Inland Fisheries Service

Wild Rainbow Trout Management 2022

Inland Fisheries Service

Tasmanian Government

Contents

Title:	Inland Fisheries Service Wild Rainbow Trout Management 2022
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Introduction

The Inland Fisheries Service (IFS) recognises the value of maintaining wild fisheries as they are best suited to our environment and provide a much sought-after angling experience. We only stock waters when wild populations are not adequately maintained by natural recruitment, and we use wild fish whenever possible. Stockings are guided by the *Tasmanian Inland Recreational Fishery Management Plan 2018-28* and risk assessments for each water.

Wild rainbow trout spawning runs 2022

We use fish traps at yingina / Great Lake and Lake King William to monitor and enhance the wild rainbow trout fishery.

Table 1. Total captures of rainbow trout, Liawenee (Great Lake) and River Derwent (Lake King William) traps 2015-22.

Trap	2022	2021	2020	2019	2018	2017	2016	2015
Liawenee Canal – yingina / Great Lake Est. 2006	5,402	2,310	923	988	1,093	349	587	540
Sandbanks Creek – yingina / Great Lake Est. 2015	189	0	0	0	0	0	0	19
River Derwent – Lake King William Est. 2016	112	15	0	0	0	0	0	0

Background

At Liawenee Canal, rainbow trout captured in the fish trap are counted, sorted by sex and moved into purpose built spawning channels away from the brown trout. This enhances spawning success and increases recruitment to the yingina / Great Lake fishery. A fry trap on the spawning channel allows the counting of fry and monitoring of recruitment. The trap also provides access to rainbow trout fry for stocking wild rainbow trout fisheries if required.

The Sandbanks Creek fish trap can be used to monitor rainbow trout spawning runs in yingina / Great Lake. This fish trap is however, restricted by inconsistent flows relating to rainfall in the catchment. Rainbow trout caught in the Sandbanks Creek trap are given access to the upstream spawning grounds.

The River Derwent fish trap at Lake King William, can be used during the rainbow trout spawning run when conditions are favorable. The lake level at Lake King William often floods the River Derwent fish trap during spring. This year was only the second year since the trap was built in 2016, that lake levels allowed the trap to operate during the rainbow trout spawning run.

Wild rainbow trout caught in traps

yingina / Great Lake – Liawenee Canal

Since 2015, rainbow trout entering the Liawenee Canal trap have been counted. During 2022, a total of 5,402 fish were counted. This is the most fish since monitoring commenced (Table 1 and Figure 1).

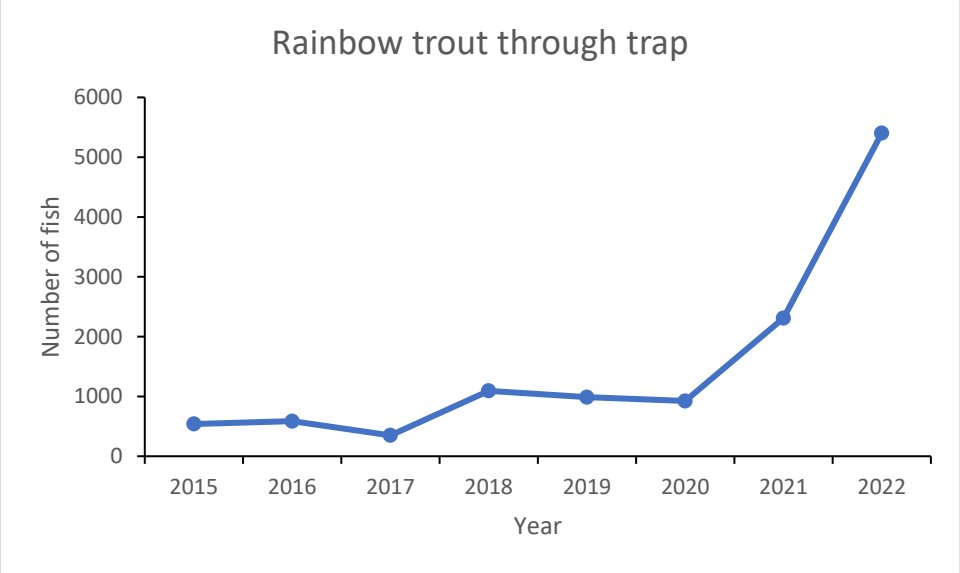

Figure 1. Total counts of rainbow trout, Liawenee trap 2015-22.

This year the Liawenee Canal trap was opened on 31 August. Liawenee Canal had good flows for the entirety of the rainbow trout spawning run. The trap was closed on 2 November. A total of 5,402 rainbow trout were captured over the entire run, consisting of 2,578 males and 2,824 females. In comparison to 2021, this total represents a 133 percent increase (Figure 1).

Figure 2 and 3, shows the number of rainbow trout counted through the Liawenee trap relating to canal (river) flows and water temperature, respectively. When interpreting these figures its necessary to account for the delay between the fish moving into the fish trap and when they are counted as they are removed. There appears to be a correlation between the flow in the canal and the number of fish moving into the fish trap (Figure 2). Peaks in the number of fish counted in the trap tend to occur after a period of increased flow. The number of rainbow trout counted through the trap generally decreased with the longer-term increase in water temperature. However, this is most likely related to a waning in numbers toward the end of the spawning run rather than responding to increasing temperature (Figure 3).

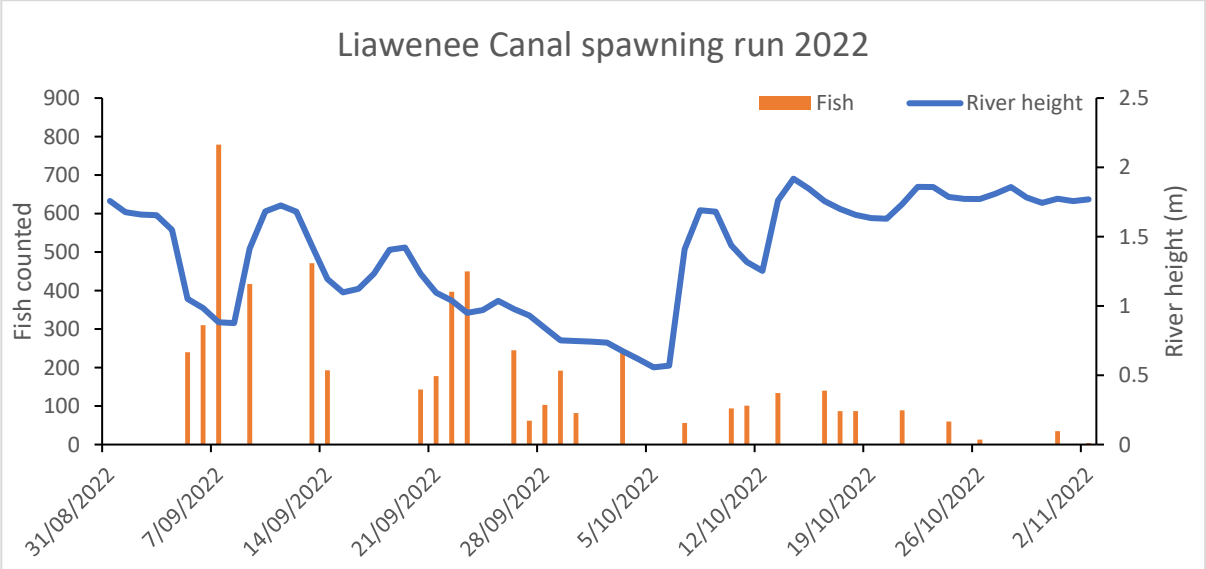

Figure 2. Number of rainbow trout captured in the Liawenee Canal trap (counted when they were removed from the trap), and river height for Liawenee Canal, August to November 2022.

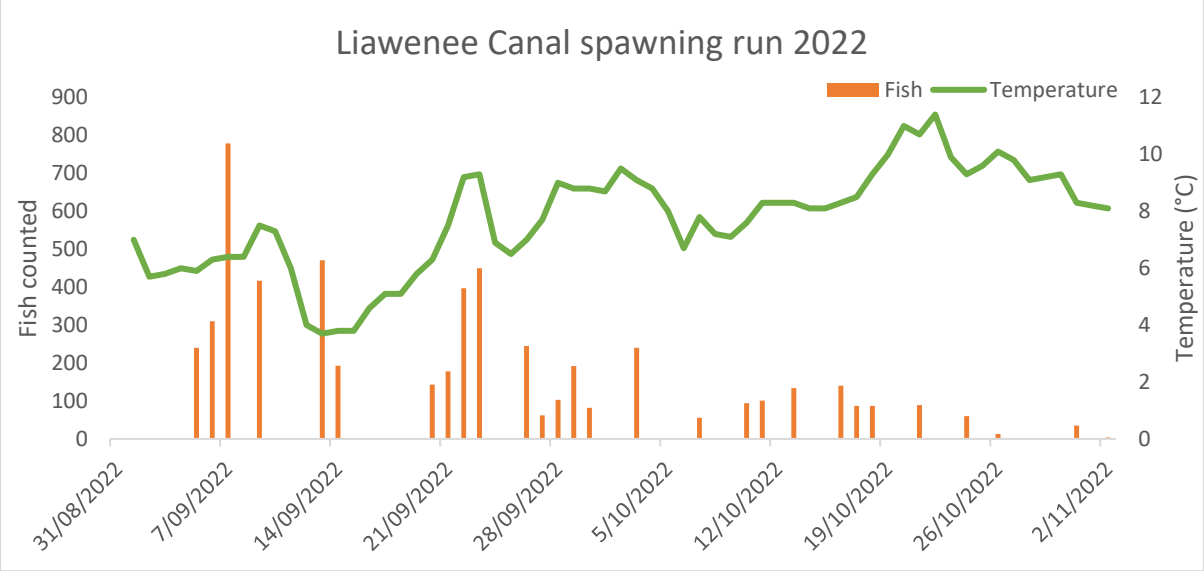

Figure 3. Number of rainbow trout captured in the Liawenee Canal fish trap (counted when they were removed from the trap), and water temperature for Liawenee Canal trap, August to November 2022.

River Derwent trap - Lake King William

This year the River Derwent trap was opened on 31 August and closed on the 31 of October. The trap caught a total of 112 rainbow trout consisting of 41 males and 71 females. All fish were weighed and measured. The first 87 of these fish were transferred to Penstock Lagoon, the remaining 25 were released into the River Derwent above the trap.

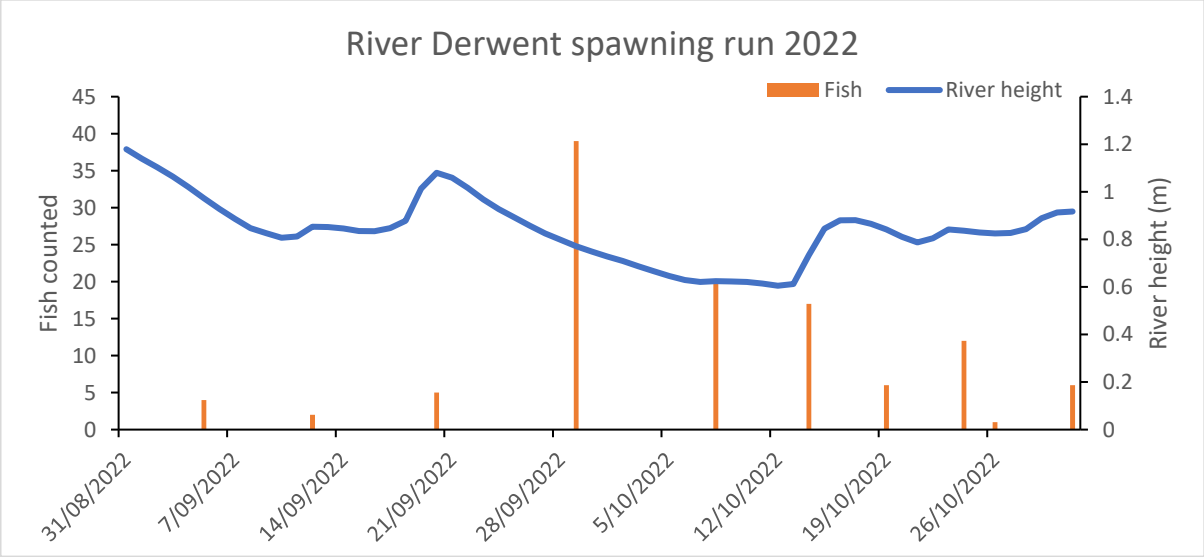

Figure 4. Number of rainbow trout captured in the River Derwent trap (counted when they were removed from the trap), and river height for River Derwent, August to November 2022.

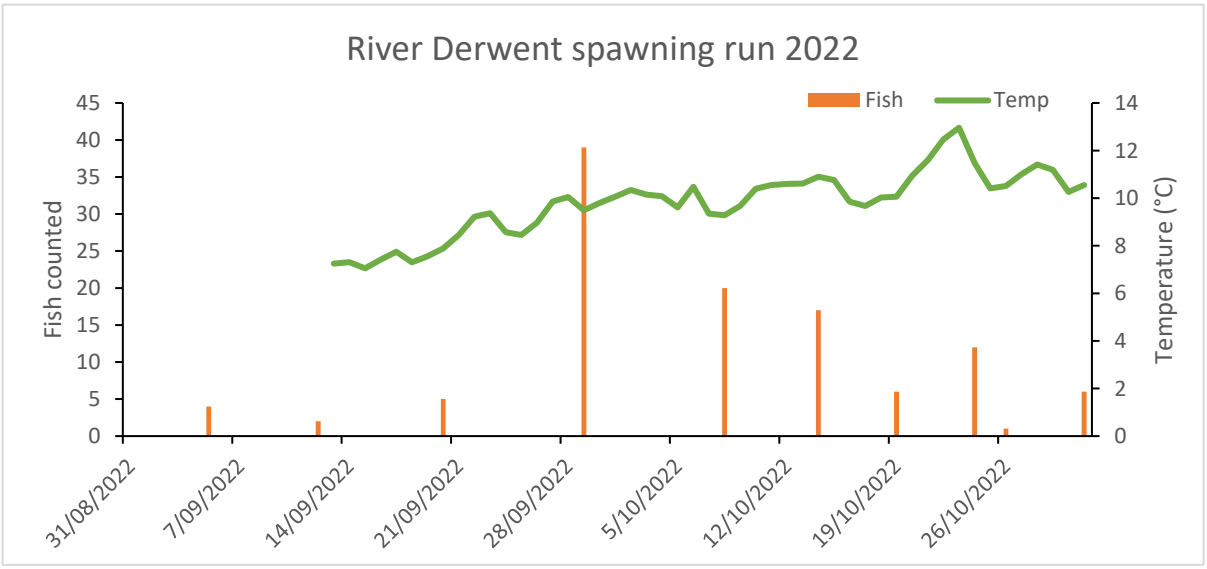

Figure 5. Number of rainbow trout captured in the River Derwent trap (counted when they were removed from the trap), and water temperature for River Derwent trap, August to November 2022.

Figure 4 and 5, shows the number of rainbow trout counted through the River Derwent trap relating to river flows and water temperature, respectively. There appears to be no significant correlation between the flow in the Derwent River and the number of fish moving into the fish trap (Figure 4). The number of rainbow trout counted through the trap generally decreased with the longer-term increase in water temperature. Similar to Liawenee Canal, this is related to a decrease in numbers toward the end of the spawning run (Figure 5).

Sandbanks Creek – yingina / Great Lake

This year the Sandbanks Creek trap was opened on 2 September and closed on the 1 November. The trap caught a total of 189 rainbow trout consisting of 85 males and 104 females. All were weighed, measured and released into Sandbanks Creek above the trap.

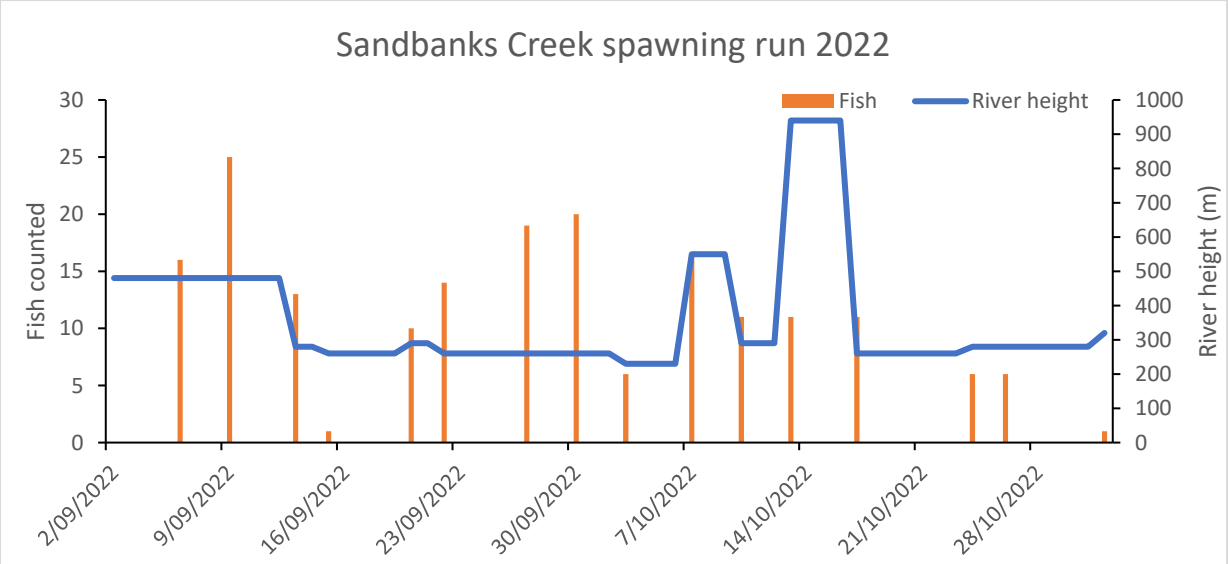

Figure 6. Number of rainbow trout captured in the Sandbanks Creek trap (counted when they were removed from the trap), and river height for Sandbanks Creek, August to November 2022.

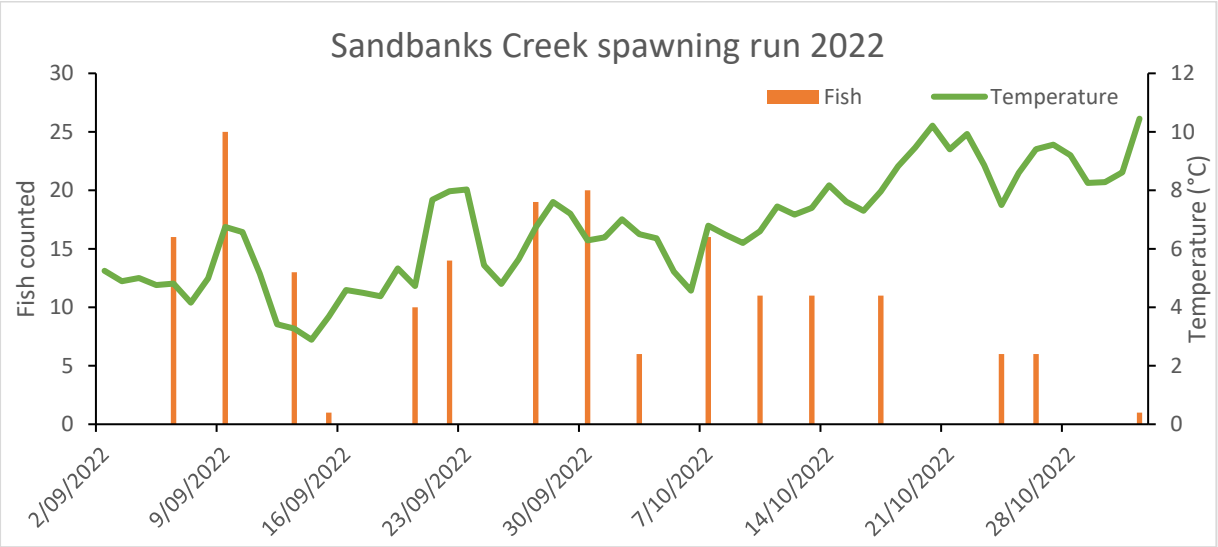

Figure 7. Number of rainbow trout captured in the Sandbanks Creek trap (counted when they were removed from the trap), and water temperature for Sandbanks trap, August to November 2022.

Similar to the River Derwent fish trap, there was no link between river flows and fish numbers or temperature.

Weigh and Measure Information

Tables 2 – 4 and figures 8 – 13 show the summary data for all rainbow trout weighed and measured at Liawenee Canal, Sandbanks Creek and the River Derwent fish traps. Rainbow trout from the Sandbanks Creek trap on average were marginally longer and heavier than Liawenee Canal. The length/weight plot and length frequency histogram for both traps were however similar.

Only 112 rainbow trout were weighed and measured at the River Derwent trap. This represented all the rainbow trout caught in the trap for the duration of the spawning run.

yingina / Great Lake – Liawenee Canal weigh and measure results

Table 2. Summary of measurements for rainbow trout from the Liawenee trap, 14 September 2022.

Grouping	Measurement	Mean	Minimum	Maximum
All Trout n=200	Length (mm)	457	336	515
	Weight (g)	1,047	420	1,470
	Condition factor	1.1	0.9	1.4
Male n=100	Length (mm)	457	336	515
	Weight (g)	1,015	420	1,440
	Condition factor	1.1	0.9	1.2
Female n=100	Length (mm)	457	395	495
	Weight (g)	1,080	680	1,470
	Condition factor	1.1	0.9	1.4

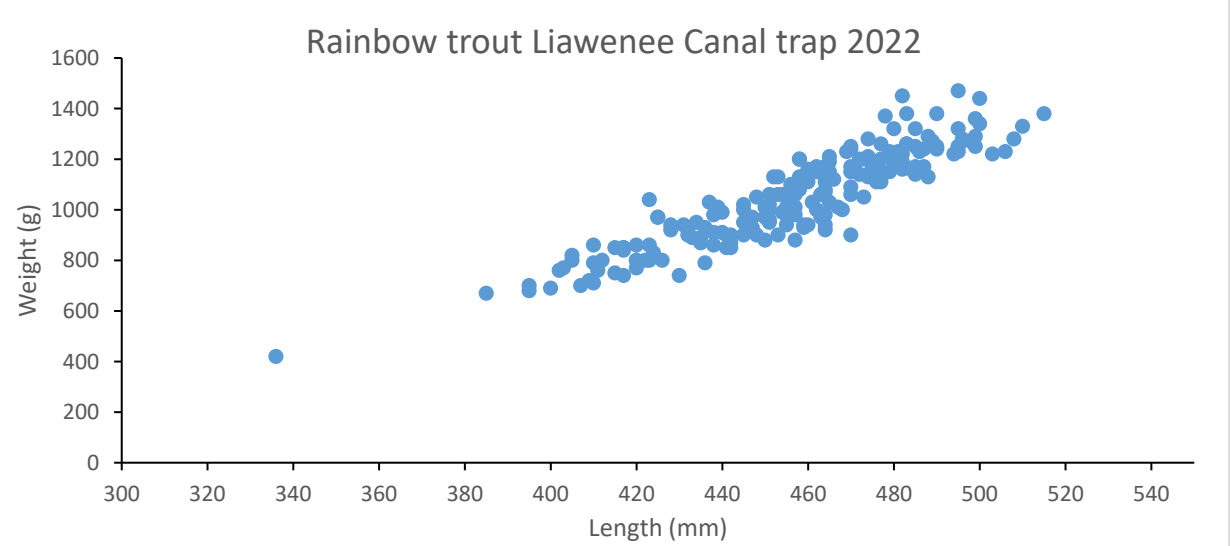

Figure 8. Length vs weight plot for rainbow trout from Liawenee Canal trap, 14 September 2022.

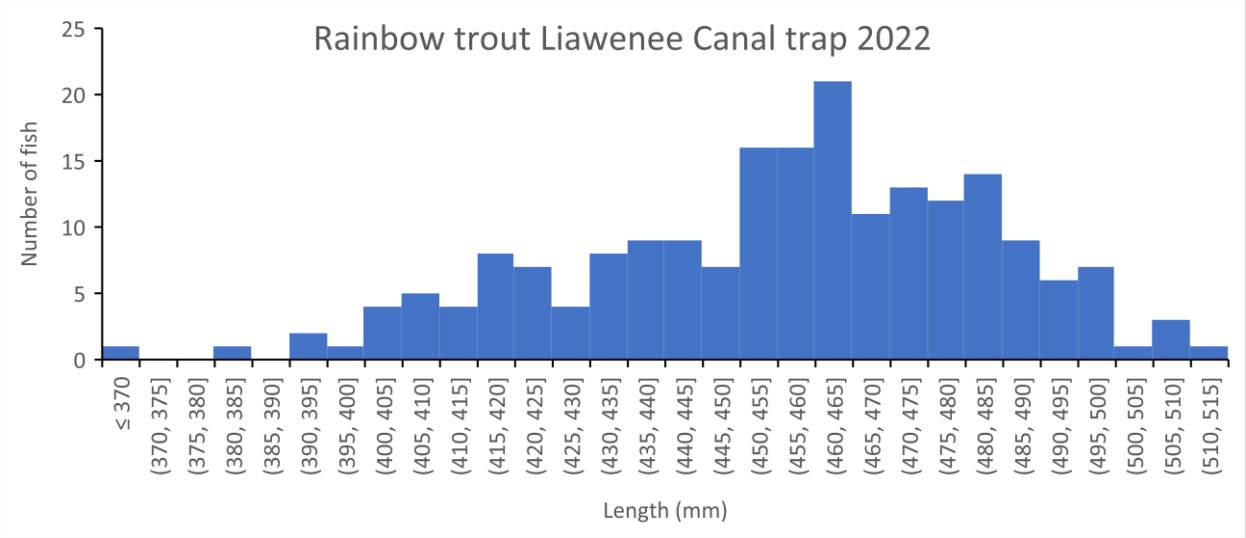

Figure 9. Length frequency histogram for rainbow trout measured from the Liawenee Canal trap, 14 September 2022.

River Derwent - Lake King William weigh and measure results

Table 3. Summary of measurements for rainbow trout from River Derwent trap from 5 September to 31 of October 2022.

Grouping	Measurement	Mean	Minimum	Maximum
All Trout n=112	Length (mm)	354	213	465
	Weight (g)	510	100	980
	Condition factor	1.10	0.76	1.61
Male n=41	Length (mm)	346	213	441
	Weight (g)	483	100	980
	Condition factor	1.08	0.89	1.46
Female n=71	Length (mm)	359	297	465
	Weight (g)	526	260	850
	Condition factor	1.11	0.76	1.61

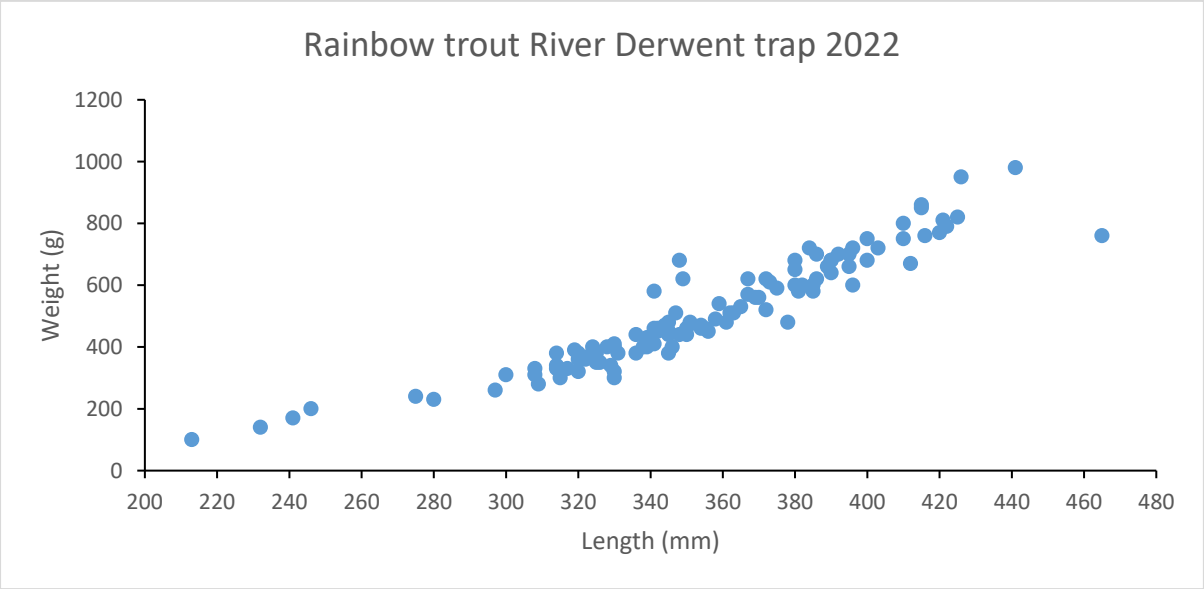

Figure 10. Length vs weight plot for rainbow trout measured in the River Derwent trap 5 September to 31 of October 2022.

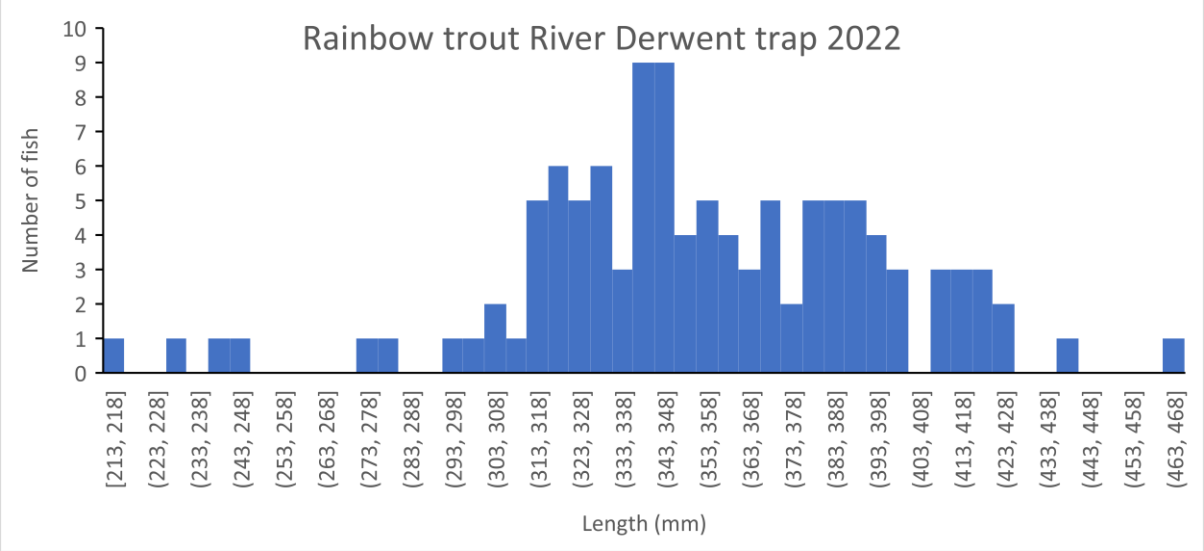

Figure 11. Length frequency histogram for rainbow trout measured in the River Derwent trap from 5 September to 31 October 2022.

Sandbanks Creek – yingina / Great Lake weigh and measure results

Table 4. Summary of measurements for rainbow trout from Sandbanks Creek trap from 6 September to 1 November 2022.

Grouping	Measurement	Mean	Minimum	Maximum
All Trout n=189	Length (mm)	461	0	557
	Weight (g)	1,067	0	1,530
	Condition factor	1.1	0.7	1.6
Male n=85	Length (mm)	465	330	519
	Weight (g)	1,074	580	1,530
	Condition factor	1.1	0.8	1.6
Female n=104	Length (mm)	457	391	557
	Weight (g)	1,059	760	1,450
	Condition factor	1.1	0.7	1.3

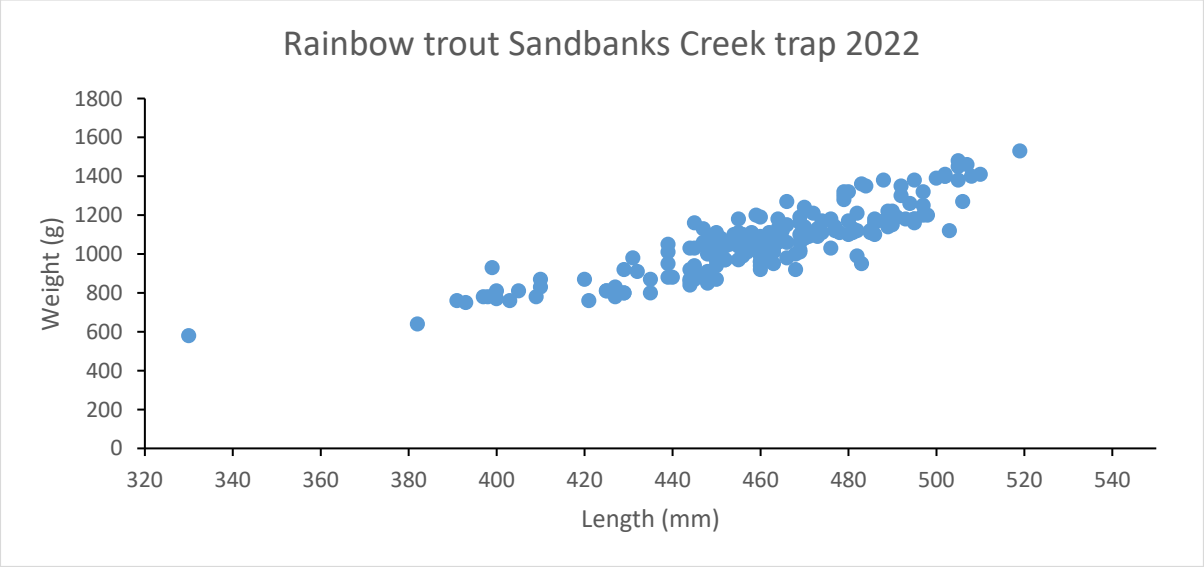

Figure 12. Length vs weight plot for rainbow trout measured in the Sandbanks Creek trap from 6 September to 1 November 2022.

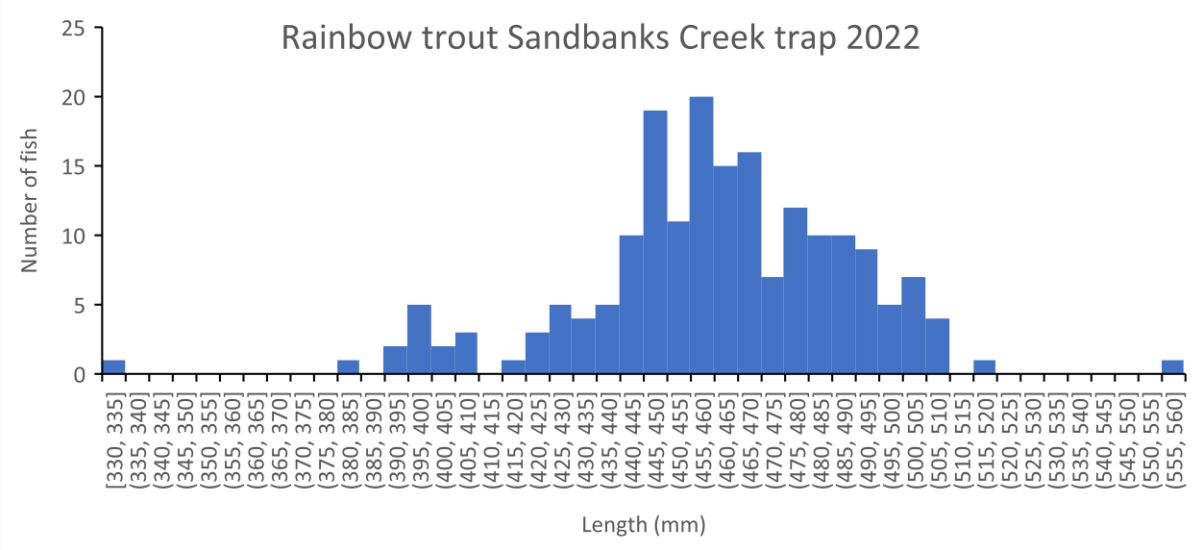

Figure 13. Length frequency histogram for rainbow trout measured in the Sandbanks Creek trap from 6 September to 1 November 2022.

Fry trapping in the Liawenee Southern Zigzag Channel

During 2022, a fry trap was installed at the bottom of the Southern Zigzag channel at Liawenee. The fry trap was operated for a 24-hour period on 12 occasions, during 23 November to 13 December. This is the period where the majority of fry exit the spawning channels as identified in 2021 (figure 14). After each 24-hour sample period, 100 fry were weighed. A total number of fry was then calculated by weighing all the fish in the sample and dividing by the average weight.

Figure 15 show that the fry dropping into the fry trap peaked on the 3 December, with 20,777 captured in the fry trap over the 24-hour period. This is the same date that the drop out peaked in 2021 with 11,653 fry (figure 14). The higher number of fry dropping out in 2022 compared to 2021 is likely due to higher stocking densities in the Southern Zigzag channels in 2022 (appendix 1 and 2). Figure 16 shows the number of fry entering the fry trap may be correlated to the average daily water temperature. From 29 November until 3 December the number of fry increased as the water temperature increased.

This year based on the sampling in the Southern Zigzag's fry trap, it is estimated that approximately 180,000 fry exited the Southern Zigzag. Given the total length of the Southern Zigzag channel is 980m, this represents 180 fry per metre of channel. Since there were 615 female adult rainbow trout placed in the Southern Zigzag channel. This equates to approximately 300 fry per spawning adult female.

Given there was 2,580 metres of spawning channel utilised this year, the information from the Southern Zigzag can be extrapolate to estimate that 464,400 fry were produced, based on the rate of 180 fry per metre.

There were 2,774 adult female rainbow trout captured in the Liawenee fish trap this year. If every female had access to the same spawning facilities as the fish did in the Southern Zigzag Channel, approximately 812,000 fry would be produced.

Calculations like this come with a large amount of approximation. Variables such as consistency and accuracy of fry counting limit the accuracy of the estimate in the Southern Zigzags. There is also a large variability in the quality of the spawning channels. The Southern Zigzag channel is the most established spawning grounds at Liawenee, with the majority of improvement work done in this section, closely followed by the Long Channel. The Northern Zigzag channel is not up to the same standard as the Southern spawning channels, as this is the first year it was operational. Eight hundred and twenty three adult spawners were moved straight into the Liawenee Canal because all dedicated spawning channels were fully allocated, this would likely reduce the reproductive success of these fish compared to dedicated spawning channels. Despite these variables, these calculations provide an estimate of how many fry are being produced at Liawenee and it would not be unreasonable to assume that in excess of 500,000 fry dropped back into the Great Lake in 2022.

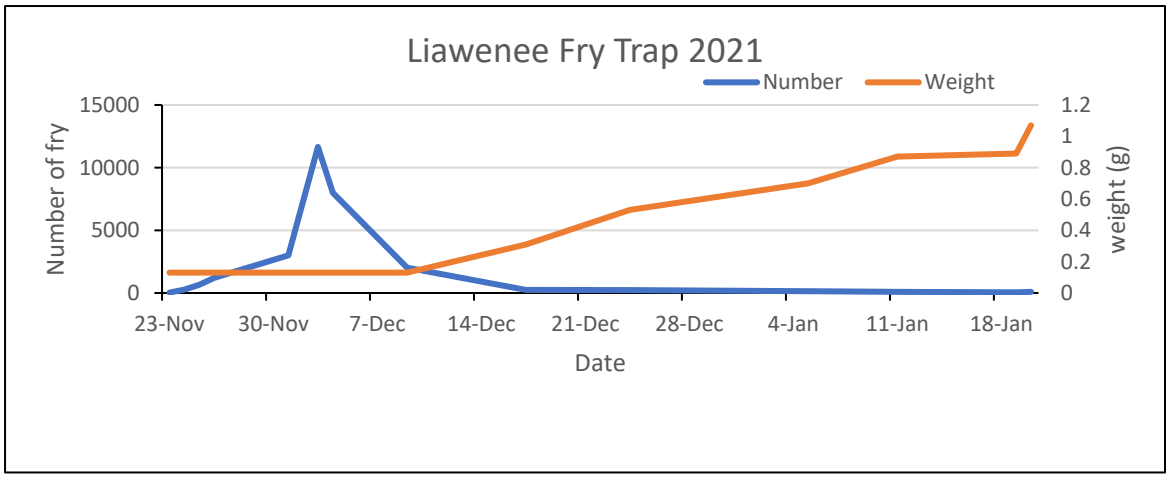

Figure 14. Number of fry counted in a 24-hour period and the average weight of the fry in the sample 2021.

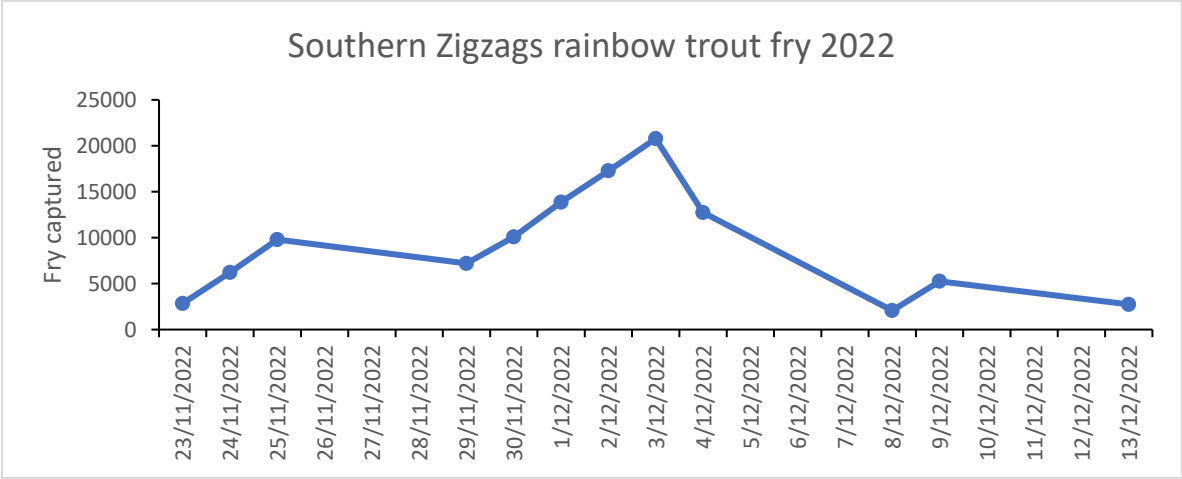

Figure 15. Number of fry counted in a 24-hour period in the Southern Zigzag fry trap 2022.

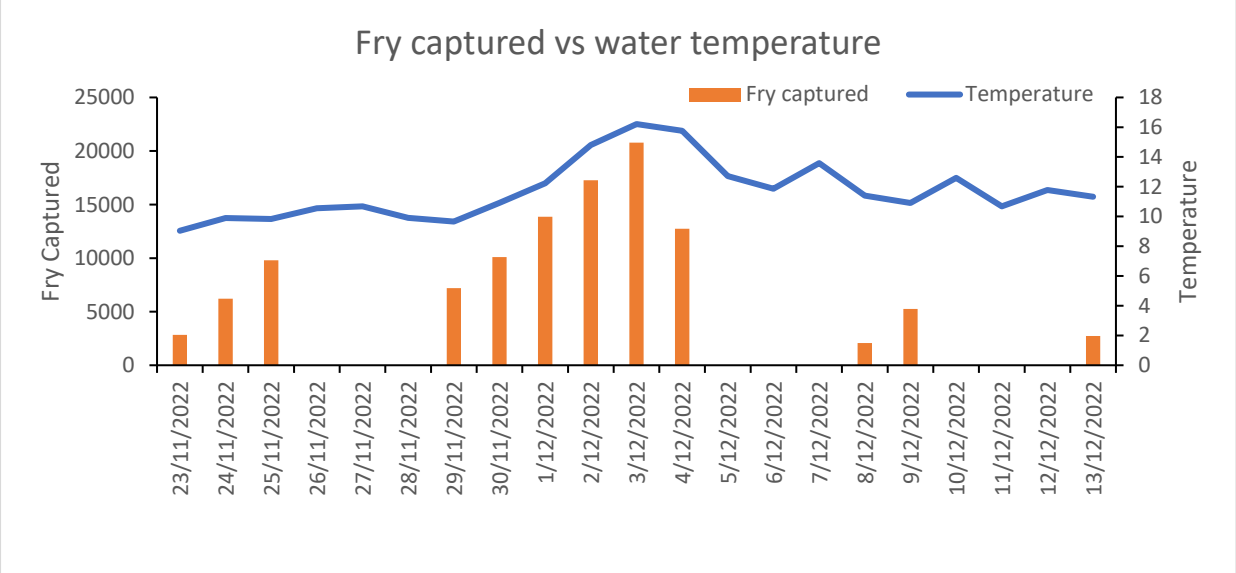

Figure 16. Number of fry counted in a 24-hour period in the Southern Zigzag fry trap in 2022 and the water temperature measured at the fry trap.

Table 5. Number of fry counted in a 24-hour period and the average weight of the fry in the sample 2022.

Date	Individual Weight	Total Weight (g)	Total Count
23/11/2022	0.13	369	2,838
24/11/2022	0.13	807	6,208
25/11/2022	0.13	1,273	9,792
29/11/2022	0.13	935	7,192
30/11/2022	0.13	1,312	10,092
1/12/2022	0.13	1,803	13,869
2/12/2022	0.13	2,245	17,269
3/12/2022	0.13	2,701	20,777
4/12/2022	0.13	1,656	12,738
8/12/2022	0.14	290	2,071
9/12/2022	0.14	735	5,250
13/12/2022	0.15	410	2,733

Recommendations

- This report provides an understanding of the River Derwent rainbow trout spawning run. Due to low numbers of spawning fish in this river, there is insufficient fish to consider transferring to other waters. Spawning fish in this system have sufficient spawning conditions below the fish trap. Therefore, there is no benefit in running the trap in future years other than to understand the population structure in Lake King William.

- This report provides an understanding of the Sandbanks Creek rainbow trout spawning run. The structure of the Sandbanks Creek spawning population is similar to Liawenee Canal. No further insight is gained by weighing and measuring these fish in the future. Due to low numbers of spawning fish, it is not necessary to operate the fish trap as fish have opportunity to spawn below the trap. In future years if the number of spawning fish at Liawenee continues to increase, it may be of benefit to count and weigh the fish at the Sandbanks Creek spawning run.
- A program to maintain and enhance rainbow trout spawning channels at Liawenee, is developed for the 2022/23 period.
- A review of the rainbow trout fishery of yingina/Great Lake is undertaken during 2023/24.
- Spring floods at Lake Sorell may have impacted the success of rainbow trout fry hatching in Mountain Creek and Silver Plains Creek. A further stocking of 25 pairs of rainbow trout in both Silver Plains Creek and Mountain Creek is recommended for 2023. A survey of the spawning creeks in the last week of November would provide confirmation of a successful spawning.

Operational details

- Higher numbers of small rainbow trout fry are available for stocking from the last week of November until the end of the first week in December.
- Larger fry that have grown to half a gram, are available for stocking after 20 December.
- During the transport of fry for stocking, 100 grams of fry should be carried with 3 litres of water within a fry bag.

Appendix

Appendix 1. Total allocation of spawning adult rainbow trout in the Liawenee spawning channels 2022.

Location	Number	Sub-total Males	Sub-total Females
Bottom Long Channel	1,395	452	943
Top Long Channel	529	244	285
Bottom Zigzag	420	180	240
Middle Zigzag	420	180	240
Top Zigzag	240	105	135
Northern Zigzag	742	390	352
Liawenee Canal (green shack)	814	535	279
Liawenee Canal (above long channel)	742	480	262
Total	**5,302**	**2,566**	**2,736**

Appendix 2. Total allocation of spawning adult rainbow trout in the Liawenee spawning channels 2021.

Location	Number	Sub-total Males	Sub-total Females
Bottom Long Channel	1,250	442	808
Bottom Zigzag	260	120	140
Middle Zigzag	260	120	140
Stripping Display	30	15	15
Top Long Channel	320	145	175
Top Zigzag	140	65	75
Total	**2,260**	**907**	**1,353**

Appendix 3. Date and location of adult rainbow trout movements from the Liawenee trap 2021.

Destination	Number	Sex	Date
Bottom Zigzags	90	M	5/09/2022
Middle Zigzags	90	M	5/09/2022
Top Zigzags	60	M	5/09/2022
Silver Plains Creek	25	M	6/09/2022
Silver Plains Creek	25	F	6/09/2022
Mountain Creek	25	M	6/09/2022
Mountain Creek	25	F	6/09/2022
Bottom Long Channel	105	M	6/09/2022
Top Long Channel	105	M	6/09/2022
Northern Zigzags	200	M	7/09/2022
Bottom Zigzags	60	M	7/09/2022
Bottom Zigzags	80	F	7/09/2022
Middle Zigzags	60	M	7/09/2022
Middle Zigzags	80	F	7/09/2022
Top Zigzags	40	M	7/09/2022
Top Zigzags	15	F	7/09/2022
Bottom Long Channel	105	M	7/09/2022
Top Long Channel	139	M	7/09/2022
Top Zigzags	30	F	9/09/2022
Top Long Channel	95	F	9/09/2022
Bottom Long Channel	95	F	9/09/2022
Northern Zigzags	152	M	9/09/2022
Northern Zigzags	45	F	9/09/2022
Liawenee Canal (Green Shack)	471	M	13/09/2022
Northern Zigzags	85	F	14/09/2022
Bottom Zigzags	80	F	14/09/2022
Middle Zigzags	28	F	14/09/2022
Liawenee Canal (Top Long Channel)	63	M	20/09/2022
Bottom Zigzags	80	F	20/09/2022
Bottom Zigzags	30	M	21/09/2022
Middle Zigzags	118	F	21/09/2022

Destination	Number	Sex	Date
Middle Zigzags	30	M	21/09/2022
Middle Zigzags	14	F	22/09/2022
Top Zigzags	5	M	22/09/2022
Top Zigzags	90	F	22/09/2022
Liawenee Canal (Top Long Channel)	137	M	22/09/2022
Northern Zigzags	151	F	22/09/2022
Liawenee Canal (Top Long Channel)	129	M	23/09/2022
Northern Zigzags	109	F	23/09/2022
Top Long Channel	190	F	23/09/2022
Bottom Long Channel	22	F	23/09/2022
Bottom Long Channel	168	F	26/09/2022
Liawenee Canal (Top Long Channel)	14	F	26/09/2022
Liawenee Canal (Top Long Channel)	63	M	26/09/2022
Liawenee Canal (Top Long Channel)	41	F	27/09/2022
Liawenee Canal (Top Long Channel)	21	M	27/09/2022
Liawenee Canal (Green Shack)	63	F	28/09/2022
Liawenee Canal (Green Shack)	40	M	28/09/2022
Liawenee Canal (Top Long Channel)	145	F	29/09/2022
Liawenee Canal (Top Long Channel)	47	M	29/09/2022
Liawenee Canal (Top Long Channel)	62	F	30/09/2022
Liawenee Canal (Top Long Channel)	20	M	30/09/2022
Liawenee Canal (Green Shack)	216	F	3/10/2022
Liawenee Canal (Green Shack)	24	M	3/10/2022
Bottom Long Channel	46	F	7/10/2022
Bottom Long Channel	10	M	7/10/2022
Bottom Long Channel	70	F	10/07/2022
Bottom Long Channel	24	M	10/07/2022
Bottom Long Channel	84	F	11/07/2022
Bottom Long Channel	17	M	11/07/2022
Bottom Long Channel	115	F	13/09/2022
Bottom Long Channel	19	M	13/09/2022
Bottom Long Channel	90	F	16/10/2021

Destination	Number	Sex	Date
Bottom Long Channel	50	M	16/10/2021
Bottom Long Channel	50	F	17/10/2021
Bottom Long Channel	37	M	17/10/2021
Bottom Long Channel	56	F	18/10/2021
Bottom Long Channel	31	M	18/10/2022
Bottom Long Channel	68	F	21/10/2022
Bottom Long Channel	21	M	21/10/2022
Bottom Long Channel	45	F	24/10/2022
Bottom Long Channel	15	M	24/10/2022
Bottom Long Channel	8	F	26/10/2022
Bottom Long Channel	5	M	26/10/2022
Bottom Long Channel	23	F	31/10/2022
Bottom Long Channel	12	M	31/10/2022
Bottom Long Channel	3	F	2/11/2022
Bottom Long Channel	1	M	2/11/2022