RIVER GUARDIAN PROGRAM
HORSEFLY RIVER
SUMMARY REPORT
2001

By
Dean Peard

BRITISH COLUMBIA

Ministry of Water, Land and Air Protection
Fisheries Branch
Williams Lake, B.C.

Funded by the Habitat Conservation Trust Fund
DRAFT
Regional Fisheries Report No. CA-2001-4

DECEMBER 2001

ABSTRACT

Peard, D. A. 2001. River Guardian Program Horsefly River Summary Report. Ministry of Water ,Land and Air Protection, Williams Lake B.C. Regional Fisheries Report No. CA-2001-4, *p14*.

During the 2001 Horsefly River angling season, one river guardian patrolled the fishable length of the river, either by boat or by foot, from July to October. A total of 42 patrols were conducted during the angling season. During patrols, information such as angler residency, river access, number of rainbow trout landed, section of river angled and whether or not anglers were guided was recorded.

Two weekdays and one weekend day per week were randomly selected as patrol days. Patrols were conducted by vehicle, pontoon boat and foot along the classified portion of the Horsefly River which extends downstream from the Horsefly River falls to Quesnel Lake. To creel the majority of anglers on patrol days the entire classified portion was driven and all visible anglers were contacted. After driving the river and observing parked vehicles in various locations a determination was made on which section of river the majority of drifting anglers could be found and then that section was drifted by the guardian.

Aerial angler counts were conducted in 2001 to estimate the percentage of anglers contacted on the river during a patrol day. A total of 9 flights occurred between July and October coinciding with ground patrols. It is estimated that 60% of anglers were contacted on any given patrol day.

In 2001,the Horsefly River had five angling guides who were allotted a total of 425 angling days for guiding. Angling guide creel reports indicate that 196 guided angling days were utilized. Guided anglers were predominantly non-resident aliens, and released 813 rainbow trout during the angling season resulting in an average of 4.14 trout landed per day angled.

187 combined guided and non-guided angler days were recorded during patrols. Out of the 187 angling days, 148 or 79% were non-guided anglers and 39 or 21% were guided anglers. The guided anglers who were contacted on the river were predominantly non-Canadian residents. Only 2 of the 39 guided anglers interviewed were BC residents. Furthermore, of the 148 non-guided anglers 114 were BC residents and 34 were non-Canadian residents. Anglers access the Horsefly River by boat or by hiking along the shore. 63% of anglers contacted were angling with the aid of a boat, and 37% of anglers contacted angled from shore.

For management purposes the river is divided in two sections at the Horsefly River townsite bridge. 72% of angling activity recorded on patrol days occurred above the townsite bridge and 28% occurred below. Angler intensity peaked during the last week in August and the first week in September. It is estimated that there were 551 non-guided angler days, and there were 196 guided angler days reported in 2001. Therefore, it is estimated that there were 747 total angler days in 2001.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF PICTURES

LIST OF TABLES

1. INTRODUCTION

The Horsefly River originates in the Quesnel Highlands and travels approximately 98 km before it enters Quesnel Lake. The river provides spawning and rearing habitat for Quesnel Lake rainbow trout as well as sockeye salmon, chinook salmon and coho salmon. MELP estimates that the Horsefly River produces 75% of the Quesnel Lake rainbow trout population. This genetically unique sub-species of late maturing rainbow trout do not spawn until reaching 5 or 6 years of age and are, therefore , vulnerable to angling effort in both the lake and river recreational fishery.

An ongoing study on the Horsefly River rainbow trout population has shown a decrease in the average size of the mature trout (R Dolighan per com 2001). Reduction in the average size of spawners reduces the fecundity of mature females by an estimated 40%, therefore, reducing the number of eggs available to be fertilized during spawning. Currently the fisheries branch estimates the rainbow trout escapement to be approximately 300 spawners. Fisheries managers remain concerned that the number of adult rainbow trout in Quesnel Lake and spawning in the Horsefly River are still declining due to various factors including angling demands on the lake and river fishery, and mortalities related to warm water temperatures in the river. The current fisheries management goals for the Horsefly River fishery are to:

- conserve and enhance the wild rainbow trout population upon which the sport fishery depends,
- maintain the quality aspects of the Horsefly River sports fishery,
- provide fair access to angling opportunities on the Horsefly River for all classes of anglers,
- manage angler density over the key angling areas during the angling season.

The Horsefly River is designated as a Class 2 river that is open for catch and release, artificial fly angling from June 1 to October 31. A river guardian program began on the Horsefly River in the 2000 angling season (Peard, Regional Fisheries Report #CA-002) to achieve the following objectives:

- estimate overall angling intensity,
- determine angler intensity in specific areas, and establish residency of anglers and record angler catch success.
- provide fisheries mangers with the information required to sustain a quality wilderness angling experience.
- monitor angler compliance with existing regulations on the Horsefly River
- provide anglers with current information about the Horsefly River rainbow trout population and present conservation concerns

The Horsefly River guardian program is funded by the Habitat Conservation Trust Fund.

2. DATA COLLECTION

2.1 METHOD OF DATA COLLECTION

The Horsefly River was patrolled 41 times by vehicle, boat and foot between July and October,2001. Two weekdays and one weekend day per week were randomly selected before the angling season began. On patrol days the classified portion of the river (from Quesnel Lake to Horsefly River Falls) was patrolled by vehicle. All visible anglers are contacted and location of vehicles along the river is also noted. After using the vehicles to determine what section of the river had the most angling activity a pontoon boat was used to drift that section to contact anglers. If there was any time left, after drifting a section, the river was driven again to contact any further anglers. Flights were also conducted to determine the success of patrol metods ,and it was determined that an average of 60% of all anglers were contacted on patrol days (fig 1).

Horsefly River Angler Aerial Counts 2001

Date	Aerial Count	Ground Count
15/07/01	0	5
28/07/01	4	5
05/08/01	12	3
17/08/01	13	3
25/08/01	18	14
02/09/01	22	15
08/09/01	15	8
16/09/01	0	4
6/10/01	6	0
TOTALS	**90**	**57**

It is estimated that 60% of anglers were contacted on Patrol Days

Figure 1 Results of Angler Aerial Counts Conducted on the Horsefly River 2001

When anglers were encountered they were asked a series of routine questions, licences checked, and their answers were recorded for future data entry. Any licensing or regulation problems were reported to the Conservation Officer Service in Williams Lake. Routine questions included whether or not the anglers were guided, their residency, hours fished and trout landed. Other recorded information included, the zone angled and access to the river.

2.2 RESULTS OF DATA COLLECTION

2.2.1 ANGLER RESIDENCY

Angler residency was recorded during patrols on the Horsefly River. During the 42 patrols conducted in 2001, a total of 187 guided and non-guided angler days were recorded, and out of the 187 days, 116 were BC resident angler days and 71 were non-resident Canadian angler days. In comparison, 25 patrols were conducted in 2000 and 164 angler days were recorded and 88 of those angler days were residents and 76 of the angler days were non-residents(fig 1).

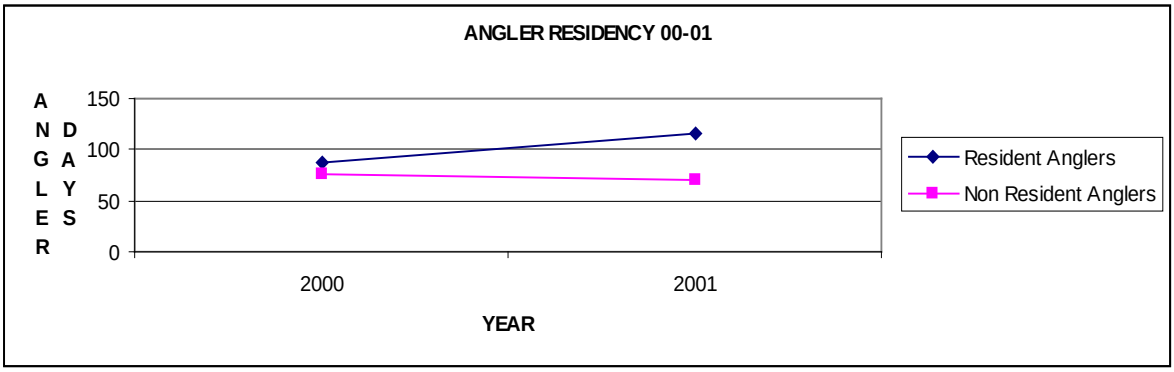

Figure 2
Angling effort (days) and residency of anglers fishing the Horsefly River 2000-2001

In 2001, creeled non-guided anglers were primarily residents of BC. BC residents accounted for 114 of the 148 non-guided recorded angler days. The remaining 34 non-guided angler days were utilized by non-resident aliens. In comparison, during the 2000 angling season there were 85 non-guided resident angler days and 33 non-guided non-resident alien anglers creeled (fig 3).

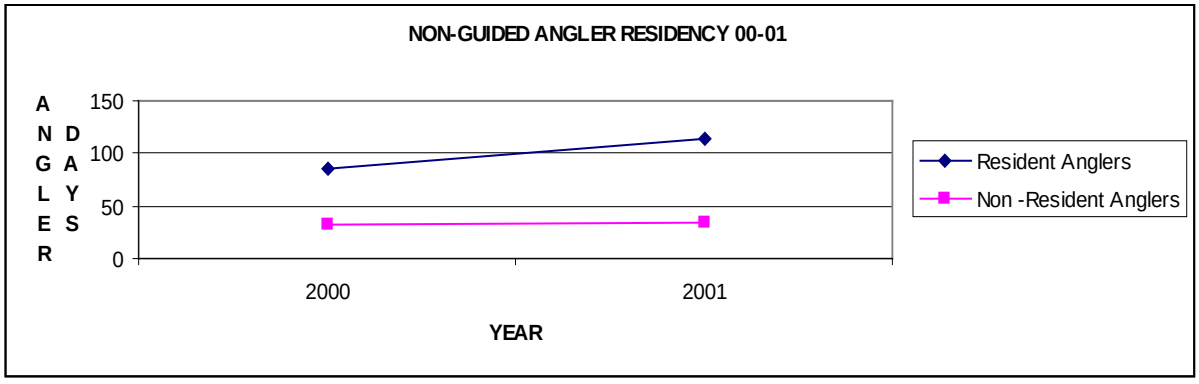

Figure3
Angling effort and residency of non-guided anglers fishing the Horsefly River 2000-2001.

Out of the 187 angler days recorded on patrol days, 148 were non-guided and 39 were guided. The 39 guided angler days were predominantly non-Canadian residents. Only 2 of the 39 guided anglers contacted were BC residents.

2.2.2 ANGLER EFFORT

The fisheries branch is involved in monitoring angler effort on the Horsefly river for two reasons. Catch and release angling has always been associated with some degree of mortality on fish stocks. The degree of that mortality is often under debate and can be influenced by various factors such as water temperature, multiple captures, gear type, species and release techniques. Monitoring angling effort over the season gives fisheries managers the opportunity to examine yearly trends. Any significant increase in angling effort could potentially lead to an increase in angling mortalities and may have a considerable impact on efforts to restore the Quesnel Lake Trout population.

Various Horsefly River user groups were asked at a public meeting for input on how they would like to see the recreational fishery managed. The group consensus was to manage for an quality, wilderness angling experience. Monitoring the angler effort allows fisheries managers to be proactive and use the tools at their disposal to maintain the experience anglers want on the Horsefly River.

Three events appeared to have impacted upon angler effort on the Horsefly River this season. In late July severe rains rose the river to extreme levels (Picture 1).

Picture #1
Horsefly River upstream of townsite bridge July 20, 2001

High water levels persisted for approximately 3 weeks, and the impact the water levels had on angler effort are reflected in figure 3.

Other impacts that appeared to have impacted on angler effort in 2001 include, events that occurred in New York City on September 11. This event seemed to primarily impact non-resident guided anglers who were unable to travel to BC, however, figure 3 shows how all angler effort declined after September 11, 2001. A similar decline in effort was recorded in the second week of September 2000. However, guide creel reports indicate that after September 11, 2001 ,the majority of guides did not resume guiding until the last week of September. Secondly, 2001 was the dominant year for the Horsefly River Sockeye spawning cycle. A large number of Sockeye were in the river by early September, and several anglers commented that they could not make a cast without unintentionally foul hooking a Sockeye. They also stated that they wouldn't be back until after the sockeye have finished spawning.

Angler effort peaked during the last week in August and the first week in September (fig 3). The highest daily angler count was recorded on September 2nd . On September 2nd 15 anglers were contacted on the river. Collected information shows that there is more effort on the weekend in comparison to weekdays. The data indicates that for every 1.9 weekend angler days there is 1 angler day during the week.

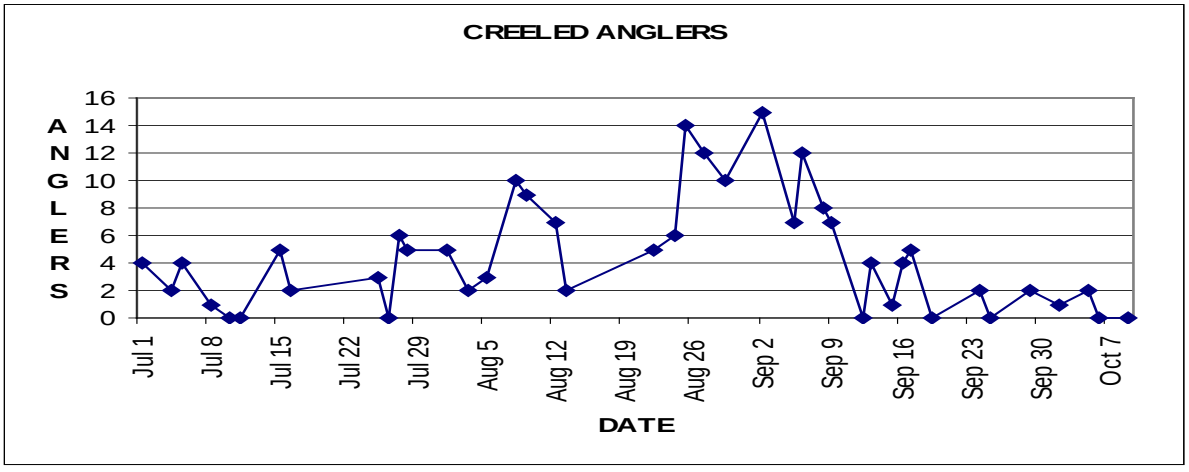

Figure 3
Seasonal Angler Effort on Patrol Days 2001

The fisheries branch has spent considerable time and effort to develop a methodology that will reflect the overall angling effort from year to year. Number of patrols, patrol methods and continued cooperation with the angling public must remain consistent in future years in order for the information to accurately reflect changes in angler effort.

On patrol days, significant effort was made to contact as many anglers as possible. However, due to the fishable length and access to the river, it was not always possible to contact every angler during a patrol. A total of 9 aerial angler counts occurred in conjunction with ground patrols to determine the success of the methodology being used on ground patrols. The 9 flights were distributed between July, August, September and early October. During combination patrol days, A total of 90 anglers were counted from the air, and 56 were counted on the ground. This indicates that 60% of anglers were contacted on the river during patrol days.

Overall non-guided angling effort is estimated by using the following criteria. Information recorded on patrol days is first separated by month and then separated into effort on weekdays and weekend days. The total recorded weekend or weekday effort is then divided by the number of patrols that took place on either weekdays or weekend days (including holidays) for the month, which provides an estimate for the daily effort on weekdays and weekend days. The estimated weekend and weekday effort is then multiplied by the number of weekdays or weekend days for the month. Finally, 40% is added to the estimated monthly effort due to the results of the aerial flight counts conducted this year (Table 1).

- **Recorded Angling Days/ Patrols= Daily Estimated Angler Days**
- **Daily Estimated Angler Days x Weekdays or Weekend Days and Holidays per Month= 60% of Estimated Non-Guided Use**
- **60% of Estimated Non-Guided Use+ 40%= Estimated Non-Guided Angler Usage in 2001**

RESULTS

In July 2001 there were 10 weekend days that included 1 stat holiday (Canada Day). Correspondingly there were 21 weekdays in July.

13 patrols occurred in July. 9 of those patrols occurred during the week, and 4 patrols occurred on the weekend. 9 angling days were recorded on the weekdays, and 15 angling days were recorded on the weekend.

9/9= 1 angling day 1 angling days x by weekdays in July (21)=21 21+40%= 29
15/4= 3.75 angling days 3.75 angling days x by weekend days in July (10)=38 38+40%=54
Estimated 54 days used on weekends
Estimated 29 days used in weekdays
Total 83 angler days

In August there were 9 weekend days including 1 sat holiday (Victoria Day), and 22 weekdays. 13 patrols were conducted in August. 10 of those patrols occurred during the week, and 3 patrols occurred on the weekend. 59 angling days were recorded on the weekdays, and 21 angling days were recorded on the weekend.

53/10= 5.3 angling days 5.3 angling days x by weekdays in August (22)=117 117+40%=164
21/3=7 angling days 7 angling days x by weekend days in August(9)=63 63+40%=88

Estimated 88 days used on weekends
Estimated 164 days used on weekdays
Total 252 angler days.

In September there are 11 weekend days including 1 stat holiday (Labour Day), and 19 weekdays. 13 patrols were conducted in September. 8 of those patrols occurred during the week, and 5 patrols occurred on the weekend. 18 angling days were recorded on the weekdays, and 26 angling days were recorded on the weekend.

18/8= 2.25 angling days 2.25 angling days x by weekdays in September (19)=43 43+40%=60
29/5=5.2 angling days 5.8 angling days x by weekend days in September(11)=110 64+40%=90

Estimated 90 days used on weekends
Estimated 60 days used on weekdays
Total 150 angler days in September

In October there were 3 patrol days and 2 unguided angler days were recorded, therefore, it is estimated that 68 days were used on the Horsefly River in October.

3/2= 1.5 angling days 1.5 angling days x by days in October (31)=47 47+40%=66

83+252+150+68=553 unguided angling days on the Horsefly River in 2001

Table 1
Estimated Non-Guided Angler Effort 2001

2.2.3 GUIDED ANGLER EFFORT

In 2001, there were 5 guides who were issued a total of 425 angler days on the Horsefly River. Guided angler effort can be measured in two different ways. Guided angler effort can be estimated by using the same method used to estimate non-guided angler days or the information can be collected from annual creel reports sent in to the regional office from the guides. Creel reports sent into the regional office indicate that there were 196 guided angler days on the Horsefly River in 2001. Figure 4 indicates the reported daily guided angler effort July through October.

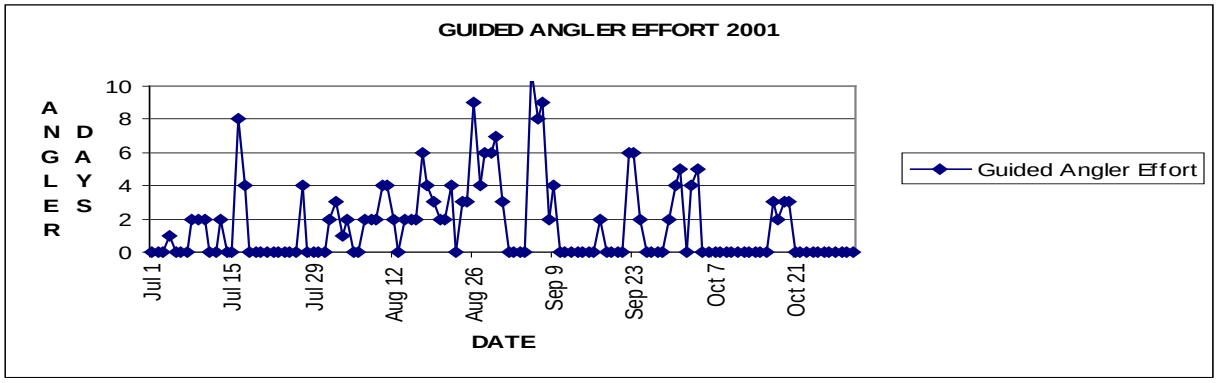

Figure 4
Reported Daily Guided Angler Effort July, August, September, October 2001

2.2.4 NON-GUIDED ANGLERS VS GUIDED ANGLERS

It is estimated that there were 553 non-guided angler days in 2001 and reportedly there were 196 guided angler days in 2001. From July through October it is estimated that 26% of angler effort was guided and 74% of the effort was non-guided. Information collected during the creel survey indicates that the maximum recorded effort by non-guided and guided anglers occurred during the first week in September (fig 5).

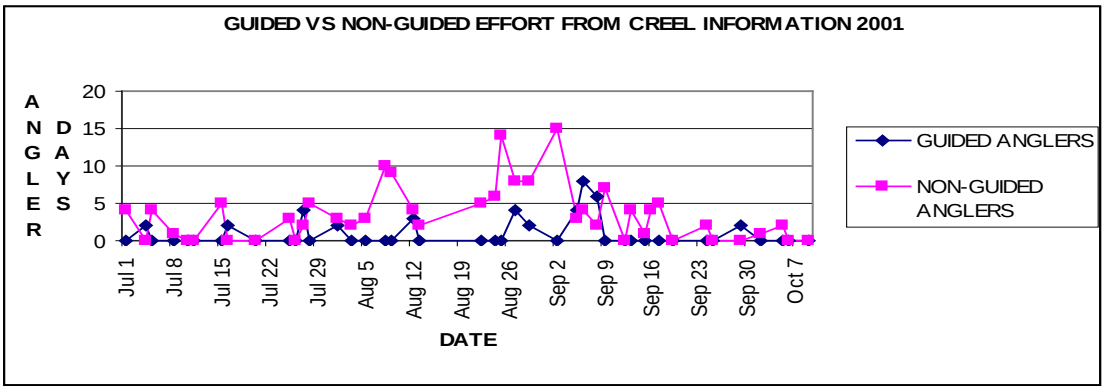

Figure 5
Guided vs. Non-Guided Effort from Creel Information 2001

The following graph (fig 6) shows the estimated ratio of used guided angler days vs. non-guided angler days analyzed by month.

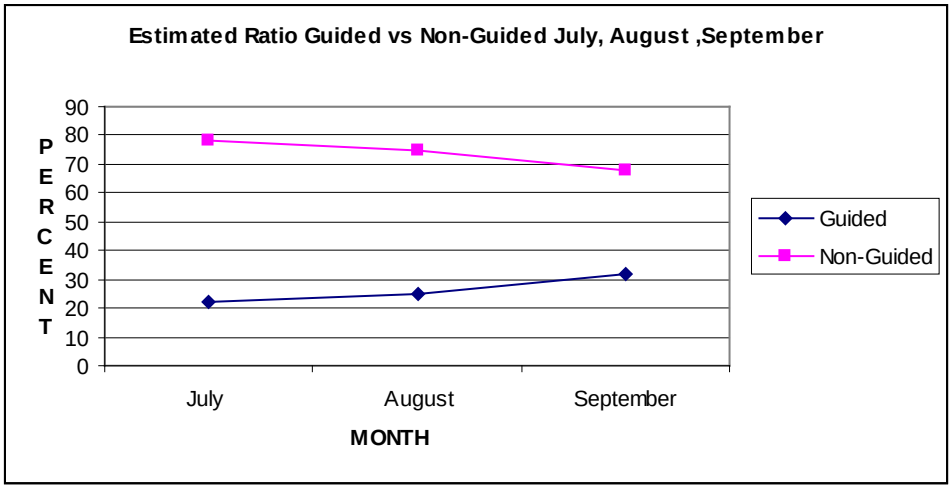

Figure 6
Estimated Ratio Guided vs. Non-Guided July, August, September 2001

2.2.5 ANGLER ACCESS

Anglers access the Horsefly River by boat and walking trails along the river. A considerable amount of land along the classified portion of the river is privately owned and , therefore, restricts shore angler access to the river. The majority of shore anglers were contacted in the general area of the Horsefly River Forest Recreation Site or around the 106 Km boat launch. Information collected from the 187 anglers surveyed shows that 37% or 69 angler days were from shore.

Similar to shore anglers, anglers who access the river by boat are limited by private property where they can put a boat in or take out. There are four sections of the river that anglers drift, the Horsefly River Forest Recreation Site to 118Km, 106 Km to the Townsite Bridge, Townsite Bridge to Rocky Bar and from Rocky Bar to Squaw flats Forest Recreation Site. Data collected from interviewed anglers shows that 63% or 118 angler were angling with the benefit of a boat.

2.4.6 ANGLER DISTRIBUTION

Angler distribution is an important aspect of the Horsefly River recreational fishery. Monitoring angler distribution trends provides fisheries managers with the information necessary to maintain an uncrowded, wilderness angling experience , and conserve critical habitat for the trout population.

For creel purposes the Horsefly River is separated into 5 zones. The location of anglers contacted on patrol days was recorded for future analysis. Zone 1 is from Quesnel Lake to Rocky Bar. During patrols, 17 anglers or 9% of creeled anglers were contacted in this location. In zone 2, from Rocky Bar to the Horsefly Townsite bridge , 37 anglers or 20% of anglers were contacted in this area. Zone 3, Townsite bridge to the Woodjam creek bridge, received the most angling effort on patrol days. Even though the zone extends downstream from the Woodjam Creek bridge almost all recorded effort was from the 106Km boat launch down to the townsite bridge. There were 56 anglers or 30% of effort recorded in this area. Zone 4 extends upstream from the Woodjam Creek bridge to the “Bosk” bridge located at the Horsefly River Forest Recreational Site. This area typically receives more effort later in the angling season when sockeye salmon are spawning in the area. In zone 4, 46 anglers or 25% of recorded effort was in this location. Zone 5 has limited access, and predominantly utilized by shore anglers. 30 anglers or 16% of effort was recorded in this area. Figure 8 shows the recorded effort for each zone.

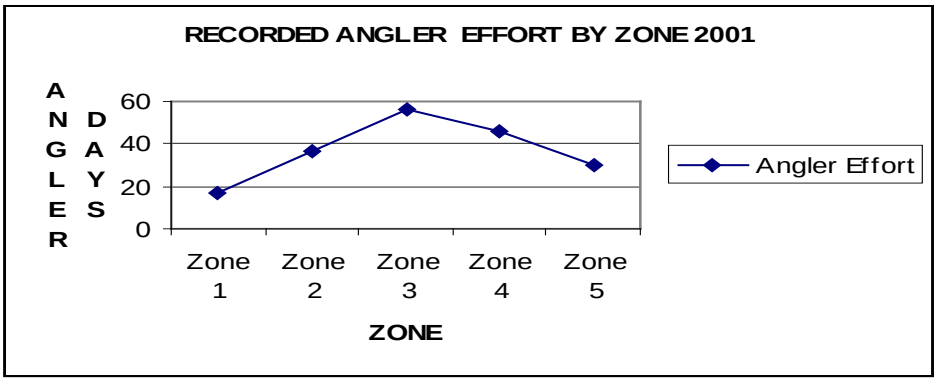

Figure 8
Recorded Angler Effort by Zone 2001

2.2.7 ANGLER SUCCESS

For the purposes of this report angler success will be measured in two different ways. As anglers are encountered on the river they are asked how many hours they have fished that day , and how many trout they have landed .If anglers hadn't begun fishing when they were checked a zero for catch and hours fished was recorded and does not factor in the overall CPUH (catch per unit hour). CPUE (catch per unit effort) is measured by recording the anglers success at the end of the days angling activities. Guide creel reports include information regarding CPUE and can be analyzed that way. For non-guided anglers there success will be measured by CPUH due to the fact that non-guided anglers may have been contacted at the beginning, middle or the end of their angling effort for the day.

Non-guided anglers had a CPUH of 0.51 in 2001, or it can be said that on average non-guided anglers landed one trout every two hours angled. Catch success peaked three times during the 2001 angling season (fig 9). The first peak occurred on August 8, on that day non-guided anglers reported a CPUH of 1.36. the second peak occurred on August 24, anglers reported a CPUH of 1.44 on that day. The final peak occurred on September 6, non-guided anglers reported a CPUH of 1.34.

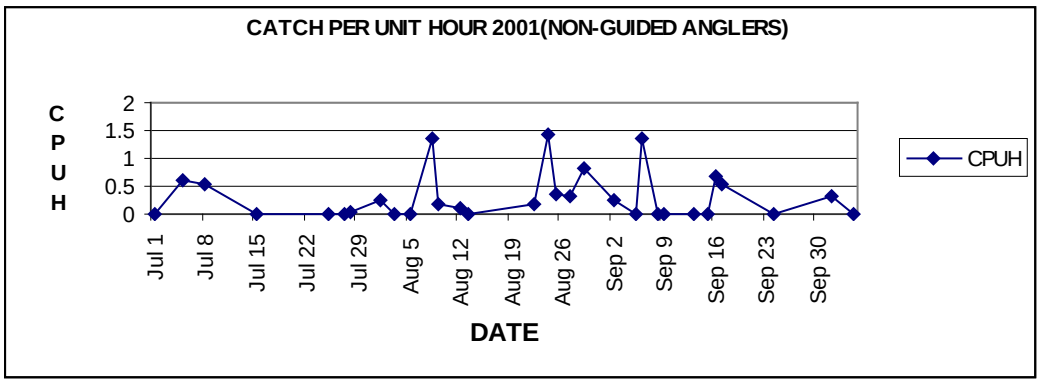

Figure 9
Catch per Unit Hour (Non-Guided Anglers) 2001

Angling guides reported that there were 196 guided angler days on the Horsefly River in 2001. Angling guides also reported that there clients landed 813 rainbow trout during the season. Therefore, guided anglers catch per unit effort (CPUE) is 4.15. In comparison, guides reported that there were 209 guided angler days and 1325 rainbow trout landed resulting in a CPUE of 6.34 during the previous year.

Guided angler success peaked three times during the 2001 season. The three peaks occurred during the first week in July, the last week in August and the last week in September. The CPUE during these three weeks was 8.00 (fig 10)

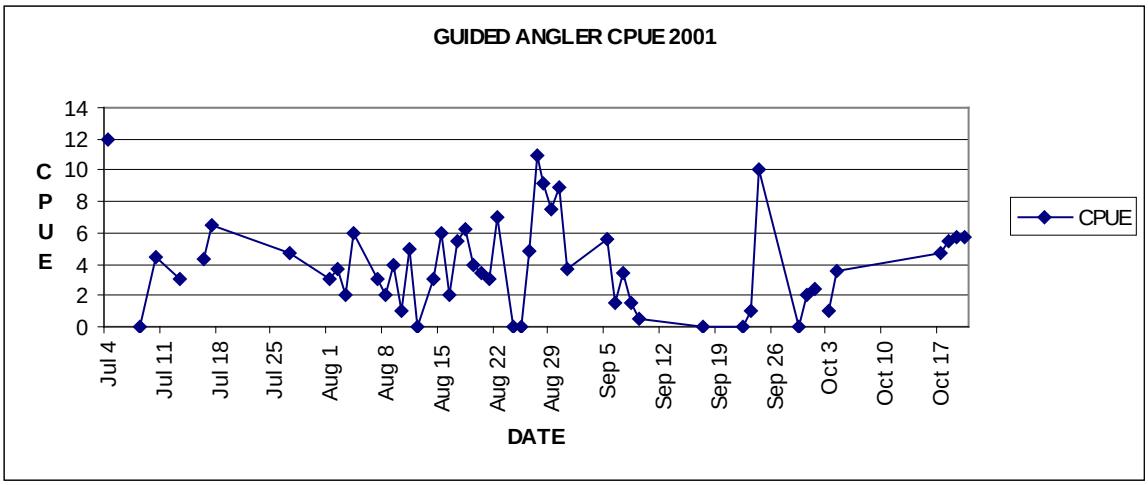

Figure 10
Guided Angler CPUE 2001

Collecting and analyzing non-guided anglers CPUH and guided anglers CPUE on an annual basis can potentially be used to evaluate trends in the Horsefly River rainbow trout population.

2.2.7 WATER TEMPERATURE

Water temperature is an important component of a healthy aquatic environment. Fisheries managers are concerned that high river temperatures during the summer months are having a negative impact on the trout population. Warm water temperatures can affect fish growth rates, availability of dissolved oxygen in the river and the fish's ability to fight disease. It has been reported that temperatures above 17° celcius have a negative impact on salmonid life processes.

Fish mortality from angling is also affected during periods of high water temperatures. One study reports post-angling mortality of 0% as a result of 20 atlantic salmon angled in water temperatures of 6° celcius (Booth et al.1994). This is in contrast to the 40% post angling mortality associated with water temperatures of 22° celcius reported by (Wilkie et al 1996).

Water temperatures for the 2001 angling season were provided from a temperature data logger maintained by Fisheries and Oceans Canada (D Barnes 2002). The data logger was located near the Horsefly townsite. Maximum recorded water temperatures surpassed 20º C during a 4 day period in August (fig 10).

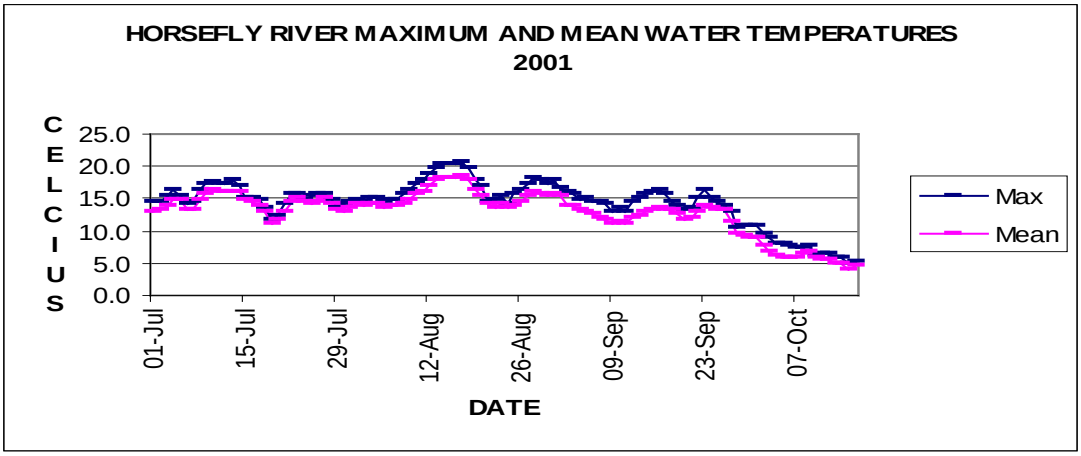

Figure 10
Horsefly River Maximum and Mean Water Temperatures 2001

During those 4 days, the maximum daily water temperatures were 20.2ºC, 20.4ºC, 20.5ºC and 20.6ºC. The minimum daily recorded daily temperatures were 16.8ºC, 16.7ºC, 16.6ºC and 17.1ºC. Figure 11 shows the mean water temperatures recorded in the same location, during the same time period, from 1999 to 2001.

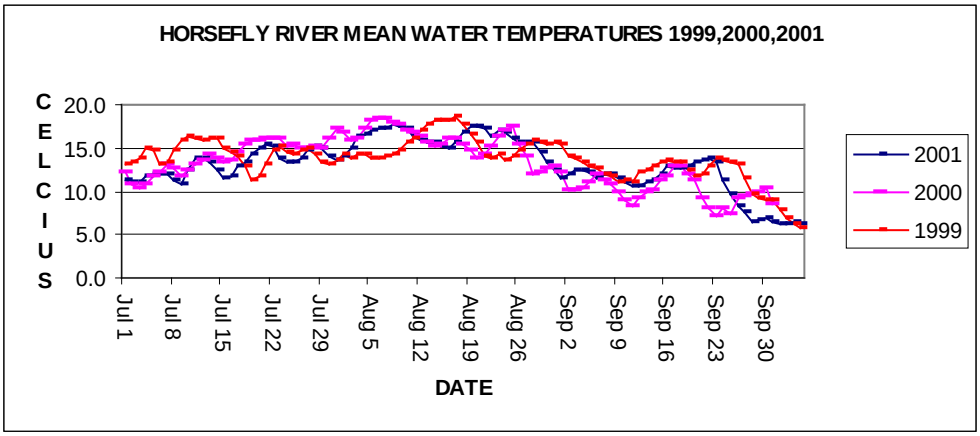

Figure 11
Horsefly River Mean Water Temperatures 1999,2000,2001

3 SUMMARY

- The Horsefly River was surveyed 42 times between July and October
- 187 guided and non-guided angler days were recorded during patrols. BC residents accounted for 116 days and non-Canadian residents accounted for 76 angler days
- 148 angler days surveyed were non-guided and 39 non-Canadian resident were guided angler days
- 116 anglers were BC residents and 71 anglers were non-resident anglers
- The majority of angler effort was recorded in zone 3 (Woodjam Creek to Horsefly townsite.
- It is estimated that there were 553 non-guided angler days on the Horsefly River in 2001, and there were reportedly 196 guided angler days on the Horsefly River in 2001
- August was the busiest period on the Horsefly River, and it is estimated that 252 angler days during this month
- Non-guided anglers had a CPUH of 0.51
- Guided anglers had a CPUE of 4.14
- Water temperatures reached 20º C for four consecutive days in August

4. LITERATURE CITED

Bielak, A.T., R.K. Booth, K. Davidson, J.D. Kiefer, B.L Tufts (1994). *Effects of Late-Season Catch and Release Angling on Anaroebic Metabolism, Acid –Base Status,Survival, and Gamete Viability in Wild Atlantic Salmon*. Canadian Journal of Fish and Aquatic Sciences. Vol 52 pgs 283-290 (1995)

Bielak, A.T., R.K. Booth, M.A. Brobbel, K. Davidson, J.D. Kiefer, B.L Tufts, M.P Wilkie *Physiology and Survival of Wild Atlantic Salmon Following Angling in Warm Summer Waters* American Fisheries Society Vol 125 pgs 572-580 (1996)

Barnes,D Fisheries and Oceans Canada. Personal Communication. January 29,2002