survey.
- Advocate and support for continued improvement of water quality within the Derwent Estuary.

References

- I. DEP (2020). State of the Derwent estuary — 2020 update. An update and review of environmental data and activities, U. Taylor, S. Whitehead, I. Visby, A. Weller-Wong and B. Proemse, Derwent Estuary Program (Hobart, Australia)

Appendix

Appendix 1: Length, weight, and condition factor for all tagged trout from the first release (2021-22 season)

Grouping	Measurement	Mean	Minimum	Maximum
All Trout n=400	Length (mm)	347	255	468
	Weight (g)	477	200	1,050
	Condition Factor (K)	1.13	0.81	1.50
Male n=77	Length (mm)	366	255	468
	Weight (g)	530	200	1,050
	Condition Factor (K)	1.06	0.91	1.36
Female n=323	Length (mm)	343	255	425
	Weight (g)	465	230	850
	Condition Factor (K)	1.15	0.81	1.50

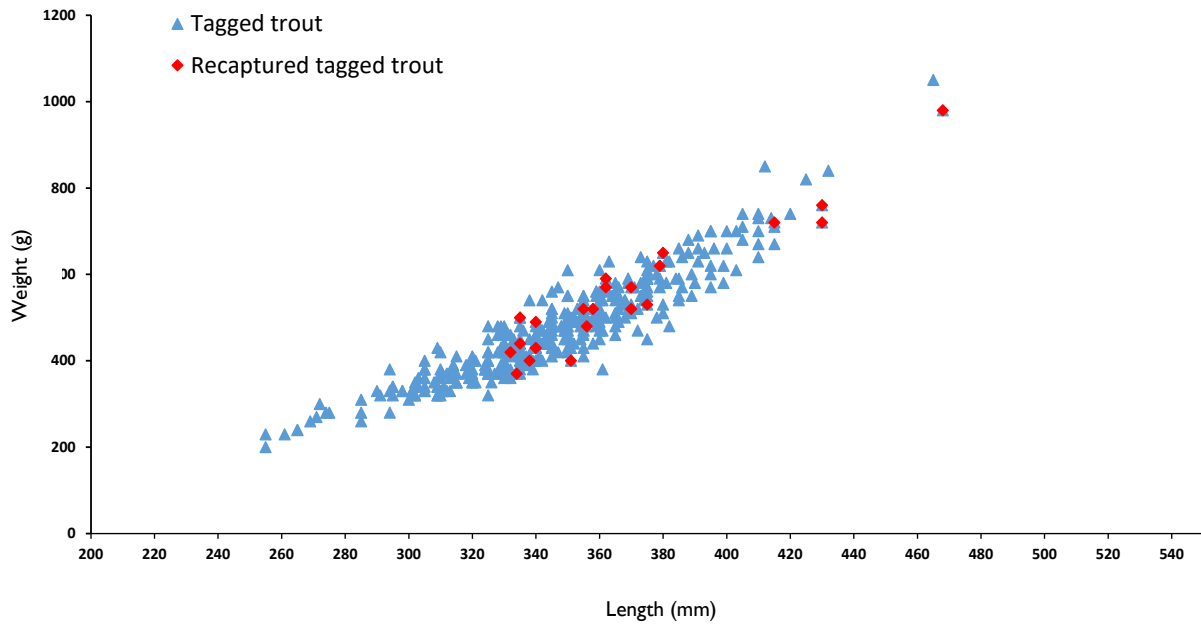
Condition factor categories are as follows: poor- 0.5 to 0.99, fair- 1.0 to 1.19, good- 1.2 to 1.59, excellent- 1.6 to 1.8.

Appendix 2: Length, weight, and condition factor for all tagged trout from the second release (2022-23 season)

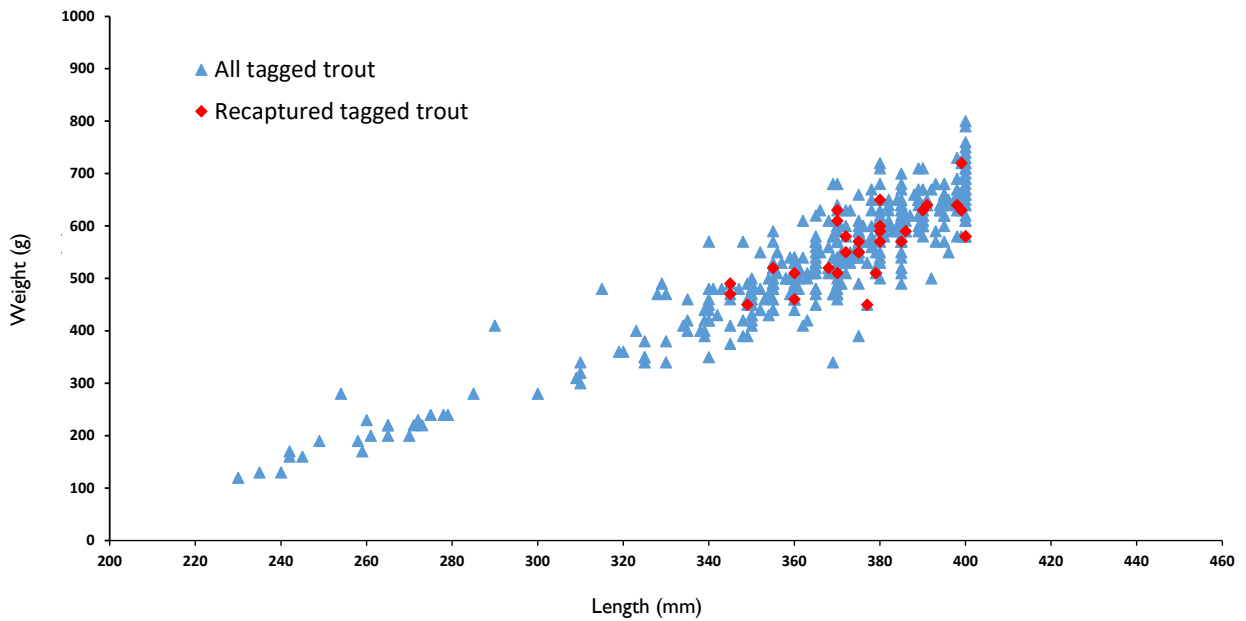
Grouping	Measurement	Mean	Minimum	Maximum
All Trout n=400	Length (mm)	364	230	400
	Weight (g)	533	120	800
	Condition Factor (K)	1.08	0.68	1.71
Male n=131	Length (mm)	353	230	400
	Weight (g)	483	120	760
	Condition Factor (K)	1.06	0.68	1.71
Female n=269	Length (mm)	370	285	400
	Weight (g)	558	280	800
	Condition Factor (K)	1.09	0.74	1.45

Condition factor categories are as follows: poor- 0.5 to 0.99, fair- 1.0 to 1.19, good- 1.2 to 1.59, excellent- 1.6 to 1.8.

Appendix 3: Length/weight scatterplot for all tagged trout and recaptured tagged trout for the first release (2021-22)



Appendix 4: Length/weight scatterplot for all tagged trout and recaptured tagged trout for the second release (2022-23)





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