

1999 Thompson River Steelhead Angler Survey

Prepared for:

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Abstract

Surveys of steelhead anglers were conducted on the Thompson River from 1976 to 1978 and 1980 to 1985. After a twelve-year absence, the angler surveys commenced again in the fall of 1998. Previous surveys have been used to illustrate the characteristics of the fishery, to collect biological information, and to estimate escapements (Moore and Olmsted 1985). The 1998 and 1999 angler surveys were used primarily to describe characteristics of the sport fishery and angler trends.

The 1999 Thompson River steelhead trout angler survey took place from October 26 to November 27. A total of 485 anglers were interviewed over the duration of the five week survey, reporting 88 beached steelhead and a further 86 steelhead that were hooked, but not beached. The average catch per unit effort (cpue) for census days was 0.038 beached steelhead/rod hour, or 3.6 angler days/beached steelhead. The highest daily cpue during the census was 0.098 steelhead/rod hour on November 17; the lowest daily cpue was 0.00 steelhead/rod hour on November 21. British Columbia residents, including locals, comprised the majority of anglers interviewed at 73 percent. American fishers were the second largest geographic group at 21 percent (the majority were residents of Washington). Anglers using a combination of bait, lures, and flies had the greatest success on the Thompson River, with a cpue of 0.14 steelhead/rod hour. Lure fishers had the greatest angling success, with a cpue of 0.055, closely followed by bait fishers at 0.050 steelhead/rod hour. Fly fishing was the most popular angling method, but had the lowest success rate at 0.015 steelhead/rod hour. The total catch and release mortality during the fall survey was estimated.

Acknowledgements

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1 Introduction

Steelhead trout (*Oncorhynchus mykiss*) are the focus of a popular sport fishery in British Columbia. The Thompson River steelhead sport fishery is managed by fisheries staff at the Ministry of Environment, Lands and Parks regional office in Kamloops. Angler surveys serve as an important tool in the management of the steelhead fishery. Previous surveys occurred from 1976-78, from 1980-85, and in 1998.

In recent years, Thompson River steelhead escapement estimates have ranged from a high of 3500 in 1985 to a low of 900 in 1992. Escapement estimates are calculated during spring spawning. Escapement estimates in the Nicola watershed are based on spawning ground surveys. Estimates in the Deadman system were based on spawning ground surveys and fence counts, while escapement estimates in the Bonaparte River are based on fishway counts (Review of Fraser River Steelhead Trout, draft report, 1998). Steelhead escapement predictions are calculated each fall from the Albion test fishery located in the lower Fraser River near Fort Langley. Escapement predictions during the 1998 fishery were 2200. Escapement estimates from the spring spawning placed the Thompson River population at 2400. In 1999, despite drastically reduced commercial fishing pressure, escapement predictions for Thompson River steelhead were only 1500 (Bison, pers. com., 1999).

In 1989, the release of all wild Thompson River steelhead became mandatory (BC Freshwater Fishing Regulations Synopsis 1989). Since then, recreational fishermen have been permitted to keep two hatchery steelhead per month, with an annual British Columbia catch quota of 10 steelhead. The chance of an angler catching a hatchery steelhead in the Thompson River at present is very unlikely. The last stocking to occur in the Thompson River system was in 1992, when 105,000 adipose clipped steelhead fry were released in the Bonaparte River (Crowe 1993). Any hatchery steelhead in the 1999 sport fishery would be at least 7+ years old, and a large proportion of Thompson River steelhead spawn by age six (McGregor 1986)

The weather from October 26 to November 27 was unseasonably warm. The week of Remembrance Day was especially wet, raining almost every day. As a result, the Nicola River rose rapidly and became extremely muddied. On Friday, November 12, the Thompson River became very turbid downstream of the Nicola River. Anglers reported visibility of 30 centimeters or less all the way down to Lytton. The Thompson River also rose rapidly, by approximately three feet, as a result of the rain. The Thompson River took almost a week to clear.

2 Study Area

The Thompson River originates at the confluence of the North and South Thompson Rivers in Kamloops. The Thompson flows into Kamloops Lake, west to Cache Creek, and then south to Lytton where it merges with the Fraser River. The three major

tributaries to the Thompson River are the Deadman, Bonaparte and Nicola Rivers (Figure 1).

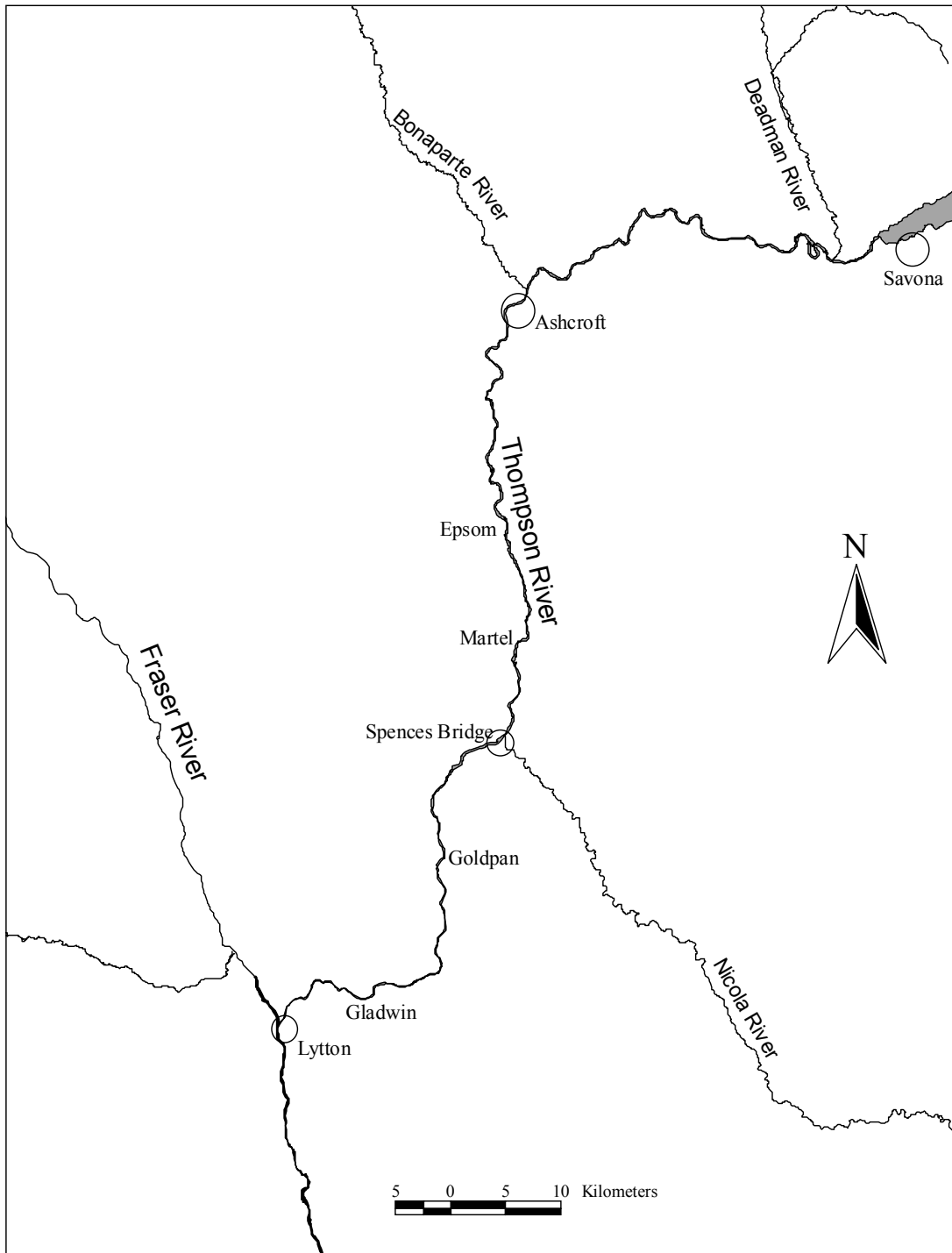


Figure 1. The 1999 Steelhead Angler Survey Area. The census took place from Epsom to Lytton.

Steelhead anglers distributed themselves from the outlet at Kamloops Lake to Lytton, with the greatest concentration of anglers occurring around Spences Bridge. The Trans-Canada Highway was built along the Thompson River valley bottom, allowing good public access to the river for anglers. The 1999 Thompson River steelhead angler survey encompassed the area from Epsom to Lytton (Figure 1).

3 Methods

The Thompson River steelhead angler survey began on October 26 and ended on November 27. The survey was stratified into weekday and weekend strata. Surveys were conducted once on the weekend and twice during the weekday for the duration of the five-week study. The fifteen survey days were randomly selected before the survey commenced.

Instantaneous angler counts were conducted each survey morning around ten o'clock. Anglers were counted in the survey area from Epsom to Lytton. Angler interviews were then conducted on the drive back up the river. Anglers were asked the following questions:

1. initials
2. residency
3. number of hours they had fished that day
4. estimated total number of hours to be fished that day
5. number of steelhead beached that day
6. number of steelhead hooked, but not beached that day
7. number of rainbow trout beached that day
8. had they fished the previous day
9. how many steelhead they beached the previous day
10. gear type (bait, lure, fly)

Anglers were also asked if they had caught any other species of fish that day.

3.1 Effort

Effort was calculated from the total number of hours anglers estimated they would fish on survey days. A daily activity profile was produced from the data by adding up the number of anglers that would be fishing on each hour of the day. Creating an activity profile in one hour increments resulted in a rounding error of approximately one percent for the estimated total number of hours fished and was considered insignificant. The difference between the number of anglers calculated to be fishing at ten o'clock from the activity profile and the number of anglers on the river at ten o'clock during the instantaneous angler count was used to create an expansion factor. The expansion factor accounted for anglers that were fishing on survey days, but were not counted during the angler interviews. The daily activity profile was scaled by the expansion factor. The integral of the scaled activity profile was the estimated angler effort in rod hours.

3.2 CPUE

The catch per unit effort (cpue) was determined for both steelhead and resident rainbow trout. The cpue was calculated from the total number of hours anglers had fished in each strata and the total number of beached steelhead and rainbow trout reported for each day and for each day type strata. The cpue was also stratified by gear type.

3.3 Catch

Estimated angler catch for steelhead and rainbow trout was calculated from the cpue for each day type strata and the estimated total number of rod hours for each strata.

3.4 Residency

Angler residency was divided into five categories:

1. Local – resident living along the Thompson River
2. BC – British Columbia resident living outside the local category
3. Canadian – Canadian resident living outside of BC
4. USA – United States resident
5. International – resident of countries other than Canada or the United States

In previous surveys, residents of Kamloops were considered Local. In this survey, anglers from Kamloops were included in the BC resident category. The home province or territory of Canadian anglers, home state of American anglers, and home country of International anglers was also recorded under the resident category.

3.5 Gear Type

Angler gear type was recorded as either bait, lure (includes artificial bait), or fly. In instances where anglers used more than one gear type throughout the day, all gear types were recorded.

4 Results

4.1 Effort

A total of 485 anglers were surveyed on the Thompson River, representing an estimated 3412 fishing hours over the 15 survey days. The total estimated angler effort on the Thompson River during the five-week survey was 14,410 rod-hours, or 2073 angler days. Angler effort for the month of November was estimated at 11,606 rod hours, or 1705 angler days. November 11 received the greatest angling pressure amongst the survey days

at 769 rod hours. The lowest angling pressure during the study was observed the following week, on November 17, at 216 rod hours (Figure 2, Appendix I). Appendix II shows the activity profile graphed on an hourly basis for each census day of the five-week study.

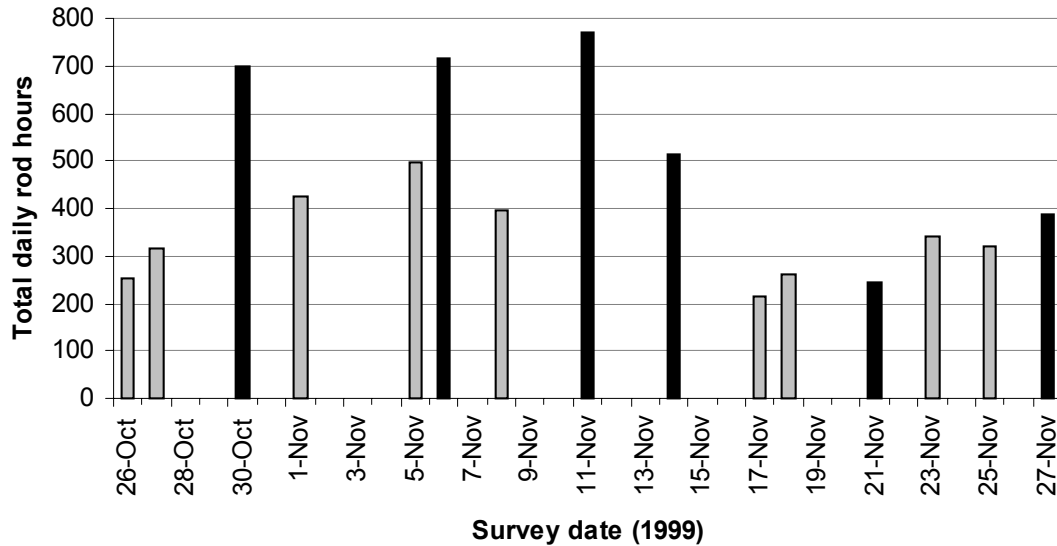


Figure 2 Total angler effort (rod hours) on 1999 survey days. Black bars represent weekends and holidays (November 11) and gray bars represent weekdays.

4.2 CPUE

The average cpue for steelhead over the entire survey period was 0.0375 beached steelhead trout/rod hour. An estimated average of 3.7 angler days for every beached steelhead was spent on the Thompson River. The highest daily cpue was 0.0984, occurring November 17, after the rain-swollen Thompson River had peaked and cleared. The lowest cpue, 0.00, occurred on November 21 the following weekend (Figure 3). The average cpue for resident rainbow trout was 0.0739 beached rainbow trout/rod hour. The highest daily cpue was 0.1639, occurring on November 17 as well. The lowest cpue was 0.0284, occurring on November 5.

4.3 Catch

From October 25 to November 27, an estimated 580 steelhead and 1076 resident rainbow trout were beached. There were also reports of numerous mountain whitefish (*Prosopium williamsoni*) and one bull trout (*Salvelinus confluentus*) being caught on survey days. There were no reports of coho salmon (*Oncorhynchus kisutch*) being caught by steelhead anglers.

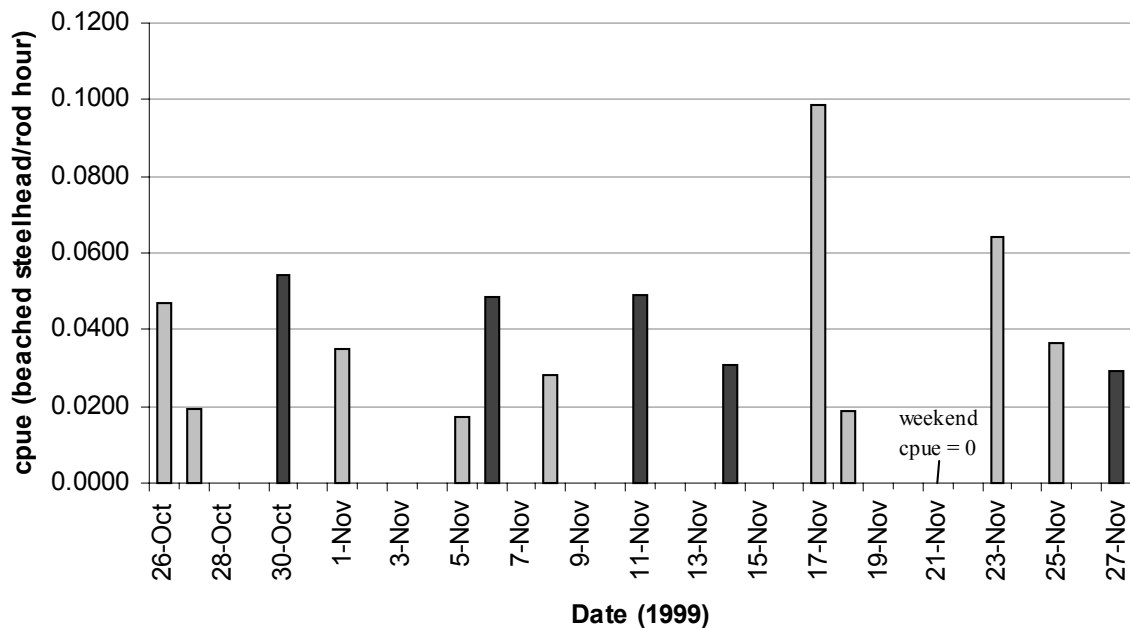


Figure 3 Angler cpue (beached steelhead/rod hour) on survey days. Black bars represent weekend days. On Sunday, November 21 the cpue = 0.

4.4 Residency

Of the 485 anglers surveyed during the census period, 72.8% were from BC, 20.6% were from the United States, 5.4% were from Canada, 0.8% were international residents, and 0.4% were local residents. Appendix III offers further details on residency.

4.5 Gear Type

Of all the anglers surveyed, 31.3% were using a fly, 29.9% were using a lure, 26.4% were using bait, and 12.4% used more than one gear type throughout the day. Of the 12.4% that used more than one gear type, 80% used bait and lures, 15% used flies and lures, 3.3% used bait, lures and flies, and 1.7% used bait and flies. The breakdown in gear type based on angler residency is summarized in Table 1. Appendix III offers further details on gear type.

Table 1 Angler gear type (percent) based on residency.

Gear Type	Local	BC	Canada	USA	International
Bait	0	32	4	13	25
Lure	100	34	38	13	0
Fly	0	20	31	72	75
More than one	0	14	27	2	0
n	2	353	26	100	4

Anglers that used more than one gear type during the day expressed a number of different reasons for doing so. The most common reasons for switching between gear types throughout the day were weather, supply of gear type, angler success and fishing location.

4.6 Stratification by Gear Type

The average number of rod hours in an angler day, when stratified by gear type, were very similar (Table 2). The calculations for angler effort, cpue, and catch by gear type were based on the assumption anglers spent an equal number of hours on the river, no matter what type of gear they were using. The percent of the integral rod hours spent on the river by gear type was based on the proportion of anglers that reported using fly, bait, lure or more than one gear type during the angler interviews conducted each day. During the 1999 survey period, fly-fishing was the most popular angling method, closely followed by lure fishing (Table 2). Angler effort by gear type was estimated to be 4605 rod/hours by fly fishers, 4325 rod/hours by lure fishers, 3771 rod/hours by bait fishers, and 1708 rod/hours by multiple gear fishers. The average catch per unit effort was the highest amongst fishers using more than on gear type at 0.1383 beached steelhead/rod hour and the lowest amongst fly fishers at 0.0153. The average cpue amongst lure fishers was slightly better than that of bait fishers in 1999 at 0.0548 and 0.0504 steelhead/rod hour respectively. From October 26 to November 27, an estimated 219 steelhead trout were beached by bait fishers, 205 were beached by lure fishers, 104 were beached by multiple gear fishers and 87 were beached by fly fishers (Table 2).

Table 2 Angling results based on gear type.

Gear Type	Total # anglers	Total rod hours	Total rod days	Average # rod hours/day	CPUE	Total # beached steelhead	Total # angler days/ steelhead
Bait	128	3771	540	6.99	0.0504	219	2.47
Lure	145	4325	645	6.71	0.0548	205	3.15
Fly	152	4605	653	7.05	0.0153	87	7.49
More than one	60	1708	246	6.95	0.1383	104	2.37

5 Discussion

The total estimated number of steelhead caught during the 1999 five-week survey was 580. In the month of November an estimated 455 steelhead were beached, a 60 percent decrease over the estimated 1095 steelhead beached in November 1998. Catch per unit effort on the Thompson River for November 1999 was 0.036 steelhead/rod hour. In 1998 the cpue for November was 0.058 steelhead/rod hour. Angler effort reflected the poorer 1999 fishery, with a 40 percent decrease over November 1998. The total estimated number of angler days in November 1999 was 1705. During the same month in 1998 the estimated effort was 2863 angler days.

Angler effort during the survey was the highest during the first two weeks of November (Figure 2), dropping after the Remembrance Day long-weekend. Unlike 1998, the average angler cpue did not increase in the second half of November. Anglers experienced drastic changes in cpue during the last two weeks of November, with both the best and the worst cpue days occurring. It is interesting to note both the highest cpue and lowest angler effort occurred on November 17 (Appendix IV). During the first half of the survey the cpue was generally higher on the weekends than the weekdays and during the last two weeks of the survey the cpue was higher on the weekdays than the weekends (Figure 3). At the start of the survey, the fishing locations on the river may not have been maximized during the week. During the last two weeks of the survey, variable river conditions may have been the most significant contributing factor affecting the cpue.

Fly fishing was the most popular angling method in 1999, even though fly fishers reported the least success angling. On average, fly fishers spent 7.49 angler days/ beached steelhead on the Thompson River. Lure fishing was the second most popular gear choice, closely followed by bait fishing. The average cpue was slightly higher for lure fishers than bait fishers in 1999 at 0.0548 and 0.0504 beached steelhead/rod hour respectively. Bait fishers had better angling success than lure fishers on the Remembrance Day long-weekend and during the last week of November. A higher proportion of anglers used more than one gear type in 1999 over 1998, with 60 out of 485 angler interviews reporting the use of multiple gear types. Anglers using more than one gear type reported the greatest angling success (0.1383 steelhead/rod hour), probably a factor of increased flexibility and access to fishable water.

The general perception amongst steelhead anglers was that the 1999 season was very poor. The combined factors of low steelhead escapement and high water levels in the Thompson River throughout the majority of the steelhead angling season may have contributed to a poorer 1999 season. However, angling trends from previous Thompson River surveys do not show the 1999 season as being especially poor. Looking at data from previous steelhead angler studies, 1999 places as the fourth highest November in catch per angler day (Figure 4). November 1999 places sixth amongst survey years for total angler effort (Figure 5). The month of November was used for comparison because it is the only entire month surveyed in every census year. It should be kept in mind angler survey data is missing for a number of years, previous angler surveys were conducted in slightly different manners, and November may not be the most representative month of the steelhead season every year. It should also be noted that anglers may be getting better at steelhead trout fishing over the years. Angler expectations may have been higher than they would be otherwise due to a good angling year in 1998 and conservation measures in the commercial and First Nations gillnet fisheries in 1999.

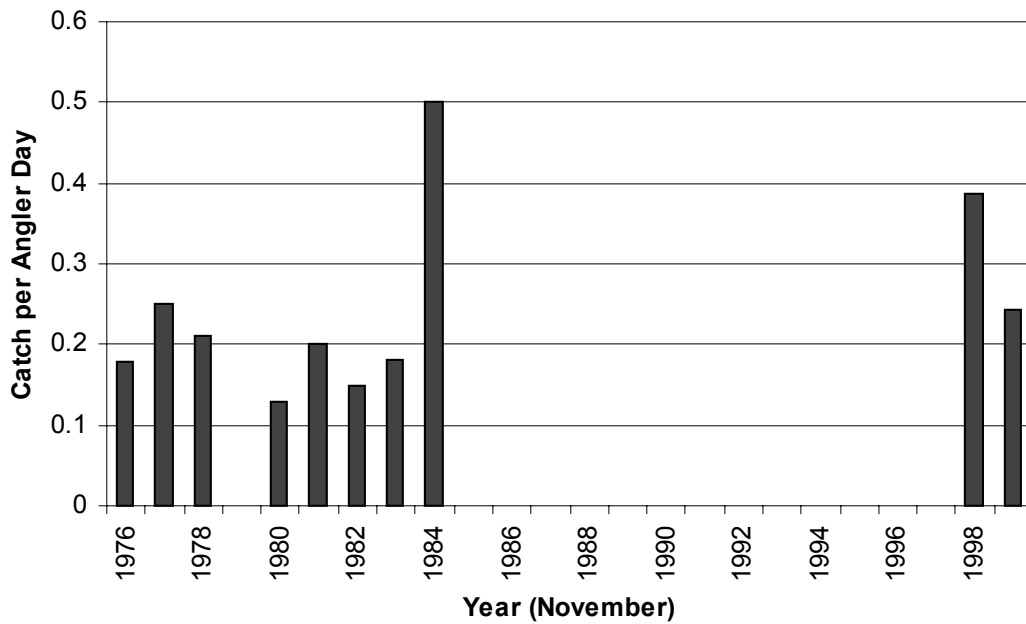


Figure 4 Trends in catch per angler day for the month of November (from angler survey reports).

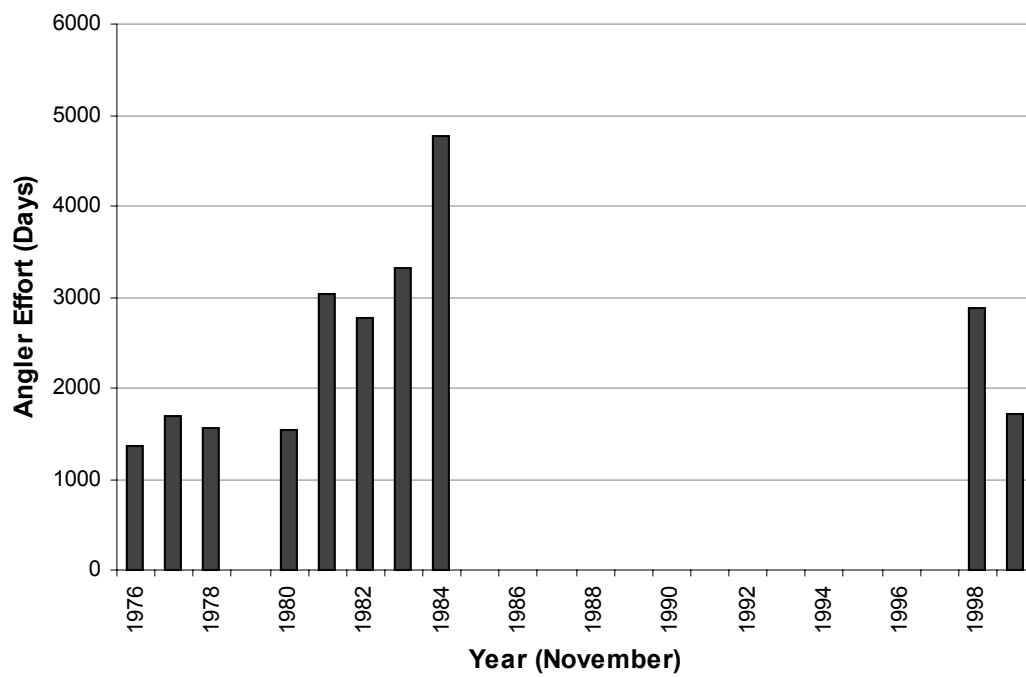


Figure 5 Trends in angler effort (angler days) for the month of November (from angler survey reports).

Regression analysis of the angler survey cpue's versus the Albion test fishery cpue's (Figure 6) shows angler catch is not very representative of the run-size index ($n = 7$, $r^2 = 0.49$). 1984 had the highest cpue at the Albion test fishery and the highest angler cpue, but the same trend is not seen in other years.

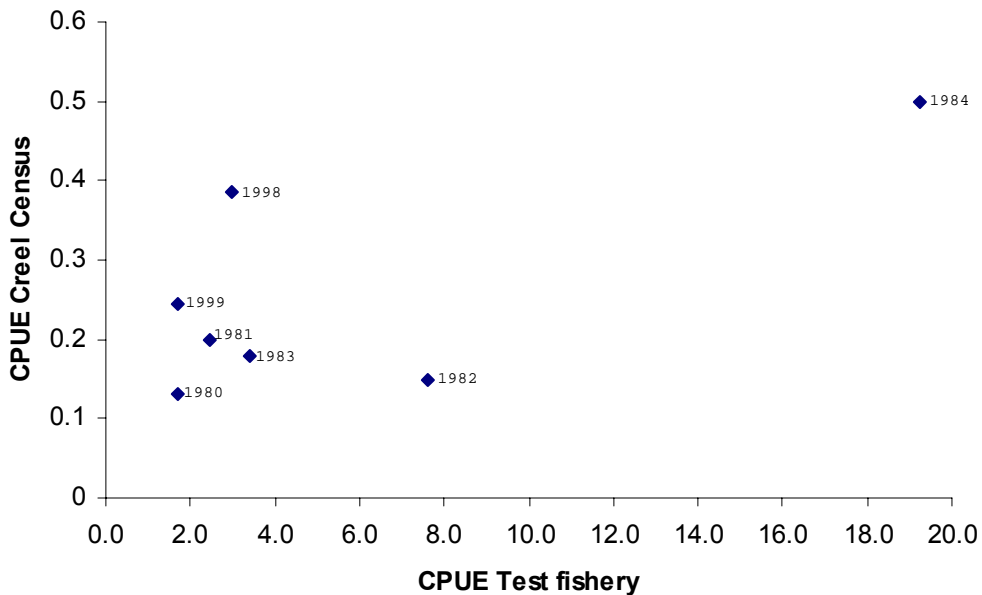


Figure 6 Regression analysis of Steelhead cpue from the Albion Test Fishery (October 1 - November 30) vs cpue from the Steelhead angler surveys for the month of November ($r^2 = 0.49$).

The mortality rate of steelhead in the Thompson River sport fishery, determined from steelhead angled in the provincial broodstock fishery, is 1.61 percent (Review of Fraser River Steelhead Trout, draft report, 1998). Using the mortality rate of 1.61 percent and the higher rate of five percent, which is used for management purposes, the estimated mortality of steelhead caught and released in the Thompson River during the 1999 angler survey is 7 to 28.

The attitude towards the angler survey was very positive. Steelhead fishers were courteous and very open with their answers. Most anglers expressed their concern over the future of the steelhead fishery, and were very welcoming to any sign of government presence.

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Appendices

Appendix I – Activity profile showing the number of anglers on the Thompson River on an hourly basis during survey days.

The gray cells represent the time profile created from angler interviews. White cells have been calculated using the expansion factor to include anglers that were fishing but were not interviewed on survey days.

DATE	SUM	TIME PROFILE													INSTANTANEOUS ROD COUNT	EXPANSION FACTOR
		6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00		
26-Oct-99	216	0	2	11	17	22	26	28	28	28	25	18	11	0	30	1.15385
	249	0	2	13	20	25	30	32	32	32	29	21	13	0		
27-Oct-99	147	0	6	11	11	16	16	18	20	18	18	11	2	0	34	2.125
	312	0	13	23	23	34	34	38	43	38	38	23	4	0		
30-Oct-99	256	0	4	20	21	30	30	32	33	32	29	23	2	0	82	2.73333
	700	0	11	55	57	82	82	87	90	87	79	63	5	0		
01-Nov-99	179	4	4	10	20	24	27	28	26	21	13	1	1	0	57	2.375
	425	10	10	24	48	57	64	67	62	50	31	2	2	0		
05-Nov-99	261	3	14	20	28	33	34	35	35	31	26	2	0	0	63	1.90909
	498	6	27	38	53	63	65	67	67	59	50	4	0	0		
06-Nov-99	271	2	8	13	20	34	39	39	43	39	32	2	0	0	90	2.64706
	717	5	21	34	53	90	103	103	114	103	85	5	0	0		
08-Nov-99	229	0	4	18	24	30	30	33	33	31	26	0	0	0	52	1.73333
	397	0	7	31	42	52	52	57	57	54	45	0	0	0		
11-Nov-99	532	2	28	45	55	65	65	68	69	67	61	7	0	0	94	1.44615
	769	3	40	65	80	94	94	98	100	97	88	10	0	0		
14-Nov-99	206	6	9	13	19	24	31	30	29	28	17	0	0	0	60	2.5
	515	15	23	33	48	60	78	75	73	70	43	0	0	0		
17-Nov-99	154	0	13	17	18	20	18	18	18	18	14	0	0	0	28	1.4
	216	0	18	24	25	28	25	25	25	25	20	0	0	0		
18-Nov-99	170	0	8	16	21	24	24	24	23	18	12	0	0	0	37	1.54167
	262	0	12	25	32	37	37	37	35	28	19	0	0	0		
21-Nov-99	104	0	8	11	15	15	14	13	13	9	6	0	0	0	35	2.33333
	243	0	19	26	35	35	33	30	30	21	14	0	0	0		
23-Nov-99	259	2	15	19	30	32	36	34	34	33	24	0	0	0	42	1.3125
	340	3	20	25	39	42	47	45	45	43	32	0	0	0		
25-Nov-99	129	0	6	12	15	15	19	17	19	17	9	0	0	0	37	2.46667
	318	0	15	30	37	37	47	42	47	42	22	0	0	0		
27-Nov-99	262	0	22	29	31	35	35	35	35	28	12	0	0	0	52	1.48571
	389	0	33	43	46	52	52	52	52	42	18	0	0	0		

Appendix III – Breakdown of Thompson River steelhead anglers by residency and gear type.

	TOTAL	%TOTAL	BAIT	%BAIT	LURE	%LURE	FLY	%FLY	B/F/L	%B/F/L
LOCAL	2	0.4	0	0.0	2	100.0	0	0.0	0	0.0
BC	353	72.8	113	32.0	120	34.0	69	19.5	51	14.4
CANADA	26	5.4	1	3.8	10	38.5	8	30.8	7	26.9
ALBERTA	9	1.9	0	0.0	2	22.2	6	66.7	1	11.1
SASK.	3	0.6	0	0.0	1	33.3	1	33.3	1	33.3
ONTARIO	9	1.9	0	0.0	7	77.8	1	11.1	1	11.1
YUKON	5	1.0	1	20.0	0	0.0	0	0.0	4	80.0
USA	100	20.6	13	13.0	13	13.0	72	72.0	2	2.0
WASHINGTON	67	13.8	12	17.9	12	17.9	41	61.2	2	3.0
IDAHO	10	2.1	0	0.0	0	0.0	10	100.0	0	0.0
OREGON	6	1.2	0	0.0	1	16.7	5	83.3	0	0.0
CALIFORNIA	5	1.0	0	0.0	0	0.0	5	100.0	0	0.0
MONTANA	5	1.0	0	0.0	0	0.0	5	100.0	0	0.0
UTAH	2	0.4	0	0.0	0	0.0	2	100.0	0	0.0
VIRGINIA	2	0.4	0	0.0	0	0.0	2	100.0	0	0.0
COLORADO	1	0.2	0	0.0	0	0.0	1	100.0	0	0.0
PENNSYLVANIA	1	0.2	1	100.0	0	0.0	0	0.0	0	0.0
ALASKA	1	0.2	0	0.0	0	0.0	1	100.0	0	0.0
INTERNATIONAL	4	0.8	1	25.0	0	0.0	3	75.0	0	0.0
ENGLAND	1	0.2	1	100.0	0	0.0	0	0.0	0	0.0
JAPAN	3	0.6	0	0.0	0	0.0	3	100.0	0	0.0
TOTAL	485	100	128	26.4	145	29.9	152	31.3	60	12.4

Appendix IV Average angler cpue vs total angler effort on survey days. Black bars represent weekend days. The cpue on Sunday, November 21 was 0.0000.

