

# 1998 Thompson River Steelhead Angler Survey

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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 angler survey was used primarily to describe characteristics of the sport fishery and angler trends.

The 1998 Thompson River steelhead trout angler survey took place from November 5 to December 13. A total of 843 angler interviews were conducted over the duration of the six week survey, reporting 228 beached steelhead and a further 210 steelhead that were hooked, but not beached. The average catch per unit effort (cpue) for census days was 0.061 beached steelhead/rod hour, or 2.5 angler days/beached steelhead. The highest daily cpue during the census was 0.12 steelhead/rod hour on November 18; the lowest daily cpue was 0.021 steelhead/rod hour on November 15. British Columbia residents, including locals, comprised the majority of anglers interviewed at 74.3 percent. American fishers were the second largest geographic group at 18.7 percent. Bait fishers had the greatest angling success on the Thompson River, with a cpue of 0.097 steelhead/rod hour, followed by lure fishers at 0.050 steelhead/rod hour, fly fishers at 0.036 steelhead/rod hour, and multiple gear fishers at 0.030 steelhead/rod hour. The total catch and release mortality during the fall survey was estimated.

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## **1 Introduction**

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

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 (Bison, pers. com., 1999).

During the 1980's, the Ministry of Environment, Lands and Parks fisheries biologists became increasingly concerned with the conservation of steelhead stocks. In 1989, steelhead mortality in the sport fishery was reduced by implementing catch-and-release restrictions province-wide. MELP also entered into negotiations with the Department of Fisheries and Oceans (DFO) and First Nations to address management strategies in non-selective commercial and aboriginal salmon fisheries to assist in the conservation of Thompson steelhead (Bison 1996).

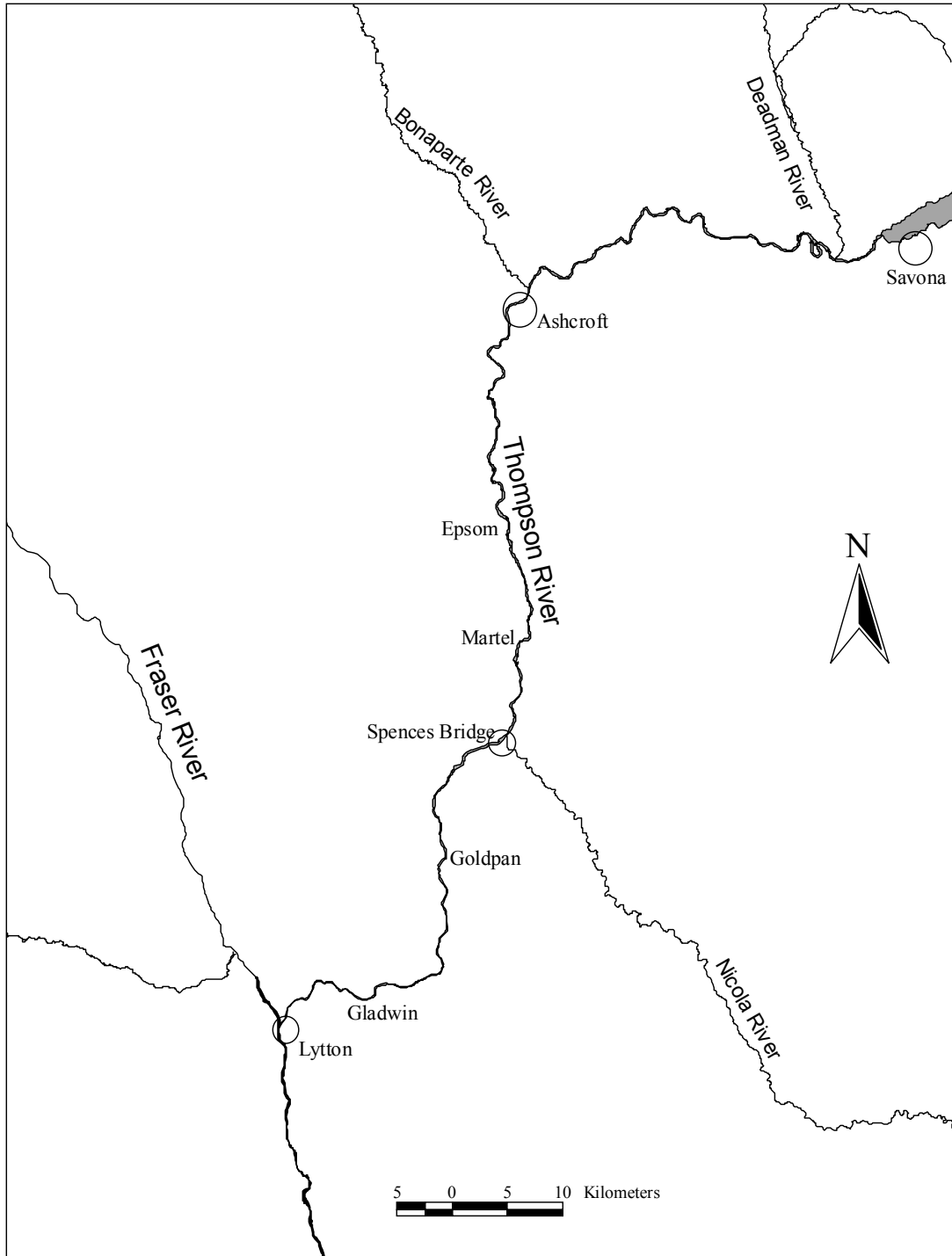
The Thompson River steelhead fishery occurs from September 1 to December 31 from the fishing boundary signs below the Kamloops Lake outlet to the train bridge below Lytton. The 1998 steelhead angler survey was conducted 4 days a week from November 1 to December 15. Personal contact was made with as many anglers as possible throughout the course of a day in order to calculate angler effort.

## **2 Study Area**

The Thompson River originates at the confluence of the South and North Thompson Rivers in Kamloops, British Columbia. The Thompson flows through the Thompson Plateau and merges with the Fraser River at Lytton, B.C. Major tributaries to the Thompson River include the Deadman, Bonaparte, and Nicola Rivers.

Steelhead anglers are distributed 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 1998 study area encompassed the section of the Thompson River between Martel (approximately 10 kilometers north of Spences Bridge) and the community of Lytton (situated at the confluence of the Thompson and Fraser

Rivers)(Figure 1). This totals approximately 51 kms of the southern portion of the Thompson River.



**Figure 1** The 1998 Steelhead Angler Survey Area. The census took place from Martell to Lytton.

### 3 Methods

The Thompson River steelhead angler survey began on November 5 and ended on December 13. The survey was stratified into weekday and weekend strata. Angler surveys were conducted approximately four times a week for the duration of the six-week study. The 18 survey days were randomly selected before the survey commenced.

An instantaneous count of total anglers on the Thompson River from the outlet of Kamloops Lake to the Thompson Fraser Confluence at Lytton was recorded around ten o'clock on the morning of each creel day. Anglers were counted in the survey area from Martell to Lytton. Angler surveys were then conducted on the drive back up the river. Anglers were asked the following questions:

1. initials (used as an identifier if surveyed more than once on the census day)
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)

#### 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 – B.C. resident living within 100 km of the Thompson River
2. BC – British Columbia resident not in 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

### 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.

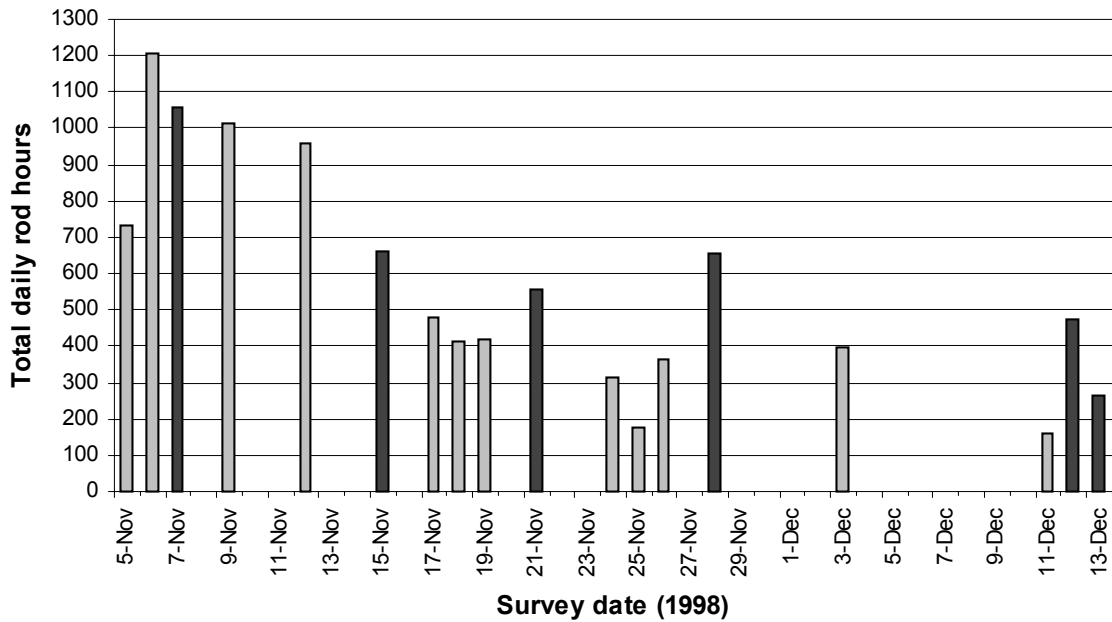
## 4 Results

### 4.1 Effort

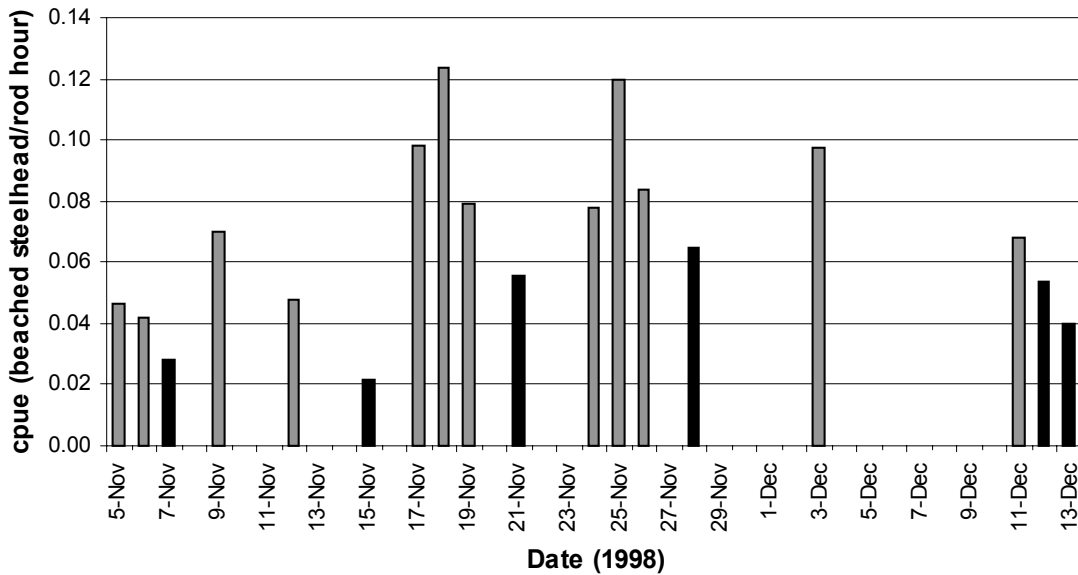
A total of 843 anglers were surveyed on the Thompson River, representing an estimated 5619 hours fishing over the 18 survey days. An average angler day was 6.7 hours. An angler effort activity profile (Appendix I) was generated using information from the daily angler surveys in conjunction with the ten o'clock expansion factor. The total estimated angler effort on the Thompson River during the six-week survey was 23,021 rod-hours, or 3454 angler days. Angler effort for the month of November was estimated at 19,227 rod hours, or 2878 angler days. November 6 received the greatest angling pressure amongst the survey days at 1204 rod hours. The lowest angling pressure during the study was observed on December 11, at 162 rod hours (Figure 2). Appendix II shows the activity profile graphed on an hourly basis for each census day of the six-week study.

### 4.2 CPUE

The average cpue for steelhead was 0.0615 beached steelhead/rod hour. An estimated average of 2.5 angler days for every beached steelhead was spent on the Thompson River. The highest daily cpue was 0.1238, occurring November 18. The lowest cpue, 0.0213, occurred the previous weekend on November 15 (Figure 3). It is interesting to note the cpue appears to be lower on the weekends than mid-week.



**Figure 2** Total angler effort (rod hours) on survey days. Weekends are black and weekdays are gray.



**Figure 3** Angler cpue (beached steelhead/rod hour) on survey days. Black bars represent weekend days.

### 4.3 Catch

From November 2 to December 13, an estimated 1391 steelhead trout were beached.

### 4.4 Residency

Of the 843 anglers surveyed during the census period, 67.7% were from BC, 18.7% were from the United States, 6.5% were local residents, 1.8% were from Canada, 0.6% were international residents, and 4.6% were unknown. Appendix III offers further details on residency.

### 4.5 Gear Type

Of all the anglers surveyed, 41.0% were using bait, 34.4% were using a fly, 15.1% were using a lure, and 9.5% used more than one gear type throughout the day. 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	Unknown
Bait	23	276	2	33	0	12
Lure	7	96	3	10	1	10
Fly	21	142	7	101	4	15
More than one	4	57	3	14	0	2
n	55	571	15	158	5	39

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 1998 census period, bait fishing was the most popular gear choice amongst anglers, closely followed by fly-fishing (Table 2). Only 80 of the 843 angler interviews claimed they used more than one gear type throughout the day. Angler effort by gear type was estimated to be 9166 rod/hours by bait fishers, 7896 rod/hours by fly fishers, 3420 rod/hours by lure fishers, and 2275 rod/hours by multiple gear fishers. The average catch per unit effort was highest amongst bait fishers at 0.0972 beached steelhead/rod hour,

followed by lure fishers at 0.0503. The cpue for fly fishers was slightly better than that of multiple gear fishers at 0.0364 and 0.0295 steelhead/rod hour respectively. From November 5 to December 13, an estimated 907 steelhead trout were beached by bait fishers, 207 were beached by lure fishers, 189 were beached by fly fishers and 84 were beached by multiple gear 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	346	9166	1336	6.86	0.0972	907	1.47
Lure	127	3420	536	6.38	0.0503	207	2.59
Fly	290	7896	1240	6.37	0.0364	189	6.56
More than one	80	2275	354	6.42	0.0295	84	4.24

## 5 Discussion

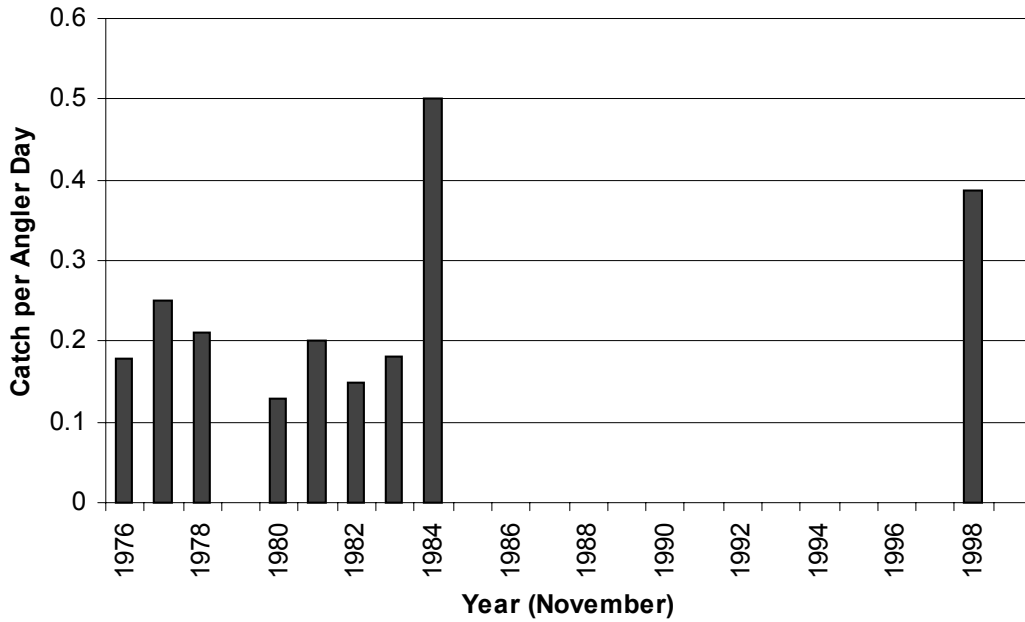
The total estimated number of steelhead caught during the 1998 six-week survey was 1391. In the month of November an estimated 1095 steelhead were beached and the average cpue was 0.058 steelhead/rod hour. The total estimated number of angler days in November 1998 was 2878.

Angler effort during the survey was the highest during the first two weeks of November (Figure 2). It is interesting to note angler cpue was relatively low during the first two weeks of November (Figure 3) and increased around mid-November as the total angler effort began to drop (Appendix IV). It is also interesting to note angler cpue tends to drop on the weekends in relation to the weekday cpue (Figure 3). The drop in angler cpue may be attributed to a number of different factors. Possible reasons include: less efficient or inexperienced anglers may fish on weekends, jockeying for prime fishing holes on weekends may result in more anglers fishing in secondary locations, and an increase in anglers may cause steelhead to become spooked.

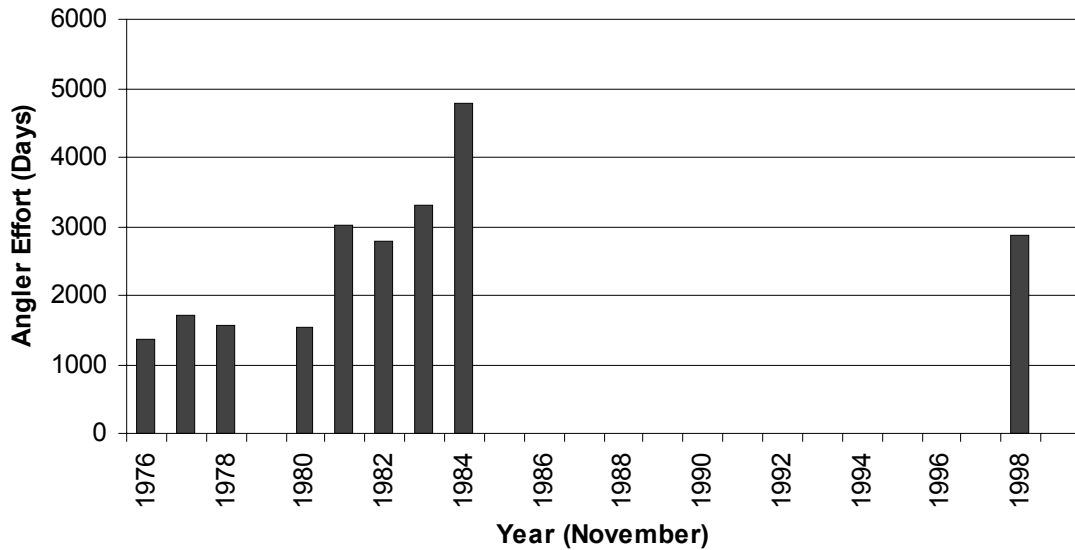
Bait fishing was the most popular fishing method in 1998 and bait anglers reported the greatest angling success, with an average of 1.47 days/beached steelhead spent on the Thompson River. More than fifty percent of all beached steelhead were caught by bait fishers. Fly-fishing was a close second behind bait fishing as the most popular angling method despite less successful angling results. Fly anglers reported spending an average of 6.56 days/ beached steelhead on the river. Lure fishers accounted for 15 percent of anglers in 1998, but with an average rate of 2.59 days/beached steelhead spent on the river, they had the second best angling success rate. It is believed the surprisingly low angling success by fishers using more than one gear type (0.0295 steelhead/rod hour) may be attributed to a higher proportion of beginner Thompson River steelhead anglers experimenting with different gear.

The general perception amongst steelhead anglers was that the 1998 season was good. Looking at data from previous steelhead angler studies, 1998 places as the second highest

November in catch per angler day (Figure 4). November 1998 places fourth amongst survey years for total angler effort (Figure 5). The month of November was used for



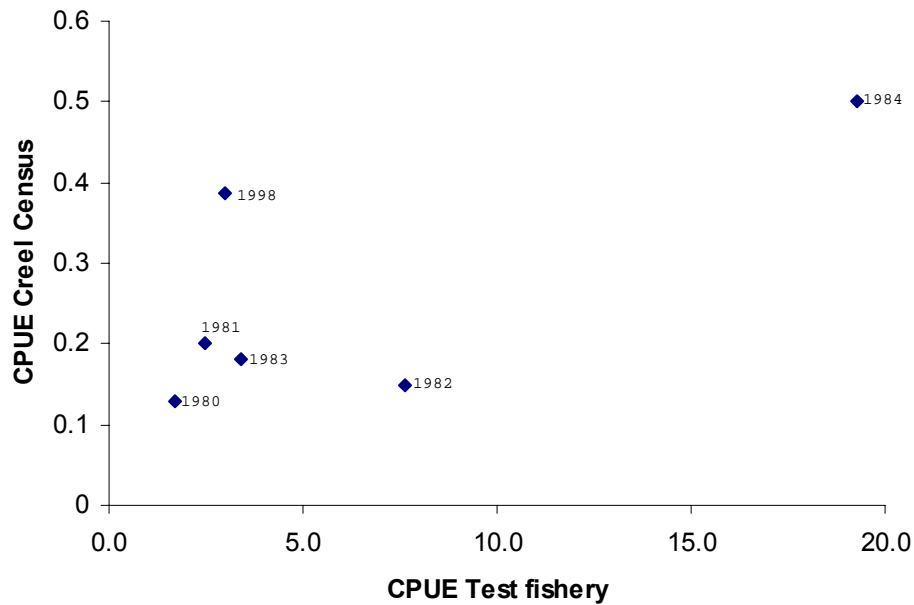
**Figure 4** Trends in catch per angler day for the month of November (from angler survey reports).



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

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.

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 runsize index ( $n = 6$ ,  $r^2 = 0.46$ ). 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 ( $r^2 = 0.46$ ).

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 1998 angler survey is 22 to 70.

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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.

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 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	19:00	20:00		
05-Nov	477	0	19	38	48	58	61	61	63	56	45	24	4	0	0	0	89	1.534483
	732	0	29	58	74	89	94	94	97	86	69	37	6	0	0	0		
06-Nov	484	0	10	21	33	41	59	63	69	73	59	48	8	0	0	0	102	2.487805
	1204	0	25	52	82	102	147	157	172	182	147	119	20	0	0	0		
07-Nov	673	0	17	52	72	81	88	86	85	85	69	33	5	0	0	0	127	1.567901
	1055	0	27	82	113	127	138	135	133	133	108	52	8	0	0	0		
09-Nov	594	0	27	44	57	64	72	75	77	72	62	33	11	0	0	0	109	1.703125
	1012	0	46	75	97	109	123	128	131	123	106	56	19	0	0	0		
12-Nov	514	0	16	26	44	57	62	68	69	65	56	33	16	1	1	0	82	1.8636
	958	0	30	48	82	106	116	127	129	121	104	62	30	2	2	0		
15-Nov	448	0	13	36	49	53	57	58	62	56	37	24	3	0	0	0	78	1.4717
	659	0	19	53	72	78	84	85	91	82	54	35	4	0	0	0		
17-Nov	271	0	7	11	20	29	32	34	39	39	35	19	6	0	0	0	51	1.7586
	477	0	12	19	35	51	56	60	69	69	62	33	11	0	0	0		
18-Nov	255	0	1	9	22	29	30	32	35	33	32	22	7	1	1	1	47	1.6207
	413	0	2	15	36	47	49	52	57	53	52	36	11	2	2	2		
19-Nov	263	0	1	6	22	29	36	36	36	35	31	23	8	0	0	0	46	1.5862
	417	0	2	10	35	46	57	57	57	56	49	36	13	0	0	0		
21-Nov	319	0	13	26	38	40	40	40	40	37	27	15	3	0	0	0	70	1.7500
	558	0	23	46	67	70	70	70	70	65	47	26	5	0	0	0		
24-Nov	210	0	0	11	17	22	25	25	30	30	27	20	3	0	0	0	33	1.5000
	315	0	0	17	26	33	38	38	45	45	41	30	5	0	0	0		
25-Nov	85	0	0	1	9	10	11	11	12	12	12	7	0	0	0	0	21	2.1000
	179	0	0	2	19	21	23	23	25	25	25	15	0	0	0	0		
26-Nov	212	0	2	8	19	25	26	29	27	28	27	15	6	0	0	0	43	1.7200
	365	0	3	14	33	43	45	50	46	48	46	26	10	0	0	0		
28-Nov	286	0	0	17	29	35	37	37	39	36	35	19	2	0	0	0	80	2.2857
	654	0	0	39	66	80	85	85	89	82	80	43	5	0	0	0		
03-Dec	261	0	0	9	21	23	34	35	37	34	34	28	6	0	0	0	35	1.5217
	397	0	0	14	32	35	52	53	56	52	52	43	9	0	0	0		
11-Dec	81	0	0	6	9	9	10	9	10	12	10	5	1	0	0	0	18	2.0000
	162	0	0	12	18	18	20	18	20	24	20	10	2	0	0	0		
12-Dec	227	0	0	10	24	26	26	27	30	30	30	24	0	0	0	0	54	2.0769
	471	0	0	21	50	54	54	56	62	62	62	50	0	0	0	0		
13-Dec	176	0	0	12	20	22	25	23	22	20	18	10	2	2	0	0	33	1.5000
	264	0	0	18	30	33	38	35	33	30	27	15	3	3	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
<b>Local</b>	55	6.5	23	2.7	7	0.8	21	2.5	4	0.5
<b>BC</b>	571	67.7	276	32.7	96	11.4	142	16.8	57	6.8
<b>Canada</b>	15	1.8	2	0.2	3	0.4	7	0.8	3	0.4
<b>USA</b>	158	18.7	33	3.9	10	1.2	101	12.0	14	1.7
<b>International</b>	5	0.6	0	0.0	1	0.1	4	0.5	0	0.0
<b>Unknown</b>	39	4.6	12	1.4	10	1.2	15	1.8	2	0.2
<b>Total</b>	843	100	346	41.0	127	15.1	290	34.4	80	9.5

**Appendix IV** Average angler cpue vs total angler effort on survey days. Black bars represent weekend days.

