A Survey of
Kispiox River Steelhead Anglers
in 2001

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BRITISH
COLUMBIA

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Executive Summary

The Kispiox River in the Skeena Region of northwestern British Columbia (B.C.) is well known for providing a high quality steelhead (*Oncorhynchus mykiss*) recreational fishery. In 1990, the province of B.C. implemented a Classified Waters system to protect such high quality angling experiences on rivers throughout the province. The purpose of the Classified Waters system was to provide a diversity of angling opportunities, maintain a high quality angling experience and improve regulation of the angling guide industry.

The 2001 fall steelhead season marked the fourth year of the River Guardian program in the Skeena Region. The program started in 1997 and in the past has conducted surveys of anglers on the Bulkley, Babine, Kispiox and Zymoetz (Copper) Rivers. The River Guardians conducted a survey of Kispiox River steelhead anglers in the fall of 2001. Similar to the 1998 River Guardian program on the Bulkley River, aerial counts and an on-site roving survey were the two main components of the creel survey. The steelhead angling season was stratified into one week strata and simple random sampling without replacement was conducted within each weeks to obtain two aerial counts in each week. In addition, the aerial counts and roving survey were designed to cover the majority of the steelhead angling season (August 27 through November 18, 2001) and not only the Classified Waters Period (September 1-October 31). The Kispiox River was divided into four river sections for the analysis.

Interviews

♦ The River Guardians were on the Kispiox River for 45 (54%) of the 84 day (12 weeks) study period. Of the 381 anglers that were observed, 257 of them were approached for an interview.

♦ Of the 257 anglers approached for an interview, 237 (92%) anglers agreed to complete the interview while 12 anglers (5%) did not know enough English to complete the whole interview, four anglers (2%) refused to complete the interview and four people (2%) were not fishing.

♦ The majority of anglers were interviewed between time period 9-1 and 10-2 (81%). A total of 86% (221 interviews) of angler interviews were conducted in the Classified Waters Period.

♦ Twenty-eight percent of anglers were interviewed between the Confluence with the Skeena River and the Rodeo Grounds, while 50% were interviewed between the Rodeo Grounds and the Upper Recreational Site, while fewer were interviewed between the Upper Recreational Site and the Mitten Bridge (17%) and the remainder were interviewed between Mitten Bridge and the Sweetin Recreational Site (5%).

Angler Characteristics

Residence, Gender and Age

♦ Thirty percent (70 interviews) of all anglers interviewed were B.C. residents. Three of those interviews were repeat interviews, and thus 67 individual B.C. resident anglers were contacted. Of all B.C. resident interviews, 36 (54%) were Skeena Region residents and the remainder (46%) were from other areas of the province.

♦ Almost two percent of all angler interviews were Canadian residents and no repeat interviews were conducted with Canadian residents. Non-Canadian residents composed 68% of all interviews and 19 of those were repeat interviews (139 individual anglers).

♦ More Non-Canadian residents than B.C. or Canadian residents were interviewed in all time periods except 11-2, when slightly more B.C. residents were interviewed. More Non-Canadians were interviewed in the Classified Waters Period than the shoulder weeks of the study period.

♦ Ninety-three percent of anglers interviewed were male (240 anglers) and seven percent (17 anglers) were female.

♦ On average, males were 39 years old and females were 43 years old. No female anglers under the age of 25 were interviewed. In

Guided Status

♦ There were 41 (16%) guided anglers and 209 (84%) non-guided anglers interviewed. Guides and assistant guides were not included in the number of guided angler interviews.

♦ The guided angler interviews were not evenly distributed throughout the study period. Almost 83% of guided anglers were interviewed in the Classified Waters Period (34 anglers) and few guided anglers were interviewed in the shoulder weeks of the study period (late August, November). Most guided anglers were interviewed in time period 9-1.

♦ No B.C. or Canadian and 25% of Non-Canadian residents interviewed were guided.

Conservation Club Membership

♦ Thirty-eight percent of anglers interviewed were members of a conservation club. . Non-Canadian residents (50%) were more likely to be members of a conservation club than B.C. or Canadian residents (17% and 25%; respectively)

♦ Of the anglers that were members of at least one conservation club most were members of the Trout Unlimited (27%). Fewer anglers were members of the Steelhead Society (18%), the Nature Conservancy (14%), California Trout (11%) or the Federation of Fly Fishermen (7%).

Angler Trip Characteristics

Angling Method

♦ Of all angler interviews, there were more fly anglers than gear anglers (75%, 188 anglers and 19%; 48 anglers, respectively) while 6% of anglers (15 anglers) indicated they used both a fly and a gear rod.

♦ More B.C., Canadian and Non-Canadian residents were fly anglers than gear anglers. The proportion of B.C. residents that fished with a gear rod (31%) was higher than Canadian (25%) or Non-Canadian (13%) residents.

♦ Of all angler interviews, 51% were shore-access anglers, whereas the remaining anglers gained access with a drift boat (49%).

♦ Of all drift boat-access anglers interviewed, 24% (27 anglers) were B.C. residents, 77% (88 anglers) and Non-Canadian and none were Canadian residents. Thirty-six percent all shore-access anglers interviewed were B.C. residents (41 anglers) while sixty-one percent were Non-Canadian (69 anglers) and 4% Canadian residents (4 anglers).

♦ Overall, 88% of drift boat-access anglers interviewed were fly fishing, 5% were gear fishing and 7% were fishing with both a fly and a gear rod.

Trip Length

♦ Overall, Kispiox River anglers expected to spend an average of 7.7 hours fishing per day.

♦ On average, B.C. residents (6.8 hours) fished for fewer hours per day than Canadian or Non-Canadian residents (7.5 and 8.1 hours, respectively).

♦ Guided anglers planned to fish longer (9.2 hours) than non-guided anglers (7.4 hours). Anglers that fished from a drift boat fished longer on average than shore based anglers (8.6 and 6.9 hours, respectively).

♦ Overall, anglers planned to spend an average of 10.7 days angling for steelhead on the Kispiox River. On average, B.C. residents planned to fish for 13.3 days. While Canadian and Non-Canadian residents planned to fish for fewer days (5.8 and 8.1 days respectively).

♦ Guided anglers planned to fish for an average of 4.9 days while non-guided anglers planned to fish for 11.6 days.

License Class and Classified Days Purchased

♦ All B.C. resident anglers interviewed purchased an annual angling license. Similarly, more Canadian and Non-Canadian residents bought annual angling licenses than eight-day or one-day angling licenses.

◆ Canadian and Non-Canadian resident anglers planned to fish for more days than their Classified Waters license specified. For example, only eight non-guided anglers planned to fish for only one day and 498 anglers purchased one-day Classified Waters licenses. These results helped clarify the understanding that non-guided, non-resident anglers purchase their Classified Waters license in one or two day blocks.

Angler Compliance

◆ Almost three percent of anglers interviewed (10 individual anglers) had a license infraction. No anglers were recorded as having more than one infraction.

◆ Failure to carry/produce a license was the most frequent infraction noted by River Guardians (60%).

Angler Catch and Effort

Catch Rate

◆ A total of 833 hours (231 interviews, 26 missing with no data) were spent fishing by Kispiox River anglers which averaged 3.6 hours fishing per anglers at the time of the interview. One-hundred and three (103) steelhead were landed and released. The catch rate for all angler interviews was 0.12 steelhead/hour or 0.93 steelhead/rod day (7.7 hr rod day).

◆ Catch rates were estimated for each time period of the study period by grouping all river sections together. Time period 11-2 produced the highest catch rate (1.88 steelhead/rod day) followed by 11-1 (1.42 steelhead/rod day) and 10-1 (1.24 steelhead/rod day). Time period 9-2 (0.23 steelhead/rod day) and 8-2 (0.42 steelhead/rod day) had the lowest steelhead catch rates.

◆ The highest river section catch rates were between the Confluence with the Skeena River and the Rodeo Grounds (1.06 steelhead/rod day) and between the Rodeo Grounds and the Upper Recreation Site (1.02 steelhead/rod day). The lowest river section catch rates were between Upper Recreation Site and the Mitten Bridge (0.40 steelhead/rod day) and between the Mitten Bridge and the Sweetin Recreation Site (0.16 steelhead/rod day).

◆ Among residence categories, Non-Canadian residents had the highest catch rate (0.89 steelhead/rod day), followed by B.C. residents (0.74 steelhead/rod day) and Canadian residents (0.38 steelhead/rod day).

◆ Guided anglers had higher catch rates (1.47 steelhead/rod day) than non-guided anglers (0.81 steelhead/rod day).

◆ On average, gear anglers caught 1.08 steelhead per rod day whereas fly anglers caught 0.87 steelhead per rod day.

Aerial Flights

♦ There were 688 anglers counted on the Kispiox River during 25 aerial flights. The high count of 64 anglers occurred on October 1 (study period 10-1) while a low count of 6 anglers occurred on both November 13 and November 18 (study period 11-2).

♦ A total of 207 drift boats were observed during 25 aerial flights. Overall, there was an average of 8 drift boats counted per day.

♦ The highest proportion of angler effort occurred in the first two river sections; the confluence with the Skeena River to the Rodeo Grounds (38%) and the Rodeo Ground ant the Upper Recreation Site (41%). Less angler effort was observed between the Upper Recreation Site and the Mitten Bridge (15%) and the Mitten Bridge and the Sweetin Recreation Site (6%).

Catch and Effort Estimates

♦ The total effort estimate for the whole study period (and study area) was 2,433 rod days while the effort estimate for the Classified Waters Period was 2,215 rod days.

♦ The total catch estimate was 2,000 steelhead and 1,966 steelhead (98%) of those were caught in the Classified Waters Period.

♦ The largest time period effort estimates occurred in combined time-period of 9-2 and 10-1 (1,203 rod days) followed by time period 8-2 and 9-1 (897 rod days), whereas time period 10-2 and 11-1 had the lowest effort estimates (334 rod days).

♦ The largest river section effort estimates were in the river sections from the Rodeo Grounds to the Upper Recreation Site (1,043 rod days) followed by between the Confluence with the Skeena River to the Rodeo Grounds (891 rod days).

♦ For the whole study period, 708 ($\pm$ 226) drift boat days were estimated for the Kispiox River. Considering the total effort estimate in rod days (2,433 rod days) and the total estimate of boat days (708 boat days), the ratio of angler days to boat days was 3.43:1.

Quality Angling Experience

♦ Two-hundred and two individual anglers reported 369 characteristics About 20% of anglers reported that large steelhead (21%), few people (17%) and beauty or scenic attributes (17%) were key characteristics of a high quality angling experience on the Kispiox River.

♦ B.C. residents indicated that high fish abundance, few anglers, large steelhead, beauty of the area, high fish abundance and weather/water level/water clarity were all key characteristics of a high quality angling experience.

♦ Canadian and Non-Canadian anglers answered similarly and believed that large steelhead, the beauty or scenic attributes, few people, river size/river attributes/rive flow and high fish abundance were all important characteristics of a high quality angling experience.

♦ The average angler rating of their quality angling experience was 3.8 (between fair and good), where one was very poor and five was excellent. The majority of anglers rated their experience as excellent (31%) or good (27%) and few anglers rated their experience as poor (8%) or very poor (4%).

♦ There was no difference in the mean ratings of the quality angling experience between residence categories, guided and non-guided anglers, drift boat or foot access method and those anglers using a fly or gear rod.

Abstract

The River Guardians conducted a creel survey of Kispiox River steelhead (*Oncorhynchus mykiss*) anglers from late August until mid November. Similar to the 1998 River Guardian program on the Bulkley River, aerial counts and an on-site roving survey were the two main components of the creel survey. Two River Guardian teams collected recreational angler's demographics (residence, age, conservation club membership, trip length, hours angling that day), angling methods, access method, license details, and steelhead catch were collected from the short interview.

The River Guardians conducted 257 interviews. Of those, 221 (86%) were interviewed for the first time while 36 (14%) had previously been interviewed. The majority of anglers interviewed were Non-Canadian residents (68%) followed by B.C. (30%) and Canadian residents (2%). There were 41 (16%) guided anglers and 209 (84%) non-guided anglers interviewed. No B.C. or Canadian residents interviewed were guided anglers while 25% of Non-Canadian residents interviewed were guided. Fly anglers were more common than gear anglers (75% and 19%, respectively) and six percent of anglers indicated they fished with both a fly and a gear rod. A higher percentage of B.C. anglers used gear rods (31%) than Canadian (25%) or Non-Canadian (13%) residents. Of all angler interviews, 51% were shore-access anglers, whereas the remaining anglers gained access with a drift boat (49%).

From angler interviews, a total of 833 hours were reported spent angling and the observed catch rate for was 0.25 steelhead/hour or 0.93 steelhead per rod day (7.7 hr).

There were 688 anglers counted on the Kispiox River during 25 aerial flights. Twenty-six aerial flights were scheduled but one was cancelled due to poor weather. The high count of 64 anglers occurred on October 1 (study period 10-1) while a low count of 6 anglers occurred on both November 13 and November 18 (study period 11-2). On average, 30 anglers were counted per flight. A total of 207 drift boats were observed during 25 aerial flights. Overall, there was an average of 8 drift boats counted per day.

The total effort estimate for the whole study period (and study area) was 2,433 rod days while the effort estimate for the Classified Waters Period was 2,215 rod days (91% of total). The total catch estimate was 2,000 steelhead and 1,966 steelhead (98%) were caught in the Classified Waters Period. The total effort and catch estimates were the sum of all time period estimates. The majority of estimated angler effort occurred in the Classified Waters Period (91%). Spatially, the river sections from the Rodeo Grounds up to the Upper Recreation Site (43%) and from the Confluence with the Skeena River to the Rodeo Grounds (37%) had the highest angler effort.

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1.0.0.0 Introduction

The Kispiox River in the Skeena Region of northwestern British Columbia (B.C.) is well known for providing a high quality steelhead (*Oncorhynchus mykiss*) recreational fishery. In 1990, the province of B.C. implemented a Classified Waters system to protect such high quality angling experiences on rivers throughout the province. The purpose of the Classified Waters system was to provide a diversity of angling opportunities, maintain a high quality angling experience and improve regulation of the angling guide industry (ARA Consulting Group 1991). Rivers or sections of rivers were defined as Classified Waters during critical time periods which were usually during preferred steelhead angling seasons.

The freshwater recreational fishery in B.C. was estimated to grow in value by 2.0% per year between 1994 and 1999 (Price Waterhouse and ARA Consulting Group Inc. 1996). As a result of this growth, local anglers voiced concerns with respect to crowding on Classified Waters in the Skeena Region. In turn, the province of B.C. implemented a Skeena Region River Guardian program to help monitor recreational angling opportunities on Classified Waters.

The 2001 fall steelhead season marked the fourth year of the River Guardian program in the Skeena Region. The program started in 1997 and in the past has conducted surveys of anglers on the Bulkley, Babine, Kispiox and Zymoetz (Copper) rivers. There was not a River Guardian program in the Skeena Region in 2000. The program was funded by the Habitat Conservation Trust Fund (HCTF) and was a cooperative effort between the B.C. Conservation Foundation, B.C. Ministry of Water, Land and Air Protection (WLAP) and Cascadia Natural Resource Consulting.

The River Guardians conducted a survey of Kispiox River anglers that collected information about steelhead angler's demographics, catch and effort, and characteristics of a quality angling experience. Also, aerial counts of anglers were conducted to further document the spatial and temporal patterns of angler effort and total angler effort. The River Guardians were not officers under the B.C. Wildlife Act and therefore did not have enforcement powers. Their presence was primarily for data collection and to promote river stewardship.

The objectives of the 2001 River Guardian Program on the Kispiox River were:
1. To collect accurate catch and effort data in order to estimate total catch and effort by steelhead anglers;
2. To collect representative demographic data describing the steelhead anglers; and,
3. To provide a Ministry of Water, Land and Air Protection presence and encourage river stewardship among anglers.

2.0.0.0 Study Area

The Kispiox River flows for about 140 km into the Skeena River at the village of Kispiox, 16 km north of Hazelton B.C. It drains a total area of 2,086 km^2 and is highly responsive to flood events because it has a minimal amount of lake influence. Extensive roads from forest harvesting has resulted in significant runoff and siltation during high precipitation events (Anonymous 1996). During high runoff from a large rainfall or unusually warm weather (late August) the water clarity is reduced, which, in turn produces unfavorable fishing conditions. The frequency of these events can range from none to four or five per season and seldom lasting less than three or four days or more than 10 to 12 days. The Kispiox River steelhead are known for their world record size.

The Kispiox River is accessible by road from both sides of the river for most of its length and the valley is populated and well developed agriculturally. Power boats are prohibited on the river but drift boats are permitted and commonly used by anglers and non-angling recreationists. Over 50 km of the river can be accessed by anglers but most are concentrated within the lower 30 km upstream of the Skeena River (Anonymous 1997). This study included the Kispiox River from the Sweetin Recreation Site downstream to the Confluence with the Skeena River.

The Kispiox River is one of 42 class one or class two, Classified Waters in the province (Anonymous 1999). Class one waters are remote, pristine, wilderness rivers with significant fisheries value that are largely accessible only by boat or aircraft (J. Paul and Associates 1998). Class two waters are more accessible, but still represent a quality angling experience. Class two waters typically have more local use than class one waters. During the classified waters period, angling guides are limited as is the number of days they can guide. In the Classified Waters Period on the Kispiox River, three angling guides are licensed on the river and can provide 393 rod days of guided angling. WLAP does not restrict the number of assistant angling guides on any of the Classified Waters throughout the province. In 2001 the Kispiox River was a class 2 Classified Water between September 1 and October 31.

Angling restrictions in the Kispiox River are published in the B.C. Freshwater Fishing Regulations Synopsis (Anonymous 2001). In short, no fishing was permitted from January 1 to June 15. From June 16 through December 31 the river had a bait ban and there was no angling from boats. No power boats were permitted on the Kispiox River. There was a single-barbless hook only restriction and all steelhead must be released. A steelhead stamp is mandatory in the classified waters period. In the classified waters period, non-resident anglers were required to purchase a classified waters license at $10.00 per day and B.C. residents were required to purchase an annual classified waters license at $10.00 per year.
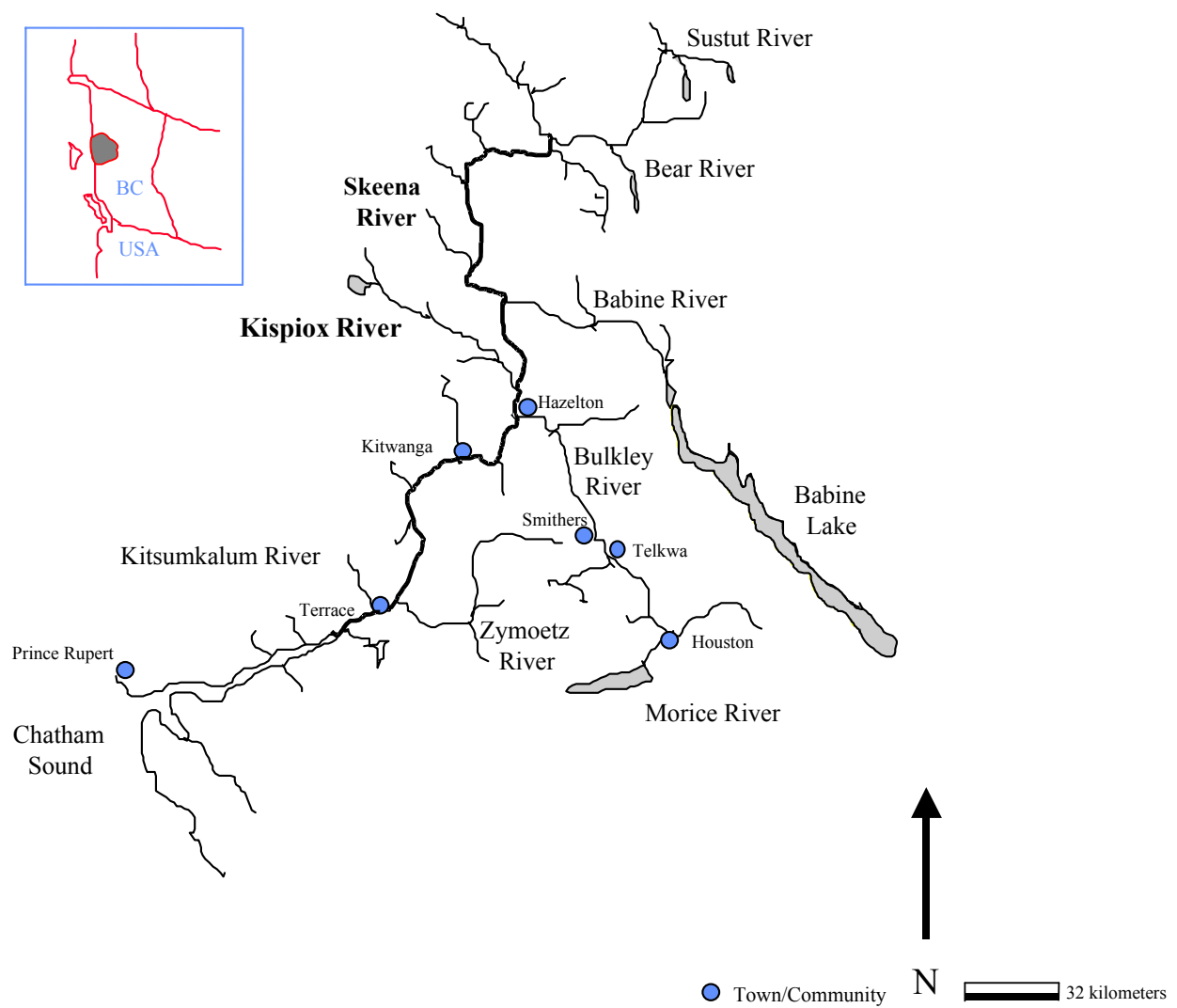
Figure 1.   The Skeena River watershed.
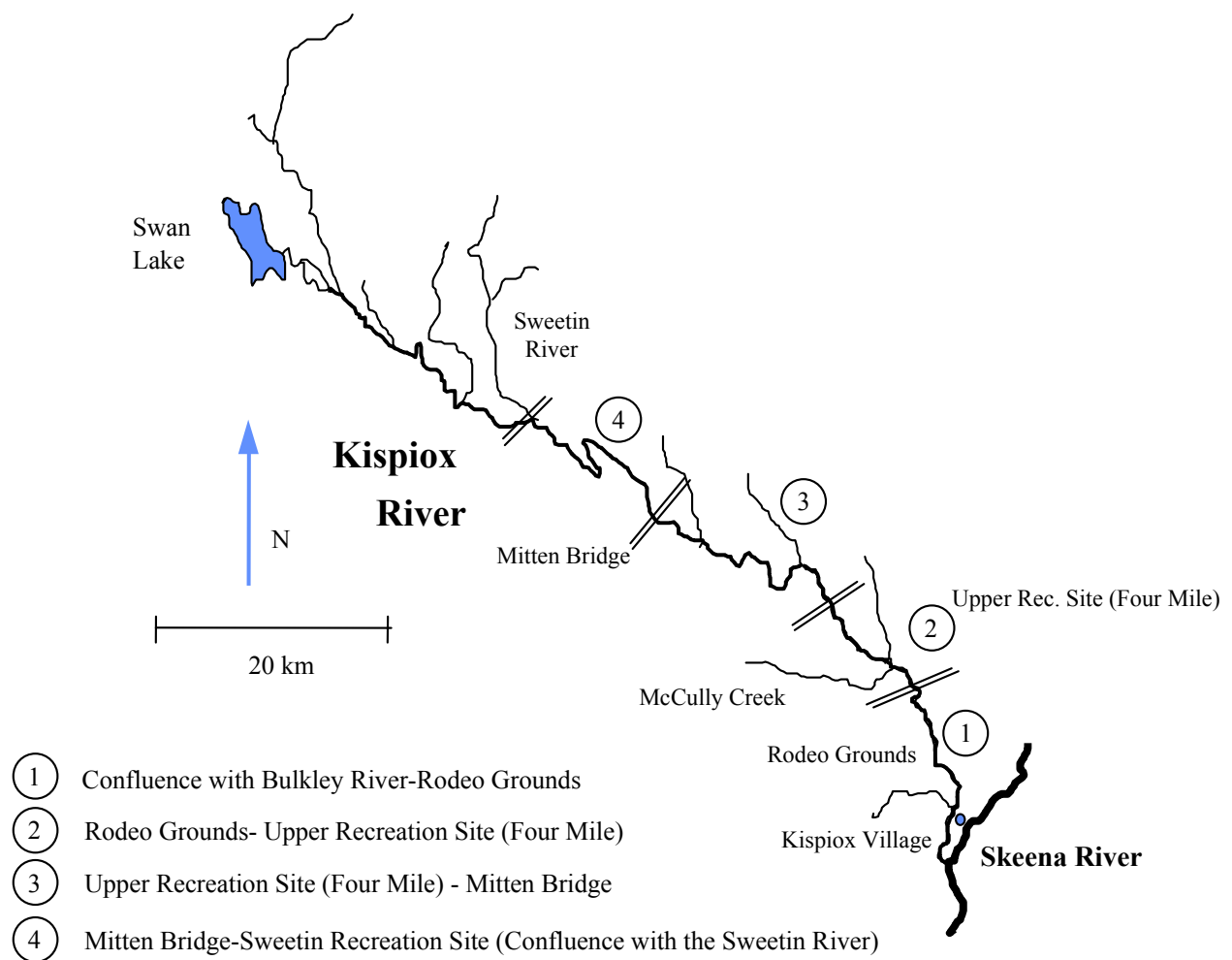
Figure 2.   The Kispiox River sections used for analysis.

3.0.0.0 Methods

3.1.0.0 Field Methods

The River Guardians conducted a creel survey of 2001 Kispiox River steelhead anglers. Aerial counts and an on-site roving survey were the two main components of the creel survey. The steelhead angling season was stratified into one week strata and simple random sampling was conducted within each week and day type to obtain two aerial counts per each week (stratified random sampling design; Schaeffer *et al.* 1990). One aerial count occurred on a weekday day and one aerial count occurred on a weekend day. In addition, the aerial counts and roving survey were designed to cover the majority of the steelhead angling season (August 27 through November 18, 2001) and not only the Classified Waters Period (September 1-October 31). The Kispiox River was also divided into four river sections for the analysis (Figure 2).

Two River Guardians were on the Kispiox River on each of the days selected for aerial counts. The River Guardians used an inflatable raft to contact as many drift boat-access and shore-access anglers as possible. Occasionally, a truck was used to access anglers due to a River Guardian team member being unavailable. The River Guardian team interviewed anglers downstream of an established section put-in site in one of four river sections. Each river section required approximately 3-5 hours to drift; Guardians generally initiated each drifts between 09:00hrs and 11:00hrs. The direction of travel of each section was always downstream. As many interviews as possible were conducted in the river section surveyed on the assigned day. River Guardians may have randomly selected anglers to be interviewed during periods of high angler density and limited remaining daylight hours.

Each team of River Guardians completed two forms while on the river: the angler interview form and the angler count form (Appendix 1). The angler was approached and asked for their cooperation to complete the interview. The recreational angler's demographics (residence, age, conservation club membership, trip length, hours angling that day), angling method, access method and steelhead catch were recorded on the angler interview form. The River Guardians also asked to see the angler's license, and if needed, recorded any infractions they noticed. If the anglers did not agree to the interview, had already completed the interview, or there was a language barrier, the River Guardians only recorded data on the access method, angling method, gender, hours fished, catch and license details. Often, the River Guardians would interview an angler that was previously interviewed. In this case, only the name, angling method, access method, catch information and trip length information were collected from the angler.

The River Guardians also completed an angler count form each day they were on the river. The date, river section surveyed, number of anglers interviewed in each river section, number of anglers observed in each river section, and weather and water conditions were completed on each angler count form. Also, the initials of the River Guardian crew and any other comments the River Guardians had were completed on the angler count form.

The River Guardians were not officers under the Wildlife Act and therefore did not have enforcement powers. Their presence was primarily for data collection. However, the

Conservation Officer Service was contacted as soon as possible when the River Guardians observed an infraction.

Twenty-three aerial counts were conducted on the Kispiox River during the study period. The helicopter traveled west from Smithers directly to the Kispiox – Skeena confluence. The helicopter then proceeded to fly directly over the river upstream to the confluence of the Kispiox and Sweetin rivers. All aerial counts were conducted between 1:00 and 2:30 p.m. This time period represented the active period for anglers in the Kispiox River and surrounding area (Lewynski and Olmsted 1990). Each aerial count took approximately 90 minutes. The count of anglers was recorded on aerial count forms while proceeding upstream (Appendix 1). The number of anglers, drift boats, fly anglers and gear anglers, guided anglers and the guide were recorded for each river section. In addition, the date, weather, time, personnel and helicopter carrier were recorded for each aerial flight. Inactive drift boats (tied up to a dock or permanent object for several days) observed during the aerial flights were excluded from the boat counts on the aerial count form.

3.2.0.0 Relevant Definitions

B.C. Resident: The anglers' permanent residence was within B.C. The angler must have been present in B.C. for at least six months during the 12 months immediately prior to purchasing an angling license (Anonymous 2001).

Canadian Resident: The anglers' permanent residence was outside of B.C. but within Canada. The angler resided outside of B.C. for more than six months during the 12 months prior to purchasing an angling license (Anonymous 2001).

Non-Canadian Resident: The anglers' permanent residence was outside of Canada. The angler resided outside of Canada for more than six months during the 12 months prior to purchasing an angling license (Anonymous 2001).

Rod Day: One day of angler effort, the length in hours varies depending on week of the study period and other demographic variables.

Drift Boat: The angler used a non-motorized boat to access recreational angling on the Kispiox River including rafts, canoes, pontoon boats and float tubes.

3.3.0.0 Analysis Methods

3.3.1.0 Interviews

The number of angler interviewed was summarized by time period and day type (weekend and weekday) and river sections. In addition the proportion of repeat interviews were summarized by time period (Tables 1) and river section (Table 2 and Figure 2).

Table 1. The dates included in each time period used for analysis. Time periods that include the Classified Waters Period are italicized.

Week	Dates
8-2	Aug. 27 – Sept. 2
9-1	*Sept. 3 – Sept. 16*
9-2	*Sept. 17 – Sept. 30*
10-1	*Oct. 1- Oct. 14*
10-2	*Oct. 15 – Oct. 28*
11-1	*Oct. 29 – Nov. 11*
11-2	Nov. 12 – Nov. 18

Table 2. The Kispiox River sections used in analyses.

	River Section[1]
1	Confluence with Skeena River-Rodeo Grounds
2	Rodeo Grounds –Upper Recreation Site
3	Upper Recreation Site-Mitten Bridge
4	Mitten Bridge – Sweetin Recreation Site

1. In past reports, the Upper Kispiox Recreation Site has been reported as the Four Mile Recreation Site river section and the Rodeo Grounds has been reported as Woods Hole river section.

3.3.2.0 Angler Characteristics

Some anglers were interviewed several times. The percentage and number of angler interviews attempted and the percentage and number of individual anglers were summarized by residence categories. Unless otherwise noted, the angler interview not the individual angler was the unit of analysis in this report. For B.C. residents, the postal code was used to determine if the angler was from the Skeena Region or other provincial WLAP regions. Canadian residents were asked for their province of origin and Non-Canadian residents were asked for their county of origin. The angler interview was used to provide a summary for the region (of B.C.), province or country the angler resided in. In addition, the date of birth was collected from the angler license. The number of male and female anglers were summarized by age categories. All angler interviews were used to summarize the proportion of anglers interviewed by each day type and time period.

Guided status (non-guided or guided) was recorded and summarized by day type, time period, number of repeat interviews and residence category.

Anglers were asked, *"Are you a member of a conservation club or organization? If YES, what organization?"* Responses were summarized by the percentage of anglers belonging to at least one type of conservation club. A chi-square test of homogeneity was used to compare the frequency of membership in a conservation club with residence categories and guided status. For 2x2 contingency tables (one degree of freedom; Zar 1984).

3.3.3.0 Angler Trip Characteristics

The angling method (fly or gear) and access method (drift boat or shore) were recorded by the River Guardians and summarized by angler residence and guided status. In addition, angling method was summarized by access method. A chi-square test of homogeneity was used to

compare frequencies for all summaries (Zar 1984). For angling methods, all angler interviews were used as the unit of analysis and not the individual angler.

Anglers were asked, *"When do you expect to finish your fishing trip today?"* With addition to the time the angler started fishing that day, the expected fishing effort was calculated for each angler interviewed. This was the expected angler day. The expected angler day was summarized by time period, residence categories, guided status, angling method and access method. Differences in the expected angler day for week, angler residence and access method were compared with a non-parametric Kruskal-Wallis test. Mann-Whitney U tests were used to examine differences in expected angler day between guided status and angling method categories. An assumption of a normal distribution of anglers was not necessary for both non-parametric statistical tests. The angler day information was used to construct an angler activity profile, which was the frequency of anglers that fished during each hour of the day (between 6:00 a.m. and 8:00 p.m.). The activity profile was constructed for the whole study period and for each time period throughout the study.

Anglers were asked, *"Excluding driving, hiking and prep time how long did you fish the Kispiox River?"* The actual time spent fishing (fishing time) was summarized and used in catch rate calculations

Anglers were asked, *"How many days have you already fished on the Kispiox River?"* and *"How many more days do you plan to fish on the Kispiox River?"* The total number of planned angling days in the 2001 steelhead angling season was calculated from the results of these two questions. The differences in the number of planned angling days for angler residence categories was compared with a non-parametric Kruskal-Wallis test. A Mann-Whitney U test was used to examine differences in the number of planned angling days between guided status categories. An assumption of a normal distribution of anglers was not necessary for both non-parametric statistical tests.

3.3.4.0 Angling Licenses

The River Guardians recorded the angler's license class and the number of Classified Waters days purchased and used from the angler's license. The license class (one day, eight day and annual) and the number of Classified Waters days purchased and used were summarized by residence category and guided status. In addition, the number of Classified Waters days purchased was summarized by license class. The number of Classified Waters days purchased and the number of days planned angling were summarized for guided and non-guided anglers.

Anglers were not required to purchase all the Classified Waters days at one time, nor were they required to carry all the used Classified Waters licenses they purchased with them. Therefore, the River Guardians recorded the number of Classified Waters days purchased by the angler just prior to the day the angler was interviewed.

The number and type of infractions observed by the River Guardians were recorded on the interview form. The frequency and type of infractions were summarized by residence category and time period.

3.3.5.0 Angler Effort and Catch

3.3.5.1 Catch Rate

The observed catch rate and effort was calculated with data from the on-site interviews. The River Guardians asked anglers, *"How many hours have you fished today?"* and *"What type of fish have you landed today? How many did you keep or release?"* The number of hours spent angling, steelhead landed, Dolly Varden/bull trout (*Salvelinus malma/Salvelinus confluentus*) kept and released, and other species kept and released were recorded on the angler interview form.

Typically, anglers were not interviewed at the end of the angling day (trip) and therefore incomplete angler catch and effort data were collected. Thus, the mean of the ratios was used to estimate catch rates instead of the ratio of the means, since anglers were sampled while they were still fishing, implying catch probabilities were proportional to their trip length (Pollock *et al.* 1994; Jones *et al.* 1995; Pollock *et al.* 1997). Also, short incomplete trips (< 0.5 hr.) were excluded to prevent the variance from being influenced by extreme catch rates that may occur during short trips (Pollock *et al.* 1994; Hoenig *et al.* 1997). Catch rate ($\hat{R}$) was estimated by:

Equation 1
$$\hat{R} = \frac{\sum_{i=1}^{n} c_i / L_i}{n}$$

where $\hat{R}$ = catch rate of the sample, n = the number of sampling units (interviews), L_i = the length of the fishing trip at the time of the interview and c_i = the catch for the *i*th sampling unit (angler interview).

The catch rate (in hours and steelhead per rod day), steelhead caught and effort (hours) were summarized by time period, river section, angler residence, guided status, access method and angling method. Steelhead per rod day was calculated by multiplying the catch rate by the rod day length in hours. The rod day length (hours) was obtained from the expected angling day length obtained from anglers in the interview (Table 14). The mean of the expected angling day length was calculated for each time period, residence category, guided status category, access method and angling method. The mean expected angling day lengths were then multiplied by the catch rate for the analysis category to obtain steelhead per rod day.

For each river section the steelhead per rod day was calculated using the overall mean expected angling day (7.7 hr). The summary of steelhead caught includes all angler trips while the effort and catch rate summaries include only trips that were greater than or equal to 0.5 hr. at the time of the interview. Also, the other species of fish caught with catch rates in rod days were summarized. An overall rod day of 7.7 hr was used to calculate the fish per rod day for Dolly Varden/bull trout and coho salmon (*Oncorhynchus kisutch*). The number of whitefish (*Prosopium* sp.), cutthroat trout (*O. clarki*), pink salmon (*O. gorbuscha*), sockeye salmon (*O. nerka)* and rainbow trout (*O. mykiss)* landed were also summarized.

3.3.5.2 Aerial Flights

The observed number of anglers counted on the aerial flights were summarized for each time period, river section, angling method, guided status. In addition, the number of drift boats were summarized by time period and river section.

3.3.5.3 Effort and Catch Estimates

Time Period Effort and Catch

Any angler observed during aerial flights was counted as one rod day of effort. Several methods were used to estimate catch and effort for time period, river sections, residence categories, guided status, access method and angling method. Methods differed according to the amount of information that was collected in each time period and river section. Due to few interviews, the seven time periods (Table 1) were pooled to create three time periods. Time periods 8-2 and 9-1 were pooled, time periods 9-2 and 10-1 were pooled and time periods 10-2 through 11-2 were pooled.

Aerial counts were corrected for anglers that were not on the river during the flight. The daily aerial counts (e_{daily}) were divided by the proportion of anglers that were on the river during the aerial flight (sampling probability; $P_{sampprob}$) and were the corrected daily effort estimates (Equation 2; $e_{dailycorr}$). The sampling probability was the mean probability that the angler was on the river during the flight for each day type within the time period stratum. The sampling probability was obtained by asking anglers when they started and when the expected to stop angling during the interview.

Equation 2
$$e_{dailycorr} = \frac{e_{daily}}{P_{sampprob}}$$

The corrected daily effort estimates were used to calculate the mean daily effort ($\bar{e}_{tp,dt}$) within each time period and day type strata. The effort within each day type strata ($\hat{E}_{tp,dt}$) was estimated by multiplying the mean daily effort by the number of fishable days in the strata (Equation 3). Non-fishable days were determined by comments from River Guardians and descriptions in Appendix 3.

Equation 3
$$\hat{E}_{tp,dt} = N_{tp,dt,fishable} \times \bar{e}_{tp,dt}$$

The variance in the estimate of effort within each day type ($Var(\hat{E}_{tp,dt})$) was calculated by:

Equation 4
$$Var(\hat{E}_{tp,dt}) = N_{tp,dt,fishable}^2 \times (s_{tp,dt}^2 / n) \times fpc_{tp,dt}$$

where $N_{tp,dt,fishable}$ was the total number of fishable days in each time period, $s_{tp,dt}^2$ was the sample variance of the daily effort within the strata, n was the number of observations of total daily effort within the stratum, and *fpc* was the finite population correction factor ((N-n)/N; Schubert 1988; Scheaffer *et al.* 1990).

The total effort ($\hat{E}_{tp}$) for each time period was the sum of day type effort within that time period (weekend day and weekday effort; Equation 5).

Equation 5
$$\hat{E}_{tp} = \sum_{dt} \hat{E}_{tp,dt} = \hat{E}_{tp,weekday} + \hat{E}_{tp,weekend}$$

The variance of the total effort ($Var(\hat{E}_{tp})$) for each time period was the sum of the day type effort variance within that time period (weekend day and weekday effort variance; Equation 6).

Equation 6
$$Var(\hat{E}_{tp}) = \sum_{dt} Var(\hat{E}_{tp,dt}) = Var(\hat{E}_{tp,weekday}) + Var(\hat{E}_{tp,weekend})$$

Approximate 95% confidence intervals for the effort within each time period were calculated with Equation 7.

Equation 7
$$95\% \text{ Confidence Intervals} = 2 \times \sqrt{Var(\hat{E}_{tp})}$$

The total effort ($\hat{E}$) for the study period was the sum of the effort of all time period strata ($\hat{E}_{tp}$; Equation 8).

Equation 8
$$\hat{E} = \sum_{tp} \hat{E}_{tp} = \hat{E}_{tp8-2} + \hat{E}_{tp9-1} + \hat{E}_{tp9-2} + \hat{E}_{tp10-1} + \hat{E}_{tp10-2} + \hat{E}_{tp11-1} + \hat{E}_{tp11-2}$$

The variance in total effort ($Var(\hat{E})$) was estimated with Equation 9 where the variance in effort for each time period strata ($Var(\hat{E}_{tp})$) was summed (Schubert 1988).

Equation 9
$$Var(\hat{E}) = \sum_{tp} Var(\hat{E}_{tp}) = Var(\hat{E}_{tp8-2}) + Var(\hat{E}_{tp9-1}) + Var(\hat{E}_{tp9-2}) + Var(\hat{E}_{tp10-1}) + Var(\hat{E}_{tp10-2}) + Var(\hat{E}_{tp11-1}) + Var(\hat{E}_{tp11-2})$$

The approximate 95% confidence intervals for the total effort were calculated with Equation 10.

Equation 10
$$95\% \text{ Confidence Intervals} = 2 \times \sqrt{Var(\hat{E})}$$

The total catch and time period catch estimates were calculated with Equations 11 through 20. For each day a flight was conducted, the daily catch rates (obtained from the interviews) were used to estimate the mean daily catch rate ($\overline{R}_{tp,dt,daily}$), Equation 1. The daily effort estimate ($e_{dailycorr}$; in rod days) was multiplied by the expected angling day length ($\overline{L}_{tp,dt}$; in hours, Table 14) to estimate the total daily effort in hours ($\hat{E}_{tp,dt,daily(hr)}$; Equation 11).

Equation 11
$$\hat{E}_{tp,dt,daily(hr)} = \overline{L}_{tp,dt} \times e_{dailycorr}$$

The total daily effort ($\hat{E}_{tp,dt,daily(hr)}$) was multiplied by the mean daily catch rate ($\overline{R}_{tp,dt,daily}$) to obtain the daily catch (Equation 12).

Equation 12
$$\hat{C}_{tp,dt,daily} = \overline{R}_{tp,dt,daily} \times \hat{E}_{tp.dt.daily(hr)}$$

The mean catch within each day type was the average of daily catches within that day type (Equation 13).

Equation 13
$$\overline{C}_{tp,dt} = \frac{\sum \hat{C}_{tp,dt,daily}}{n}$$

The total catch within each day type ($\hat{C}_{tp,dt}$) was estimated by multiplying the mean catch for that day type, ($\overline{C}_{tp,dt}$) by the number of fishable days in the day type and time period (Equation 14).

Equation 14
$$\hat{C}_{tp,dt} = N_{tp,dt,fishable} \times \overline{C}_{tp,dt}$$

The variance in the estimate of total catch within each day type was calculated with:

Equation 15 $$Var(\hat{C}_{tp,dt}) = N^2_{tp,dt,fishable} \times (s^2_{tp,dt}/n) \times fpc_{tp,dt}$$

where $N_{tp,dt,fishable}$ was the total number of fishable days in the strata, $s^2_{tp,dt}$ was the sample variance of the daily catch within the stratum, n was the number of observations of total daily catch within the week, and *fpc* was the finite population correction factor ((*N-n)/N*; Schubert 1988, Scheaffer *et al*. 1990).

The total catch ($\hat{C}_{tp}$) for each time period was the sum of the day type catch (weekend day and weekday catch; $\hat{C}_{tp,dt}$).

Equation 16 $$\hat{C}_{tp} = \sum_{dt}(\hat{C}_{tp,dt}) = \hat{C}_{tp,weekday} + \hat{C}_{tp,weekend}$$

The variance in the total catch for each time period ($Var(C_{tp})$) was calculated by:

Equation 17 $$Var(\hat{C}_{tp}) = \sum_{dt}Var(\hat{C}_{tp,dt}) = Var(\hat{C}_{tp,weekday}) + Var(\hat{C}_{tp,weekend})$$

where the variance in catch for each week ($Var(\hat{C}_{tp,dt})$) was summed (Schubert 1988).

The total catch ($\hat{C}$) for the study period was the sum of the catch of all time period strata ($\hat{C}_{tp}$; Equation 18).

Equation 18 $$\hat{C} = \sum_{tp}C_{tp} = \hat{C}_{tp8-2} + \hat{C}_{tp9-1} + \hat{C}_{tp9-2} + \hat{C}_{tp10-1} + \hat{C}_{tp10-2} + \hat{C}_{tp11-1} + \hat{C}_{tp11-2}$$

The variance in total catch ($Var(\hat{C})$) was estimated with Equation 19 where the variance in catch for each time period stratum ($Var(\hat{C}_{tp})$) was summed (Schubert 1988).

Equation 19
$$Var(\hat{C}) = \sum_{tp}Var(\hat{C}_{tp}) = Var(\hat{C}_{tp8-2}) + Var(\hat{C}_{tp9-1}) + Var(\hat{C}_{tp9-2}) + Var(\hat{C}_{tp10-1}) + Var(\hat{C}_{tp10-2}) + Var(\hat{C}_{tp11-1}) + Var(\hat{C}_{tp11-2})$$

The approximate 95% confidence intervals for the total catch were calculated with Equation 20.

Equation 20 $$95\% \text{ Confidence Intervals} = 2 \times \sqrt{Var(\hat{C})}$$

Effort and Catch for River Sections

For river sections, effort was estimated by time period and day type stratification because of the aerial count sampling design, however catch was estimated only by day type stratification because too few angler interviews were conducted for time period stratification. River sections three (Upper Recreation Site-Mitten Bridge) and four (Mitten Bridge-Sweetin Recreation Site) were pooled due to few interviews. The effort within each river section ($\hat{E}_{rs,tp,dt}$) was estimated with Equations 2 through 7. The total effort within the river section in rod days ($\hat{E}_{rs}$) was the sum of effort estimates within the time period and day type stratification ($\hat{E}_{rs,tp,dt}$; Equation 21).

Equation 21
$$\hat{E}_{rs} = \sum_{tp}\sum_{dt}\hat{E}_{rs,tp,dt}$$

The variance in the effort estimate within each river section ($Var(\hat{E}_{rs})$) was the sum of the variance estimates within the time period and day type stratification ($Var(\hat{E}_{rs,tp,dt})$).

Equation 22
$$Var(\hat{E}_{rs}) = \sum_{tp}\sum_{dt}Var(\hat{E}_{rs,tp,dt})$$

Approximate 95 percent confidence intervals for the total effort within a river section were calculated with Equation 23.

Equation 23
$$95\% \text{ Confidence Intervals} = 2 \times \sqrt{Var(\hat{E}_{rs})}$$

The total daily effort in hours for each day type was required for catch estimation. The total daily effort in hours ($\hat{E}_{tp,rs,dt,daily\,(hr)}$) was calculated with Equation 11 and the mean daily effort in hours and total number of fishable days were used to calculate the total hourly effort and variance by time period and day type strata following Equations 3 and 4, respectively. The total hourly effort by day type was calculated by summing over time periods:

Equation 24
$$\hat{E}_{rs,dt} = \sum_{tp}\hat{E}_{rs,tp,dt}$$

The average catch rate by day type ($\hat{R}_{rs,dt}$) was calculated from the angler interviews conducted in each river section. Catch was estimated by day type from the estimated total hourly effort and average catch rate with Equation 25, and the total catch was the sum of the day type estimates (Equation 26).

Equation 25
$$\hat{C}_{rs,dt} = \hat{E}_{rs,dt} \times \hat{R}_{rs,dt}$$

Equation 26
$$\hat{C}_{rs} = \sum_{dt}\hat{C}_{rs,dt}$$

The variance of catch rate estimates by day type were calculated with Equation 27 following the method for the product of independent variables described by Goodman (1960). The total variance and approximate 95 percent confidence intervals for the total catch for each river section were calculated with Equations 28 and 29.

Equation 27 $\quad Var(\hat{C}_{rs,dt}) = \hat{E}_{rs,dt}^2 \times Var(\hat{R}_{rs,dt}) + \hat{R}_{rs,dt}^2 \times Var(\hat{E}_{rs,dt}) - Var(\hat{E}_{rs,dt}) \times Var(\hat{R}_{rs,dt})$

Equation 28
$$Var(C_{rs}) = \sum_{dt}Var(\hat{C}_{dt})$$

Equation 29 $$95\% \text{ Confidence Intervals} = 2 \times \sqrt{Var(\hat{C}_{rs})}$$

Effort and Catch for Residence and Guided Status
Equations 2 through 10 were used to estimate the total effort for guided and non-guided anglers, fly, gear and unknown method anglers, and drift boats. The corrected daily effort estimates (Equation 2) for each angling method ($e_{flydailycorr}$, $e_{geardailycorr}$, $e_{unidentifiabledailycorr}$), guided status ($e_{guideddailycorr}$, $e_{non-guideddailycorr}$) or drift boats ($e_{driftdaily}$) were substituted for the total daily effort estimate ($e_{dailycorr}$). Thus, effort estimates were made for each angling method, guided status, and number of drift boats for each day type. Not all fly and gear anglers were recognizable from the helicopter, accordingly an estimate was calculated for an unknown angling method category.

Effort estimates for residence categories differed in calculation from guided status, angling method and drift boats because residency could not be determined from aerial flights. The proportion of anglers in each residence category was determined from the number of interviews completed on each flight day. Within each day type the effort for each residence category ($\hat{E}_{res}$) was the total effort ($\hat{E}_{tp,dt}$) multiplied by the proportion of anglers in each residence category (β_{res}; Equation 30).

Equation 30 $$\hat{E}_{tp,dt,res} = \hat{E}_{tp,dt} \times \beta_{res}$$

The variance in the proportion ($Var(\beta_{tp,dt,res})$) of residence category was calculated with Equation 31, where $m_{tp,dt}$ was the number of interviews in each stratum (Palsson 1990).

Equation 31 $$Var(\beta_{tp,dt,res}) = \frac{(\beta_{tp,dt,res}(1-\beta_{tp,dt,res}))}{m_{tp,dt}} \times fpc_{tp,dt,res}$$

The variance in effort for each residence category ($Var(\hat{E}_{tp,dt,res})$) was calculated with Equation 32.

Equation 32
$$Var(\hat{E}_{tp,dt,res}) = (Var(\beta_{tp,dt,res}) \times (\hat{E}_{tp,dt})^2) + (Var(\hat{E}_{tp,dt}) \times (\beta_{tp,dt,res})^2) - ((Var(\hat{E}_{tp,dt}) \times (Var(\beta_{tp,dt,res}))))$$

The approximate 95% confidence intervals for the residence effort were calculated with Equation 33.

Equation 33 $$95\% \text{ Confidence Intervals} = 2 \times \sqrt{Var(\hat{E}_{tp,dt,res})}$$

For catch in each residence and guided status category a similar approach was used. Equations 30 through 34 were used but day type effort was substituted with day type catch. Thus, proportions of catch were attributed to each residence and guided status category. In contrast, Equations 11 through 20 were used to calculate catch for each angling method category. Proportional allocation of catch could not be attributed to each angling method category because a proportion of the 'unknown' angling method from the aerial survey did not correspond with the interviews (all angling methods known).

Estimates for the Classified Waters Period
To obtain catch and effort estimates for the classified waters period days were grouped into two time periods (tp_{cw1}; September 1-30 and tp_{cw2}; October 1-31). To obtain effort estimates for the classified waters period, tp_{cw1} and tp_{cw2} were (substituted for the time periods in Table 1) and into

Equations 3 through 10. Only aerial counts within the classified waters period were used and the total number of fishable days was adjusted to the classified waters period. Equations 11 through 20 were used to estimate steelhead catch within the classified waters period. The total daily effort for the classified waters period days was used in Equation 12 instead of the total daily effort in the whole study period.

3.3.6.0 Quality Angling Experience

Anglers were asked, *"What do you feel are the key characteristics of a high quality angling experience on the Kispiox River?"* and *"How would you rate your quality angling experience today?"* The key characteristics of the quality experiences were summarized for each residence category and guided status. The individual angler was used for the unit of analysis, not the angler interviews, thus angler responses were only included. Also, only the first three key characteristics the angler provided were used. Mean ratings of the quality angling experience were summarized by time period, residence category and guided status. In this case, all angler interviews were used because the angler was asked to rate their experience on each day. In addition, angler ratings of their quality angling experience were summarized by time period.

A correlation analysis of the rating of the quality angling experience and other key factors (angler effort, catch rate, and secchi depth (water conditions)) that could impact the angling experience was completed.

3.3.7.0 Survey Bias

The distribution of aerial counts and interviews for time periods and river sections were summarized to assess the likelihood of sampling bias. The likelihood of response and non-response errors was also discussed.

4.0.0.0 Results and Discussion

4.1.0.0 Interviews

The River Guardians were on the Kispiox River for 45 (54%) of the 84 day (12 weeks) study period. Of the 381 anglers that were observed, 257 of them were approached for an interview.

Of the 257 anglers approached for an interview, 237 (92%) anglers agreed to complete the interview while 12 anglers (5%) did not know enough English to complete the whole interview, four anglers (2%) refused to complete the interview and four people (2%) were not fishing. Thus, almost eight percent of people stopped did not complete the interview. Of the 257 anglers that were approached for an interview, 221 (86%) were being interviewed for the first time and 36 (14%) had been previously interviewed.

The majority of interviews were completed on weekdays (83%), while the remainder (17%) were completed on weekends (Saturday, Sunday, holidays; Table 3). Also, the majority of anglers were interviewed between time period 9-1 and 10-2 (84%). A total of 86% (221 interviews) of angler interviews were conducted in the Classified Waters Period.

Table 3. The percentage and number (n) of anglers approached for an interview on weekdays and weekends within each time period. See Table 1 for definition of time periods. Time periods that include the Classified Waters period are italicized.

Time Period	Percentage (n) of Interviews Initiated		
	Weekday	Weekend	Total
8-2	21.4 (3)	78.6 (11)	5.4 (14)
9-1	*79.6 (39)*	*20.4 (10)*	*19.1 (49)*
9-2	*94.9 (56)*	*5.1 (3)*	*23.0 (59)*
10-1	*81.8 (54)*	*18.2 (12)*	*25.7 (66)*
10-2	*90.9 (30)*	*9.1 (3)*	*12.8 (33)*
11-1	*87.1 (27)*	*12.9 (4)*	*12.1 (31)*
11-2	80.0 (4)	20.0 (1)	1.9 (5)
Total	**82.9 (213)**	**17.1 (44)**	**100.0 (257)**

Time period 9-2 (September 23-27) had several days when the Kispiox River was 'out' and had poor angling conditions (see Appendix 3.0 for weather and water details). Otherwise, all other days in the study period provided water conditions that were 'fishable'

Anglers were not evenly distributed throughout river sections of the Kispiox River (Table 4). Twenty-eight percent of anglers were interviewed between the Confluence with the Skeena River and the Rodeo Grounds, while 50% were interviewed between the Rodeo Grounds and the Upper Recreational Site, fewer were interviewed between the Upper Recreational Site and the Mitten Bridge (17%) and remainder were interviewed between Mitten Bridge and the Sweetin Recreational Site (5%).

Table 4.   The percentage and number (n) of interviews initiated within each river section.

River Section	Percentage (n) of Interviews Initiated
Confluence with the Skeena River-Rodeo Grounds	28.0 (72)
Rodeo Grounds-Upper Rec. Site	49.8 (128)
Upper Rec. Site-Mitten Bridge	16.7 (43)
Mitten Bridge-Sweetin Rec. Site	5.4 (14)
Total	**100.0 (257)**

The River Guardians often encountered anglers more than once and thus, some anglers were interviewed on more than one occasion. The number of repeat interviews constituted 14% of all interviews. The percentage of repeat interviews was relatively high in September (weeks and early October (9-1 and 10-2) compared to other the time periods (Table 5).

Table 5.   The percentage of repeat interviews in each week of the study period. Time periods that include the Classified Waters period are italicized.

Time Period	Percentage (n) of Repeat Interviews in Each Week
8-2	0.0 (0)
9-1	25.0 (9)
9-2	16.7 (6)
10-1	25.0 (9)
10-2	19.4 (7)
11-1	13.9 (5)
11-2	0.0 (0)
Total	**14.0 (36)**

4.2.0.0 Angler Characteristics

4.2.1.0 Angler Residence

Thirty percent (70 interviews) of all anglers interviewed were B.C. residents (Table 6). Three of those interviews were repeat interviews, and thus 67 individual B.C. resident anglers were contacted. Of all B.C. resident interviews, 36 (54%) were Skeena Region residents and the remainder (46%) were from other areas of the province. Almost two percent of all angler interviews were Canadian residents and no repeat interviews were conducted with Canadian residents. Non-Canadian residents composed 68% of all interviews and 19 of those were repeat interviews (139 individual anglers). Of all repeat angler interviews, most were Non-Canadian residents (86%) and B.C. residents (14%). The rates of repeat interviews differed by angler residence could not be tested statistically due to the low sample size of Canadian residents.

Table 6.   The percentage of interviews initiated and repeat interviews for each residence category.

Residence	Percentage (n) of Angler Interviews Initiated[1]	Percentage (n) of Individual Anglers[2]
B.C. Total[3]	30.2 (70)	31.9 (67)
Skeena Region	*53.7 (36)*	*53.0 (35)*
Rest of Province	*46.3 (31)*	*47.0 (31)*
Canadian	1.7 (4)	1.9 (4)
Non-Canadian	68.1 (158)	66.2 (139)

1.   The residence was not collected from 25 interviews.
2.   The residence was not collected from 11 interviews.
3.   The postal code was not collected from three anglers

The postal code of B.C. residents described their regional residence status (Figure 3). Most B.C. residents interviewed were from the Skeena Region (54%, 36 anglers) followed by the Lower Mainland (25%, 17 anglers) and Omineca-Peace regions (10%, 7 anglers). Fewer anglers were from the Okanagan (6%, 4 anglers), Vancouver Island (3%, 2 anglers) and the Thompson-Nicola (2%, 1 angler). No anglers were interviewed from the Cariboo or Kootenay regions.
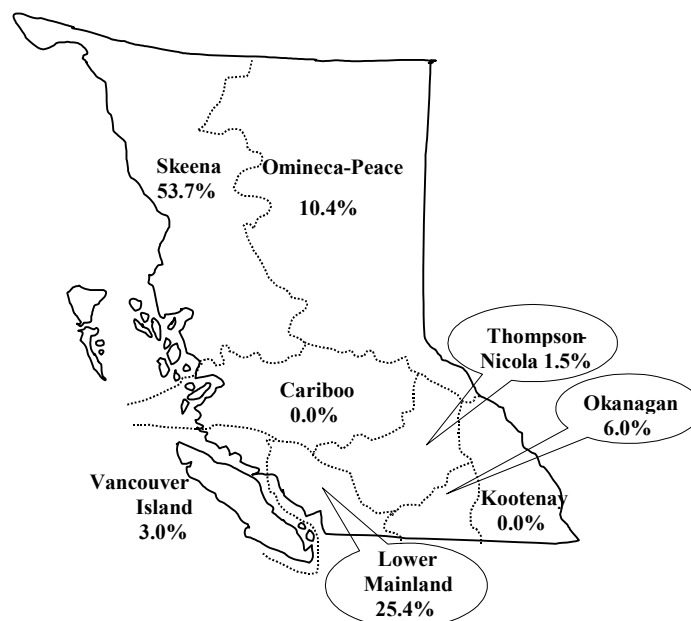
Figure 3.   The percentage of individual resident anglers interviewed who were from different regions in the province of B.C.

Canadian and Non-Canadian residents were asked for their province or country of origin. All Canadian residents were from Alberta (4 anglers). The majority of Non-Canadian residents were from the United States (76%, 120 anglers), followed by Italy (6%, 10 anglers), Netherlands, (4%, 6 anglers), Germany (3%, 4 anglers), Japan (3%, 4 anglers), Spain (2%, 3 anglers), France (1%, 2 anglers) and Ireland (2 %, 2 anglers). Fewer than one percent (1 angler) Non-Canadian anglers were from Austria and Australia.

Including this study, there have been seven independent studies of anglers on the Kispiox River since 1969. Most recently, the River Guardian program occurred on the Kispiox River

in 1997. The proportion of B.C. residents (28%), Canadian residents and Non-Canadian residents interviewed in 2001 was similar to the results of the River Guardian program in 1997 (Table 11). Prior to 1997, the proportion of B.C. residents varied from a low of 20% in 1974 to a high of 37% in 1969. Since 1974, all studies have indicated a decline in the proportion of Canadian residents and an increase in the proportion of Non-Canadian residents (Table 11).

The number of Non-Resident angler interviews peaked in time periods 9-1 and 9-2 and was greater than the number of B.C. resident interviews in all time periods except 11-2 (Figure 4). More Non-Canadians were interviewed in the Classified Waters Period than the shoulder weeks of the study period. More Non-Canadian residents were interviewed in September than October. A similar trend existed in 1997 where the majority of Non-Canadian resident anglers were interviwed in September (Morten 1998). In 2001, Canadian residents were only interviewed in time periods 10-1 and 10-2.
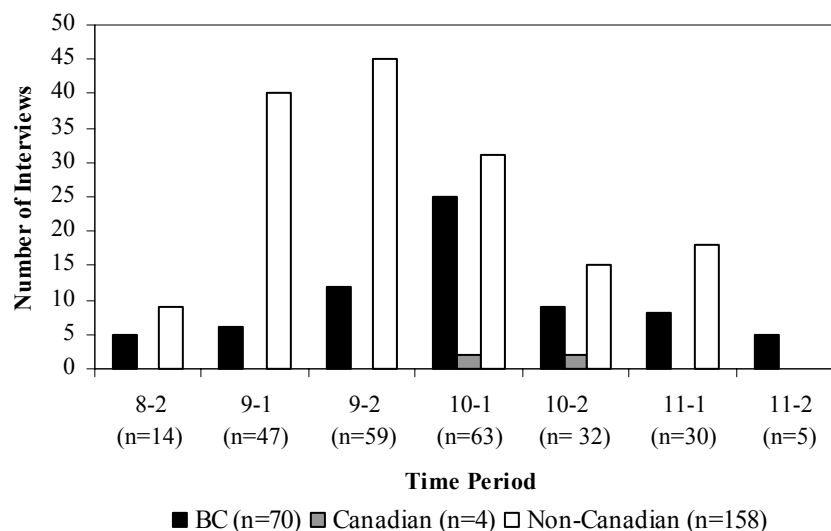
Figure 4.   The number of angler interviews in each residence category completed in each week.

Analysis of residence category results by day type indicated differences in residence composition of anglers by weekend and weekday days (chi-square $\chi^2 = 10.59$, df = 1, $P < 0.001$; Table 7). As expected, the proportion of B.C. residents interviewed on weekend days (54%) was higher than the proportion on weekdays (25%). In contrast, the proportion of Non-Canadian residents was higher on weekdays than weekend days.

Table 7.   The percentage of each residence category interviewed on weekdays and weekends for the whole study period.

Residence	Percentage (n) of Anglers Interviewed on:	
	Weekday Days	Weekend Days
B.C.	25.1 (48)	53.7 (22)
Canadian	2.1 (4)	0.0 (0)
Non - Canadian	72.8 (139)	68.1 (19)

The number of Non-Canadian residents interviewed was higher than the number of B.C. and Canadian residents in all river sections (Figure 5). Canadian residents were not interviewed between the Upper Recreation Site and Mitten Bridge. The number of Non-Canadians interview was highest between the Rodeo Grounds and the Upper Recreation Site, followed by between the Confluence with the Skeena River and the Rodeo Grounds. B.C. residents were only interviewed in the three lowest river sections. The highest number of B.C. residents that were interviewed was between the Rodeo Grounds and Upper Recreation Site. The number of Non-Canadian residents interviewed between the Rodeo Grounds and the Upper Recreation Site was substantially higher than in 1997 (Morten 1998). In 1997, the majority of Non-Canadians were interviewed between the Confluence and Rodeo Grounds whereas in 2001 more were interviewed between the Rodeo Grounds and the Upper Recreation Site.
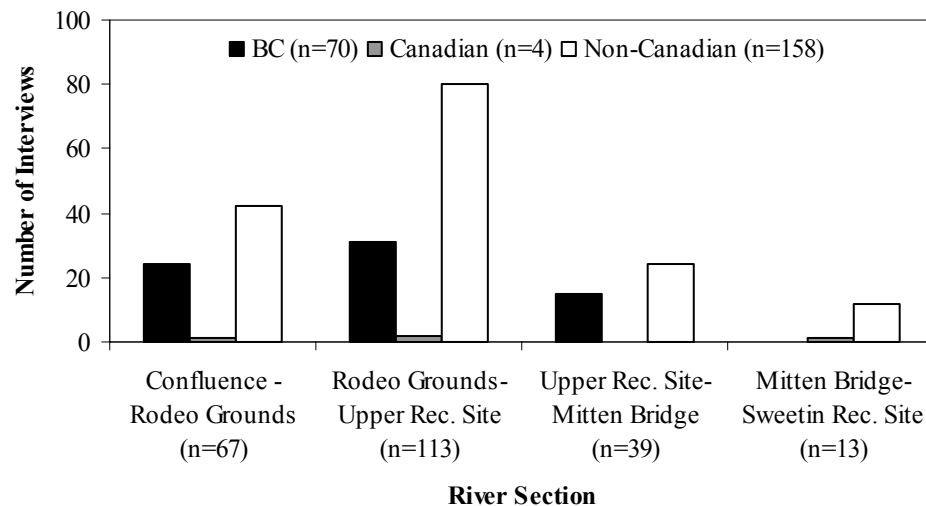
Figure 5. The number of angler interviews in each residence category in relation to all interviews completed in each river section.

4.2.2.0 Angler Gender and Age

Ninety-three percent of anglers interviewed were male (240 anglers) and seven percent (17 anglers) were female (Table 8). The percentage of female anglers in 2001 was slightly higher than the percentage of female anglers in 1997 (96% male, 4 % female; Morten 1998) but more similar to the gender breakdown of anglers in 1974 (94% male, 6% female; Wright 1975).

On average, males were 39 years old and females were 43 years old. No female anglers under the age of 25 were interviewed. In 2001 male anglers were younger than those interviewed in 1997 (mean = 45) whereas female anglers were on average, the same as those interviewed in 1997 (Morten 1998). Results were similar in 1974 where the average of a steelhead angler was 44 years old (Wright 1975).

Table 8. The percentage of male and female anglers within each age category and the mean age of male and female anglers.

Age Categories	Percentage (n) of Male Anglers[1]	Percentage (n) of Female Anglers
Under 16	0.0 (0)	0.0 (0)
17-24	3.1 (7)	0.0 (0)
25-34	24.1 (54)	58.8 (10)
35-44	20.1 (45)	5.9 (1)
45-54	18.8 (42)	23.5 (4)
55-64	21.9 (49)	11.8 (2)
65+	12.1 (27)	0.0 (0)
Total	**92.9 (240)**	**7.1 (17)**
Mean Age	**38.9**	**43.2**

1. The age was not collected from 16 male anglers.

4.2.3.0 Angler Guided Status

There were 41 (16%) guided anglers and 209 (84%) non-guided anglers interviewed. Guides and assistant guides were not included in the number of guided angler interviews. The guided angler interviews were not evenly distributed throughout the study period (Figure 6). Almost 83% of guided anglers were interviewed in the Classified Waters Period (34 anglers) and few guided anglers were interviewed in the shoulder weeks of the study period (late August, November). Most guided anglers were interviewed in time period 9-1.
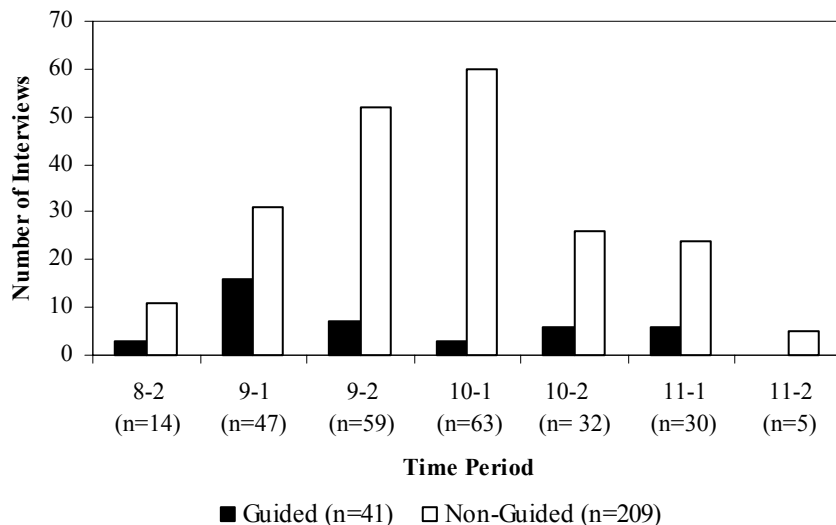
Figure 6. The number of guided and non-guided anglers interviewed in time period.

The number of guided anglers interviewed was not evenly distributed throughout river sections. Most guided anglers were interviewed between the Rodeo Grounds and the Upper Recreation Site or between the Confluence with the Skeena River and the Rodeo Grounds. Fewer guided anglers were interviewed between the Upper Recreation Site and the Mitten Bridge or between the Mitten Bridge and the Sweetin Recreation Site. Half of all anglers interviewed between the Mitten Bridge and the Sweetin Recreation Site were guided which is a substantially higher proportion than other river sections.
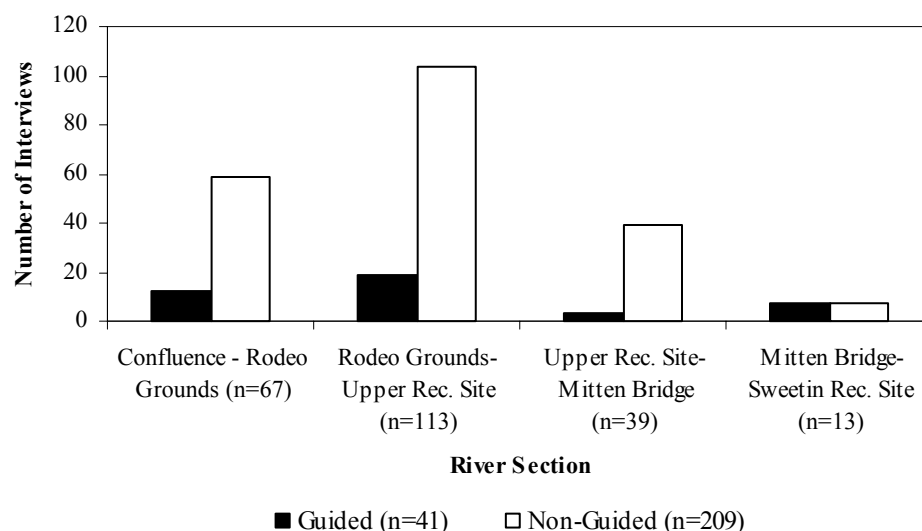
Figure 7.   The number of guided and non-guided anglers by river section.

No B.C. or Canadian and 25% of Non-Canadian residents interviewed were guided (Table 9). The proportion of guided anglers in 2001 (16%), was similar to the proportion of guided anglers in 1997 (15%; Morten 1998) and 1996 (15% Tallman 1997).

Table 9.   The proportion of guided and non-guided anglers that were B.C., Canadian and Non-Canadian residents.

	Percentage (n) of Anglers[1]	
Residence	Guided	Non-Guided
B.C.	0.0 (0)	100.0 (70)
Canadian	0.0 (0)	100.0 (4)
Non-Canadian	24.7 (39)	75.3 (119)

1. The guided status or residency was not collected from 7 anglers.

Fourteen percent (30 interviews) of non-guided angler interviews were repeat interviews and 12% (5 interviews) of guided angler interviews were repeat interviews. There was no difference in the number of anglers that were interviewed more than once by their guided status (chi-square $\chi^2 = 0.132$, df = 1, $P \leq 0.716$).

Analysis of guided status results by weekday and weekend strata indicated no differences in guided status of anglers by weekend and weekday days (chi-square $\chi^2 = 0.863$, df = 1, $P < 0.353$). The proportion of non-guided anglers interviewed on weekend days (88%) was similar to the proportion on weekdays (83%).

4.2.4.0 Angler Conservation Club Membership

Thirty-eight percent of anglers interviewed (78 anglers, 51 were missing this information) were members of a conservation club. Of those, 65% were members of one club, 35% were members of two clubs and 9% were members of three or more clubs. Non-Canadian residents (50%) were more likely to be members of a conservation club than B.C. or Canadian residents (17% and 25%; respectively chi-square $\chi^2 = 20.66$, df = 1, $P < 0.0005$). Sixty-three percent of guided anglers interviewed were members of a conservation club while

34% of non-guided anglers were members of a conservation club. Guided anglers were more likely to be members of a conservation club than non-guided anglers (chi-square $\chi^2 = 9.23$, df = 1, $P < 0.002$).

Of the anglers that were members of at least one conservation club most were members of the Trout Unlimited (27%; Table 10). Fewer anglers were members of the Steelhead Society (18%), the Nature Conservancy (14%), California Trout (11%) or the Federation of Fly Fishermen (7%). Fewer anglers were members of the other conservation clubs listed in Appendix 2.0.

Table 10. The top 5 conservation clubs that anglers reported they were members of.

Conservation Club	Percentage (n) of Anglers
Trout Unlimited	27.0 (20)
Steelhead Society	17.6 (13)
Nature Conservancy	13.5 (10)
California Trout	10.8 (8)
Federation of Fly Fishermen	6.8 (5)

The proportion that were members of a conservation club was lower in 2001 (38%) than in 1997 (51%; Morten 1998) or in 1974 (45%; Wright 1975). Similarly, fewer B.C. and Canadian and Non-Canadian residents were members of a conservation clubs in 2001 than 1997 (Table 11). The proportion of B.C. and Non-Canadian residents that were members of a conservation club in 2001 was less than the proportions found by Lewynsky and Olmsted (1990) in 1989.

Table 11. A summary of angler residence, angling method and conservation club membership for previous angler surveys on the Kispiox River.

Year	Reference	Months	Angler Residence (%)	Angling Method (%)	Conservation Club Member (%)
1969	Pinsent 1970	Oct., Nov.	37% B.C. 63% Non-Res.	NA	NA
1974	Wright 1975	Sept., Oct., Nov.	20% B.C. 32% Cdn. 48% Non-Cdn.	30% Fly 70% Lure	45 %
1975	Whately 1977	Autumn	36% B.C. 10% Cdn. 54% Non-Cdn.	24% Fly 76% Lure	NA
1989	Lewynsky and Olmsted 1990	Sept., Oct.	30% B.C. 8% Cdn. 62% Non-Cdn. approx.	80% Fly 20% Lure approx. (non-guided)	20% B.C. 45% Non-Res. (all rivers)
1996	Tallman 1997	Sept., Oct.	35% B.C. 4% Cdn. 62% Non-Cdn.	80% Fly 20% Lure approx.	NA
1997	Morten 1998	Sept., Oct.	28% B.C. 1% Cdn. 71% Non-Cdn.	84% Fly 16% Gear	29% B.C. 50% Cdn. 61% Non-Cdn.
2001	Current Study	Aug. Sept., Oct. Nov.	30% B.C. 2% Cdn. 68% Non-Cdn.	75% Fly 19% Gear 6% Both	17% B.C. 25% Cdn. 50% Non-Cdn.

4.3.0.0 Angler Trip Characteristics

4.3.1.0 Angling Methods

There were more fly anglers than gear anglers interviewed (75%, 188 anglers and 19%; 48 anglers, respectively; Table 13) while 6% of anglers (15 anglers) indicated they used both a fly and a gear rod. More B.C., Canadian and Non-Canadian residents were fly anglers than gear anglers (Table 12). The proportion of B.C. residents that fished with a gear rod (31%) was higher than Canadian (25%) or Non-Canadian (13%) residents. Sample sizes were insufficient to test gear preferences between residence categories.

From six independent surveys of Kispiox River anglers between 1974 and 2001, a clear trend toward an increase in the proportion of fly anglers is evident (Table 11). The proportion of fly and gear anglers interviewed in 2001 was similar to the proportion of fly and gear anglers interviewed in 1997, 1996 and 1989 (Table 11). In 1975, Whately (1977) found only 24% of steelhead anglers interviewed were fly anglers and 76% were gear (lure) anglers. Interestingly, a similar result was found in 1974 where Wright (1975) found 30% of steelhead anglers interviewed were fly anglers and 70% were gear (lure) anglers.

Of all angler interviews, 51% were shore-access anglers, whereas the remaining anglers gained access with a drift boat (49%; Table 12). Of all drift boat-access anglers interviewed, 23% (27 anglers) were B.C. residents, 77% (88 anglers) were Non-Canadian and none were Canadian residents. Thirty-six percent all shore-access anglers interviewed were B.C. residents (41 anglers) while 60% were Non-Canadian (69 anglers) and 4% Canadian residents (4 anglers). More Non-Canadian residents gained access to the Kispiox River by drift boat than B.C. and Canadian residents (chi-square $\chi^2 = 6.80$, df = 1, $P \leq 0.001$).

The proportion of anglers that gained access to the Kispiox River via drift boat was higher in 2001 than in 1997 (33%; Morten 1998).

Table 12. The percentage of fly and gear anglers and drift boat and shore-access anglers in each residence and guided status categories.

	Percentage (n) of Anglers		Percentage (n) of Anglers		
	Drift Boat	Shore	Fly	Gear	Both
Residence[1]					
B.C.	39.7 (27)	60.3 (41)	55.9 (38)	30.9 (21)	13.2 (9)
Canadian	0.0 (0)	100.0 (4)	75.0 (3)	25.0 (1)	0.0 (0)
Non-Canadian	56.1 (88)	43.9 (69)	83.4 (131)	13.4 (21)	3.2 (5)
Guided Status[2]					
Guided	92.7 (38)	7.3 (3)	100.0 (41)	0.0 (0)	0.0 (0)
Non-Guided	40.3 (83)	59.7 (123)	70.4 (145)	22.3 (46)	7.3 (15)

1. No data for 28 interviews.
2. No data for 10 interviews.

Guided anglers were more likely to fly fish than non-guided anglers (chi-square $\chi^2 = 16.12$, df = 2, $P \leq 0.0005$; Table 12). None of the guided anglers indicated they used a gear rod compared to 22% of non-guided anglers. Most guided anglers accessed the river by drift

boats (93%) and the remaining 7% (3 guided anglers) walked to their fishing location. Sample sizes did not permit the statistical testing of the proportion of guided anglers that used shore or a drift boat to access the river.

Overall, 88% of drift boat-access anglers interviewed were fly fishing, 5% were gear fishing and 7% were fishing with both a fly and a gear rod (Table 13). Fishing with gear was more common among shore-access anglers (33%) than drift boat-access anglers (5%). Statistically, the composition of fly and gear anglers differed by river access method (chi-square $\chi^2 = 31.03$, df = 3, $P < 0.0005$).

Table 13. The percentages of drift boat and shore-access anglers that fished with fly, gear or both types of rods.

Angling Method	Percentage (n) of Anglers[1]		
	Drift Boat	Shore	Total
Fly	87.7 (107)	62.8 (81)	74.9 (188)
Gear	4.9 (6)	32.6 (42)	19.1 (48)
Both	7.4 (9)	4.7 (6)	6.0 (15)
Total	48.6 (122)	51.4 (129)	100.0 (251)

1. No data for 6 interviews.

4.3.2.0 Trip Length

Overall, Kispiox River anglers expected to spend an average of 7.7 hours fishing per day. In general, the expected angling day was longer early in the steelhead angling season than in November (Table 14). The mean expected angling day was longest in the first time period, 8-2 (8.5 hr) followed by time period 9-1 (8.1 hr), whereas the shortest mean expected angling day was in period 11-2 (4.7 hr). Statistically, the expected angling day did not differ between time periods (Kruskal-Wallis $\chi^2 = 7.001$, df=6, $P \leq 0.321$).

Table 14. The mean expected angling day (hours) and standard deviation (hours) of anglers interviewed by time period. Time periods that include the Classified Waters period are italicized..

Time Period	Mean (n) Expected Angling Day (hr)	Standard Deviation
8-2	8.5 (14)	3.3
9-1	*8.1 (47)*	*1.7*
9-2	*7.6 (56)*	*2.4*
10-1	*7.7 (66)*	*3.0*
10-2	*7.6 (30)*	*2.6*
11-1	*7.5 (31)*	*1.8*
11-2	4.7 (5)	3.3
Total	7.7 (249)	2.5

On average, B.C. residents (6.8 hours) fished for fewer hours per day than Canadian or Non-Canadian residents (7.5 and 8.1 hours, respectively). The expected angling day differed between residence categories (Table 15). Guided anglers planned to fish longer (9.2 hours) than non-guided anglers (7.4 hours). Anglers that fished from a drift boat fished longer on average than shore based anglers (8.6 and 6.9 hours, respectively). Also, anglers that fished with a fly rod planned to fish longer (7.9 hours) than those with gear rods (6.7 hours) but

fished a similar amount of time as those anglers that fished with a fly and a gear rod (8.0 hours).

Table 15. The mean expected angling day (hours) and standard deviation in each residence category, guided status category, access method and angling method.

	Mean (n) Expected Angling Day (hr)	Standard Deviation	Statistical Test Result
Residence			Kruskal-Wallis χ^2 = 12.02.8, df = 2
B.C.	6.8 (68)	3.0	$P \leq 0.002$
Canadian	7.5 (4)	1.7	
Non-Canadian	8.1 (156)	2.3	
Guided Status			Mann-Whitney U = 2234.0,
Guided	9.2 (41)	0.8	$P < 0.0005$
Non-Guided	7.4 (204)	2.7	
Access Method			Mann-Whitney U = 5191.5,
Drift Boat	8.6 (121)	1.8	$P < 0.0005$
Shore	6.9 (128)	2.8	
Angling Method			Kruskal-Wallis χ^2 = 5.511, df = 2
Fly	7.9 (186)	2.4	$P \leq 0.064$
Gear	6.7 (48)	3.0	
Both	8.0 (15)	1.6	

Daily fishing activity followed a normal distribution and almost all anglers interviewed were on the river between 7:00 a.m. and 7:00 p.m. The majority of angler effort occurred between 11:00 a.m. and 3:00 p.m. (Figure 8). The activity profile indicated most angler effort occurred during the aerial count (between 1:00 and 3:00 p.m.). Activity profiles for each time period are in Appendix 7.0.
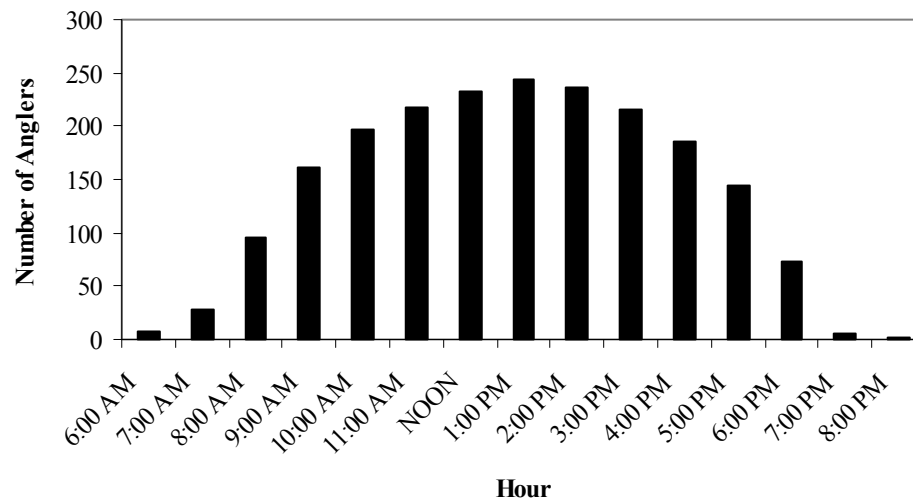
Figure 8. The number of anglers that fished during each one hour time block.

Overall, anglers planned to spend an average of 10.7 days angling for steelhead on the Kispiox River. On average, B.C. residents planned to fish for 13.3 days (Table 16). While Canadian and Non-Canadian residents planned to fish for fewer days (5.8 and 8.1 days

respectively). Statistically, there were differences in the number of days that each residence category planned to fish (Kruskal-Wallis $\chi^2 = 12.023$, df = 2, $P \leq 0.002$). Guided anglers planned to fish for an average of 4.9 days while non-guided anglers planned to fish for 11.6 days (Table 16). Non-guided anglers planned to spend more days angling than guided anglers (Mann-Whitney U = 2234.0, $P < 0.0005$).

Table 16.   The percentage of days anglers planned to fish for steelhead within each residence and guided status category.

| | Percentage (n) of Anglers in Each Category of Days They Planned to Fish | | | | | | | |
	1-5 days	6-10 days	11-15 days	16-20 days	21-25 days	26-30 days	31+ days	Mean (SD) (n)
Residence								
B.C.	53.7 (36)	13.4 (9)	9.0 (6)	1.5 (1)	1.5 (1)	4.5 (3)	16.4 (11)	13.3 (18.8) (70)
Canadian	50.0 (2)	25.0 (1)	25.0 (1)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	5.8 (4.1) (4)
Non-Canadian	47.1 (72)	31.4 (48)	11.1 (17)	3.9 (6)	2.0 (3)	1.3 (2)	3.3 (5)	8.1 (8.2) (158)
Guided Status								
Guided	61.5 (24)	35.9 (14)	2.6 (1)	0.0 (0)	0.1 (1)	1.9 (2)	0.0 (0)	4.9 (2.6) (41)
Non-Guided	44.6 (90)	22.3 (45)	12.4 (25)	4.0 (8)	4.5 (9)	2.5 (5)	9.9 (20)	11.6 (14.4) (209)

Anglers that were interviewed planned to fish for 2,755 rod days. However, not all anglers that fished on the Kispiox River were interviewed, therefore this was an underestimate of the total number of days that all anglers planned to fish. Despite the underestimate, anglers planned to fish for 322 more rod days than the effort estimate from aerial counts (2,433 rod days, Table 24). The discrepancy indicated that anglers did not fish as many days as they planned.

4.4.0.0 Angling Licenses

4.4.1.0 Angling License Class

All B.C. resident anglers interviewed purchased an annual angling license and more Canadian and Non-Canadian residents bought annual angling licenses than eight-day or one-day angling licenses (Table 17). Fifty-five percent of Non-Canadian residents bought annual angling licenses, while 39% bought eight-day angling licenses and 6% bought one-day angling licenses. Sample sizes were not sufficient to test these results statistically. The majority of guided anglers (65%) purchased eight-day angling licenses because they visit the Kispiox River for one week trips. Guided anglers were less likely to purchase annual licenses than non-guided anglers (chi-square $\chi^2 = 29.87$, df = 2, $P < 0.0005$).

Table 17.   The percentages of anglers with a one day, eight day and annual license within each residence and guided status category.

	Percentage (n) of Anglers in License Class[1]		
	One-Day	**Eight-Day**	**Annual**
Residence			
B.C.	0.0 (0)	0.0 (0)	100.0 (61)
Canadian	0.0 (0)	25.0 (1)	75.0 (3)
Non-Canadian.	5.8 (9)	39.4 (61)	54.8 (85)
Guided Status[2]			
Guided	2.7 (1)	64.9 (24)	32.4 (12)
Non-Guided	4.3 (8)	20.7 (38)	75.0 (138)

1.   No data for 37 interviews.

4.4.2.0 Classified Waters Days Purchased

Anglers were not required to purchase all the Classified Waters licenses at one time, nor were they required to carry all of their used Classified Waters licenses they purchased with them. Therefore, the data represented the number of Classified Waters days purchased by the angler on or immediately prior to the day the angler was interviewed.

Daily Classified Waters licenses purchased were analyzed by grouping all Canadian and Non-Canadian residents together. B.C. residents were excluded because all buy an annual Classified Waters license that is not available to anglers that do not reside in B.C. Most anglers that purchased a one-day angling licenses also purchased a one-day Classified Waters license (89%). The majority of anglers that purchased eight-day angling licenses purchased one or two days of Classified Waters licenses (85%, Table 18). Similarly, the majority of anglers that purchased an annual angling license purchased a one- or two-day Classified Waters license (77%). Very few anglers purchased eight day Classified Waters licenses.

Table 18.   The number of Classified Waters days purchased at the time of the interview in each license class for Canadian and Non-Canadian residents (grouped together).

License Class	Percentage (n) of Classified Waters Days Purchased[1]							
	1-Day	**2-Day**	**3-Day**	**4-Day**	**5-Day**	**6-Day**	**7-Day**	**8-Day**
1 Day	88.9 (8)	11.1 (1)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
8 Day	38.9 (21)	46.3 (25)	0.0 (0)	0.0 (0)	3.7 (2)	0.0 (0)	0.0 (0)	11.1 (6)
Annual	46.2 (36)	30.8 (24)	9.0 (7)	2.6 (2)	5.1 (4)	0.0 (0)	2.6 (2)	3.8 (3)

1. Includes two anglers that were recorded as purchasing annual classified waters licenses that were re-coded as one day purchases.

Canadian and Non-Canadian resident anglers planned to fish for more days than their Classified Waters license specified (Figure 9). For example, only eight Non-Guided anglers planned to fish for only one day and 49 anglers purchased one-day Classified Waters licenses. These results helped clarify the understanding that non-guided, non-resident anglers purchase their Classified Waters license in one or two day blocks. The anglers may want to fish on different Classified Waters or do not want to take the chance of being 'rained out' and wasting their license investment. Twenty-eight percent of non-guided anglers purchased a one-day Classified Waters license although they planned to fish for 14 days on average. Similarly, 74% of guided anglers purchased a one day Classified Waters license and planned on fishing an average of three days.
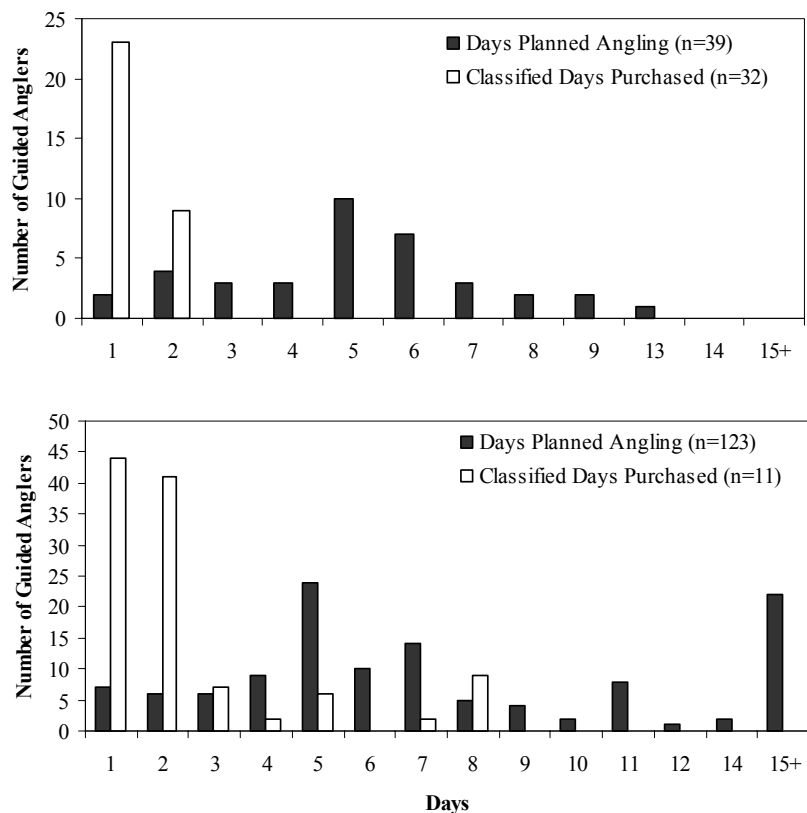
Figure 9.   The number of Classified Waters days purchased and the number of days planned angling for steelhead on the Kispiox River for guided and non-guided anglers (Canadian and Non-Canadian residents only) at the time of the interview.

4.4.3.0 Angler Compliance

Angling licenses were inspected for compliance with regulations and non-compliance was recorded on the interview form. The River Guardians did not have the authority to issue citations for license non-compliance but simply recorded the license infraction if one existed. Almost three percent of anglers interviewed (10 individual anglers) had a license infraction (Table 19). This result was similar to the three percent of anglers that had an infraction in 1997 (Morten 1998). In 1996, non-compliance with angling regulations was slightly higher (2% had no license, 4.7 did not have a steelhead stamp and 9.2% did not have a classified waters license; Tallman 1997).

No anglers were recorded as having more than one infraction. One angler was recorded as having an infraction on a second interview. All other anglers had not been interviewed before.

Failure to carry/produce a license was the most frequent infraction noted by River Guardians (60%, Table 20). No classified waters license made up 20% of license infractions noted. Two percent of all B.C. residents interviewed and almost one percent of all Non-Canadian residents did not have a classified waters license. Two anglers did not have a steelhead

conservation stamp. Both of those anglers were Non-Canadian residents. One steelhead was harvested by a First Nation angler.

Table 19.   The percentage of all anglers cited with different types of infractions within each residence category.

| Type of Infraction | Total | Percentage (n) of Anglers with Infractions[2] | | |
		B.C.	Canadian	Non-Canadian
Failure to carry/produce license[1]	60.0 (6)	0.0 (0)	0.0 (0)	0.6 (1)
No classified waters license	20.0 (2)	1.6 (1)	0.0 (0)	0.6 (1)
No steelhead conservation stamp	20.0 (2)	0.0 (0)	0.0 (0)	1.3 (2)

1. Failure to carry/produce included those anglers that refused to show the River Guardians their angling license, 5 anglers could not be assigned to a residence category.
2. Refers to the percentage within each residence category.

Two guided anglers were observed with a license infraction (5% of all guided anglers). Both of those guided anglers failed to produce or carry an angling license. Similarly, both replied they had a license but forgot it in the vehicle or in other fishing gear. Each angler had a different guide.

The infractions noted were equally distributed throughout the study period. Spatially, 70% of infractions were noted between the Rodeo Grounds and the Upper Recreation Site whereas only 52% of interviews were conducted there. Conversely, 20% of infractions were noted downstream of the Rodeo Grounds to the confluence with the Skeena River whereas 25% of interviews were completed there. Also, 10% of infractions were noted between the Upper Recreation Site and the Mitten Bridge and 18% of interviews were completed there.

These results cannot be generalized to past years and other rivers because of the increased publicity around the presence of River Guardians in 2001. The knowledge of an increased presence on the river may have caused an angler who may not have purchased a steelhead stamp or Classified Waters license in the past to one in 2001. All evidence suggested the River Guardian program had a positive effect on angler compliance with regulations.

4.5.0.0 Angler Catch and Effort

4.5.1.0 Catch Rate

A total of 833 hours (231 interviews, 26 missing with no data) were spent fishing by Kispiox River anglers which averaged 3.6 hours fishing per anglers at the time of the interview (Table 20). One-hundred and three (103) steelhead were landed and released. At the time of the interview, 185 anglers landed nothing, 53 anglers landed one steelhead, 13 anglers landed two steelhead, 3 anglers landed three steelhead, 1 anglers landed 4, 5 or 6 steelhead each. All but one steelhead was released.

The catch rate was calculated by averaging the steelhead catch rate for interviews where anglers were fishing for 0.5 hr (30 minutes) or more. Ten percent of interviews (26 interviews) were eliminated because the angler was on the river for less than 30 minutes. The catch rate for all angler interviews was 0.12 steelhead/hour or 0.93 steelhead/rod day (7.7 hr rod day).

Catch rates were estimated for each time period of the study period by grouping all river sections together (Table 20). Time period 11-2 produced the highest catch rate (1.88 steelhead/rod day) followed by 11-1 (1.42 steelhead/rod day) and 10-1 (1.24 steelhead/rod day). Time period 9-2 (0.23 steelhead/rod day) and 8-2 (0.42 steelhead/rod day) had the lowest steelhead catch rates. Turbid and high water conditions were reported for five days of time period 9-2 (September 23-27).

Table 20.   The number of steelhead landed, hours fished, catch rate and steelhead per rod day by time period. Time periods that include the Classified Waters Period are italicized.

Time Period	Steelhead Landed	Total Hours Fished	Catch Rate (st/hr) (SD)	Mean Expected Angling Day (hr)	Steelhead per Rod Day
8-2	4	53.50	0.05 (0.11)	8.48	0.42
9-1	*17*	*139.25*	*0.09 (0.22)*	*8.14*	*0.73*
9-2	*8*	*186.75*	*0.03 (0.81)*	*7.58*	*0.23*
10-1	*36*	*228.00*	*0.16 (0.31)*	*7.75*	*1.24*
10-2	*15*	*95.00*	*0.14 (0.25)*	*7.61*	*1.07*
11-1	*21*	*120.00*	*0.19 (0.25)*	*7.46*	*1.42*
11-2	2	10.00	0.40 (0.55)	4.70	1.88
Total	**103**	**832.50**	**0.12 (0.25)**	**7.71**	**0.93**

1. The average of the individual catch rates for each angler for each week were ignored for all short trips (less than 0.5 hour).
2. The time (hr) the angler spent fishing, excluding driving, hiking and preparation time.
3. Steelhead per rod day was calculated using the mean expected angling day for that time period.

Catch rates were estimated for river sections during the study period by grouping all time periods (Table 21). Catch rates for river sections on the Kispiox River were highly variable. The highest catch rate was between the Confluence with the Skeena River and the Rodeo Grounds (1.06 steelhead/rod day) and between the Rodeo Grounds and the Upper Recreation Site (1.02 steelhead/rod day). The lowest catch rate was between Upper Recreation Site and the Mitten Bridge (0.40 steelhead/rod day) and between the Mitten Bridge and the Sweetin Recreation Site (0.16 steelhead/rod day).

Table 21.   The number of steelhead landed, hours fished, catch rate and steelhead per rod day within each river section.

River Section	Steelhead Caught	Total Hours Fished	Catch Rate (SD)	Mean Expected Angling Day (hr)	Steelhead per Rod Day[2]
Confluence-Rodeo Grounds	72	213.00	0.13 (0.26)	8.14	1.06
Rodeo Grounds-Upper Rec. Site	128	466.50	0.13 (0.27)	7.81	1.02
Upper Rec. Site-Mitten Bridge	43	126.50	0.06 (0.16)	6.61	0.40
Mitten Bridge-Sweetin Rec. Site	14	26.50	0.02 (0.67)	8.10	0.16

1.   The average of the individual catch rates for each angler for each river section were ignored for all short trips (less than 0.5 hour).
2.   The time (hr) the angler spent fishing, excluding driving, hiking and preparation time.
3.   Steelhead per rod day was calculated using the mean expected angling day for that river section.

Among residence categories, Non-Canadian residents had the highest catch rate (0.89 steelhead/rod day), followed by B.C. residents (0.74 steelhead/rod day) and Canadian residents (0.38 steelhead/rod day, Table 22). Guided anglers had higher catch rates (1.47 steelhead/rod day) than non-guided anglers (0.81 steelhead/rod day). Shore-access anglers had higher catch rates (1.04 steelhead/rod day) than drift-boat accessed anglers (0.77 steelhead/rod day). On average, gear anglers caught 1.08 steelhead per rod day whereas fly anglers caught 0.87 steelhead per rod day. The expected angling day differed for each residence group, which influenced the steelhead per rod day estimates.

Eight (8) Dolly Varden/bull trout were caught and all were released. The catch rate was 0.06 Dolly Varden/bull trout/rod day. Steelhead anglers caught and released six other species of fish. Eight (8) coho salmon were landed and released and the catch rate was 0.06 coho/rod day. In addition, 3 whitefish, 2 cutthroat trout, 2 pink salmon, 1 sockeye salmon and 1 rainbow trout were landed and released.

Table 22.   The number of steelhead landed, hours fished, catch rate and steelhead per rod day within each residence, guided status, access method and angling method category.

	Steelhead Caught[2]	Total Hours Fished	Catch Rate (Steelhead/hr) (SD)[1]	Mean Expected Angling Day (hr)[3]	Steelhead per Rod Day[3]
Residence					
B.C.	22	206.50	0.11 (0.25)	6.77	0.74
Canadian	1	11.00	0.05 (0.10)	7.50	0.38
Non-Canadian	67	536.00	0.11 (0.25)	8.12	0.89
Guided					
Guided	22	124.00	0.16 (0.39)	9.19	1.47
Non-Guided	79	696.50	0.11 (0.21)	7.40	0.81
Access Method					
Drift Boat	37	416.50	0.09 (0.20)	8.55	0.77
Shore	66	416.00	0.15 (0.29)	6.92	1.04
Angling Method					
Fly	72	646.50	0.11 (0.25)	7.94	0.87
Gear	25	139.00	0.16 (0.27)	6.73	1.08
Both	6	47.00	0.10 (0.18)	8.00	0.80

1.   The average of the individual catch rates for each angler and all short trips were ignored (less than 0.5 hour).
2.   Twenty-five anglers could not be assigned to a residence category (13 steelhead), 7 anglers could not be assigned to a guided status (2 steelhead), 6 anglers could not be assigned an access method (0 steelhead) and 6 anglers could not be assigned to an angling method (0 steelhead).
3.   Steelhead per rod day was calculated using the expected angling day length for each demographic group.

Complete angling trip information on catch was collected from 49 anglers while the remaining 198 anglers had incomplete trip catch information (data not available for 10 anglers). There was no difference in average catch rates between the complete and incomplete trip information for all angler interviews completed on days when at least one complete trip interview was completed (Mann-Whitney U=4588.5, $P \geq 0.463$). More specifically, on September 21, 9 complete trip interviews (and 9 incomplete trips) were conducted and on that day there was no difference in catch rates between complete trips catch rates and incomplete trip catch rates (Mann-Whitney U=36.0, $P \geq 0.730$).

The observed catch rate for all anglers interviewed in 2001 (0.89 steelhead per rod day) was slightly higher than past estimates except 1997 (0.98 steelhead/rod day Table 22). In 1969, steelhead anglers caught 0.42 steelhead per rod day (Pinsent 1970). Whately (1977) reported steelhead anglers caught 0.25 steelhead/rod day in 1975. In 1989, the catch rate varied by the time in the classified waters period, the catch rate in September (0.56 steelhead/rod day) was lower than the catch rate in the first (0.72 steelhead/rod day) and second half of October (1.71 steelhead/rod day; Lewynsky and Olmsted 1990).

Table 23.   A catch rate in steelhead/rod day comparison between the current study and past research on the Kispiox River.

Year	Reference	Catch Rate (sthd/rod day)
1969	Pinsent 1970	0.42
1975	Whately 1977	0.25
1989	Lewynsky and Olmsted 1990	0.56 Sept. 0.72 1st half Oct. 1.71 2nd half Oct.
1996	Tallman 1997	0.82
1997	Morten 1998	0.98
2001	Current Study	0.89

4.5.2.0 Aerial Flights

There were 688 anglers counted on the Kispiox River during 25 aerial flights. Twenty-six aerial flights were scheduled but one was cancelled due to poor weather. The high count of 64 anglers occurred on October 1 (study period 10-1) while a low count of 6 anglers occurred on both November 13 and November 18 (study period 11-2). On average, 30 anglers were counted per flight. The number of anglers observed from aerial counts outside the Classified Waters Period (weeks 8-2, 11-1 and 11-2) was low in comparison to other weeks within the Classified Waters Period.

The highest proportion of angler effort occurred in the first two river sections; the confluence with the Skeena River to the Rodeo Grounds (38%) and the Rodeo Ground ant the Upper Recreation Site (41%). Less angler effort was observed between the Upper Recreation site and the Mitten Bridge (15%) and the Mitten Bridge and the Sweetin Recreation Site (6%).

Of all observed anglers, more anglers used a fly rod (481 rods) than a gear rod (182 rods), although 25 anglers' rods could not be identified. The temporal distribution of fly rod anglers differed from gear rod anglers. The majority of fly rod anglers were observed in the Classified Waters Period (91%) while fewer fly rod anglers were observed during the

shoulder seasons. The proportion of gear rod anglers observed in the Classified Waters Period was less (79%) than fly rods observed in the Classified Waters Period.

Most fly anglers were observed between the Rodeo Grounds and the Upper Recreation Site (43%) and the Confluence with the Skeena River and the Rodeo Grounds (32%). Forty-nine percent of gear rod anglers most were observed between the Confluence with the Skeena River and the Rodeo Grounds and 38% were observed between the Rodeo Grounds and Upper Recreation Site.

A total of 73 guided anglers and guides were observed during the aerial counts. A high count of 11 guided anglers occurred on October 6 and low counts of zero or one occurred on nine of the 25 aerial counts. Higher guided angler counts occurred during the Classified Waters Period than in the shoulder season.

Forty-one percent of the guided anglers counted were observed between the Confluence with the Skeena River and the Rodeo Grounds and 31% occurred between the Rodeo Grounds and the Upper Recreation Site. A small proportion of guided angler effort was observed upstream of the Upper Recreation Site (16%) or upstream of Mitten Bridge (11%).

A total of 207 drift boats were observed during the 25 aerial flights. Overall, there was an average of 8 drift boats counted per day. Considering all anglers counted from the aerial flights (688) the overall ratio of anglers to drift boats was 3.3:1. A high count of 24 drift boats occurred on September 21 and October 6 and the ratio of anglers to boats on those days were 2.5:1 and 2.3:1, respectively. In general, the shoulder days in the study period had a higher ratio of anglers to boats than those days during the Classified Waters Period.

Relative to other river sections, drift boat use was high between the Rodeo Grounds and the Upper Recreation Site (42%). Fewer drift boats were noted between the Confluence with the Skeena River and the Rodeo Grounds (25%), the Upper Recreation Site and Mitten Bridge (23%), and the Mitten Bridge and the Sweetin Recreation Site (7%). Drift boats and anglers observed were similar in their spatial distribution on the Kispiox River.

4.5.3.0 Catch and Effort Estimates

4.5.3.1 Catch and Effort Estimates for All Anglers

Several methods were used to estimate catch and effort for time period, river sections, residence categories, guided status, access method and angling method. Methods differed according to the amount of information collected in each time period and river section. Time periods and river sections were pooled due to few interviews in the shoulder time periods and river sections three and four.

The total effort estimate for the whole study period (and study area) was 2,433 rod days while the effort estimate for the Classified Waters Period was 2,215 rod days (Table 24). The total catch estimate was 2,000 steelhead and 1,966 steelhead (99%) of those were caught in the Classified Waters Period. The total effort and catch estimates were the sum of all time-period estimates.

Table 24.   Angler catch and effort estimates with 95 % confidence intervals for the whole study period and the classified waters period.

	Effort Estimate (rod day^3)	95 % CI	Catch Estimate[1] (steelhead)	95 % CI
Study Period 2001	2,433	$\pm$ 590	2,000	$\pm$ 843
Classified Waters Period 2001	2,215	$\pm$ 723	1,966	$\pm$ 960

1. Catch estimates are smaller than expected because of low sample sizes.

The largest effort estimates occurred in combined time period of 9-2 and 10-1 (1,203 rod days) followed by time period 8-2 and 9-1 (897 rod days), whereas time periods 10-2 and 11-1 had the lowest effort estimates (334 rod days Table 26). A similar pattern existed with catch with the largest catch estimates in time period 9-2 and 10-1 (1,364 steelhead) followed by week 9-2 and 10-1 (439 steelhead). The smallest catch estimate occurred in the time periods 10-2 and 11-1 (256 steelhead).

Due to only a few completed interviews on weekend days during the time periods 8-2 and 9-1 the catch estimate was zero which is almost certainly an underestimate of steelhead caught during these time periods.

Table 25.   A summary of the total effort and total catch with 95% confidence intervals by time period for the whole study period.

	Total Effort (rod days)	95% CI Effort	Total Catch (steelhead)	95% CI for Total Catch
8-2 & 9-1	897	$\pm$ 486	439	$\pm$ 738
9-2 & 10-1	1,203	$\pm$ 306	1,364	$\pm$ 358
10-2, 11-1 & 11-2	334	$\pm$ 135	256	$\pm$ 196

The largest river section effort estimates occurred between the Rodeo Grounds to the Upper Recreation Site (1,043 rod days) followed by between the Confluence with the Skeena River to the Rodeo Grounds (891 rod days; Table 25). The lowest effort estimates were between Upper Recreation Site and the Sweetin Recreation Site (502 rod days). The largest catch

estimate was between the Confluence with the Skeena River and the Rodeo Grounds (1,074 steelhead) followed by the Rodeo Grounds to the Upper Recreation Site (960 steelhead). The smallest catch estimate occurred upstream of the Upper Recreation Site and below the Sweetin Recreation Site (197 steelhead).

Table 26.   A summary of the total effort and total catch with 95% confidence intervals by river section for the whole study period.

	Total Effort (rod days)	95% CI Effort	Total Catch (steelhead)	95% CI for Total Catch
Confluence with the Skeena River-Rodeo Grounds	891	± 238	1,074	± 2,534
Rodeo Grounds-Upper Recreation Site	1,043	± 301	960	± 3,256
Upper Recreation Site – Sweetin Recreation Site[1]	502	± 131	197	± 831

1.   The river sections were combined due to few interviews.

4.5.3.2 Catch and Effort Estimate for Angler Residence, Guided Status and Angling Method

For the whole study period, B.C. residents were estimated to angle for 1,118 rod days (Table 27). Non-Canadian residents were estimated to produce 1,251 rod days of angler effort and 65 rod days of effort were estimated for Canadian residents. There were 257 guided angler days and 2,077 non-guided angler days of angler effort estimated. The estimate of the guided angler rod days did not include the guide him/herself. There was an estimated 1,728 fly rod days and 607 gear rod days of angler effort on the Kispiox River. In addition, 99 rod days were estimated as unidentifiable fly or gear anglers because a proportion of anglers could not be identified as angling with a fly or gear rod from the helicopter.

B.C. residents were estimated to catch 1,026 steelhead in the whole study period. Non-Canadian residents were estimated to catch 907 steelhead while Canadian residents caught an estimated 66 steelhead (Table 27). Non-guided anglers were estimated to catch 1,433 steelhead while guided anglers caught an estimated 149 steelhead. Fly rod anglers were estimated to catch 1,073 steelhead while gear rod anglers caught an estimated 461 steelhead. Also, unidentifiable gear or fly rod anglers caught an estimated 46 steelhead.

Table 27.   A summary of the total effort and total catch with 95 % confidence intervals by angler residence, guided status and angling method for the whole study period.

	Total Effort (rod days)	95% CI Effort	Total Catch (steelhead)	95% CI for Total Catch
Angler Residence				
B.C.	1,118	± 300	1,026	± 375
Canadian	65	± 84	66	± 89
Non-Canadian	1,251	± 429	907	± 583
Guided Status				
Guided	257	± 76	149	± 149
Non-Guided	2,077	± 523	1,433	± 717
Angling Method				
Fly	1,728	± 494	1,073	± 588
Gear	607	± 132	461	± 273
Unidentifiable	99	± 47	46	± 64

The estimates derived from this survey for total angler effort (2,434 days) and steelhead catch (1,999) was slightly less than the averages generated for the Kispiox River from the BC Steelhead Harvest Analysis dataset between 1984 – 2001 (mean total effort 2854, ± 95%CI 508.8; steelhead catch 2066, ± 95%CI 555; Appendix 9.0 Table A5). However, 2001 Steelhead Harvest Analysis estimates for effort (3,881 rod day) and catch (3,748 steelhead) were elevated by 38% and 47% respectively when compared to estimates generated from this study. The increased estimates are consistent within the range of precision provided by the BC Steelhead Harvest Analysis dataset (DeGisi 1999).

4.5.3.3 Effort Estimate for Boats

For the whole study period, 708 ($\pm$ 226) drift boat days were estimated for the Kispiox River. Considering the total effort estimate in rod days (2,433 rod days) and the total estimate of boat days (708 boat days), the ratio of angler days to boat days was 3.43:1.

4.6.0.0 Quality Angling Experience

4.6.1.0 Key Characteristics of a Quality Angling Experience

Anglers were asked, "*What do you feel are the key characteristics of a high quality angling experience on the Kispiox River*?" Two-hundred and two individual anglers reported 369 characteristics. The 369 responses were sorted into 18 categories (Figure 10). About 20% of anglers reported that large steelhead (21%), few people (17%) and beauty or scenic attributes (17%) were key characteristics of a high quality angling experience on the Kispiox River.
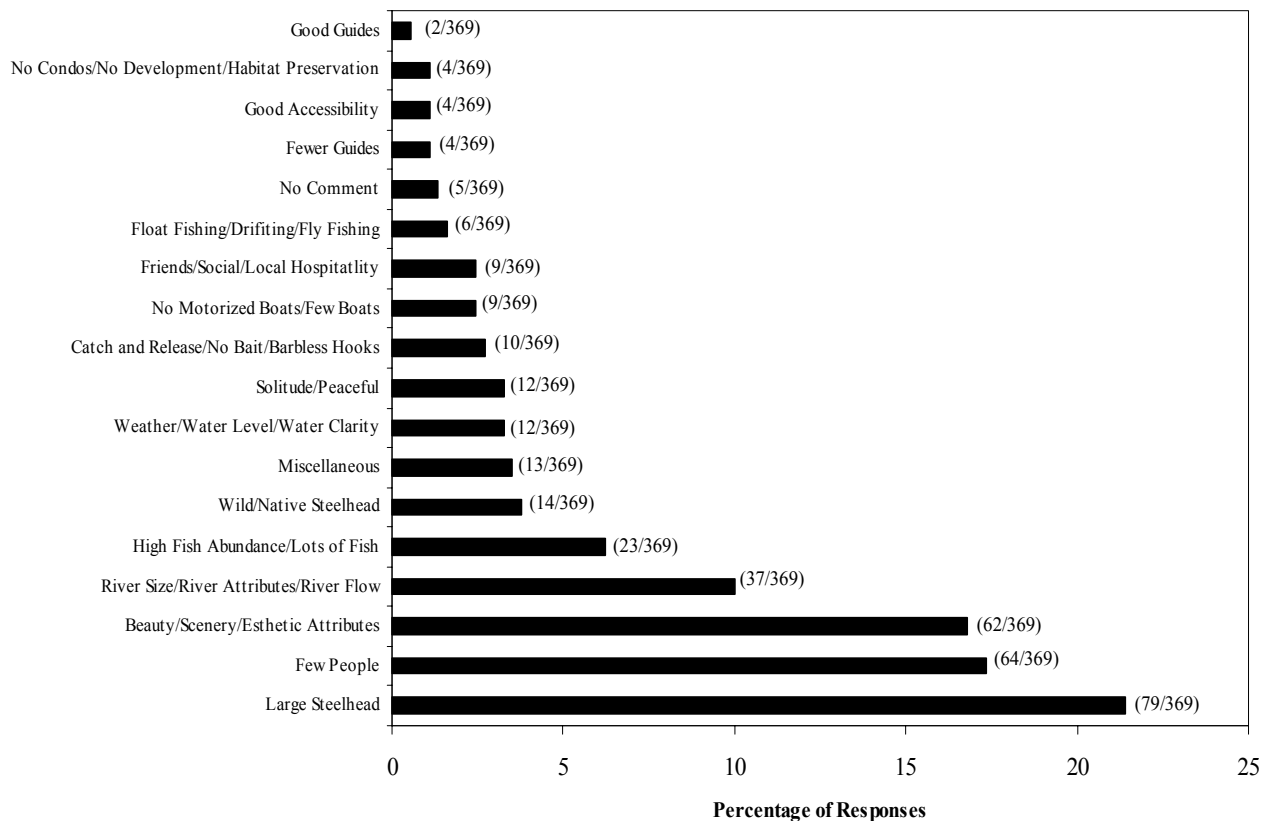
Figure 10. Key characteristics that anglers described as contributing to a high quality angling experience. See Appendix 4.0 for detailed miscellaneous comments.

Ten percent of angler comments indicated that the river size/river attributes or the river flow was a key characteristic of a quality angling experience. Fewer anglers mentioned that high fish abundance, wild/native steelhead, weather, solitude/peacefulness, catch and release, few boats, and the social aspect of angling on the Kispiox River were key characteristics. Several anglers mentioned that float fishing/drifting or fly-fishing, fewer guides, good accessibility, no condos or development and good guides were key characteristics of good quality angling experience.

B.C. residents indicated that high fish abundance, few anglers, large steelhead, beauty of the area, high fish abundance and weather/water level/water clarity were all key characteristics

of a high quality angling experience (Figure 11). Canadian and Non-Canadian anglers answered similarly and believed that large steelhead, the beauty or scenic attributes, few people, river size/river attributes/rive flow and high fish abundance were all important characteristics of a high quality angling experience. The proportion of Canadian and Non-Canadian residents that described beauty or scenic attributes as part of a high quality angling experience was substantially higher than B.C. residents. In contrast, a higher proportion of B.C. residents felt low numbers of anglers (few people) was an important characteristic of a high quality angling experience. Caution is warranted when interpreting results of Canadian anglers because sample sizes were very small.
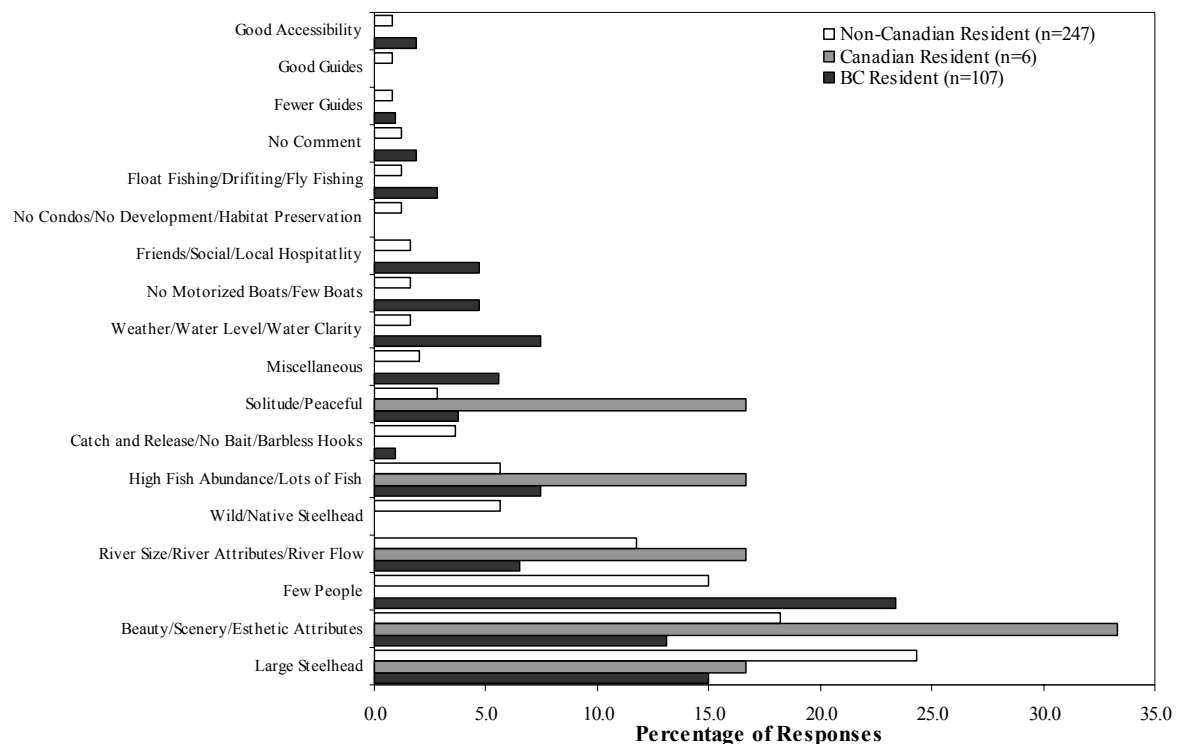
Figure 11. Key characteristics that B.C., Canadian and Non-Canadian residents described that contributed to a high quality angling experience.

Guided anglers responded that few people, large steelhead, river size/river attributes/river flow, and beauty or scenic attributes were all key characteristics of a high quality angling experience (Figure 12). Non-guided anglers responded that large steelhead, beauty or scenic attributes and few anglers were important characteristics in a high quality angling experience. The most notable was the higher proportion of non-guided anglers than guided anglers replied that large steelhead and beauty of the area were key characteristic of a high quality angling experience. In contrast, a higher proportion of guided anglers than non-guided anglers replied that few people and the river size/river attributes/river flow were key characteristics of a high quality angling experience.

Good Guides
No Condos/No Development/Habitat Preservation
Float Fishing/Drifting/Fly Fishing
Good Accessibility
Fewer Guides
No Comment
No Motorized Boats/Few Boats
Catch and Release/No Bait/Barbless Hooks
Friends/Social/Local Hospitatlity
Wild/Native Steelhead
Miscellaneous
Solitude/Peaceful
Weather/Water Level/Water Clarity
High Fish Abundance/Lots of Fish
River Size/River Attributes/River Flow
Few People
Beauty/Scenery/Esthetic Attributes
Large Steelhead

□ Non-Guided (n=307)
■ Guided (n=59)

0.0   5.0   10.0   15.0   20.0   25.0
Percentage of Responses

Figure 12.   Key characteristics that guided and non-guided anglers described that contributed to a high quality angling experience.

The results clearly indicate that a 'quality angling experience' on the Kispiox River has several dimensions and that anglers indicated that the beauty of the area was as important to a quality experience as fish abundance. In other words, a high quality angling experience means different things to different people. Holland and Ditton (1992) found similar results and concluded that there were a diversity of factors that caused satisfaction with an angling experience.

In terms of a quality angling experience, the responses of Kispiox River anglers differed than those of Zymoetz (Copper) River anglers studied in 1999. Kispiox River anglers indicated that large steelhead was the top characteristic of a quality angling experience followed by few people and the beauty of the area. In contrast, Zymoetz (Copper) River anglers indicated the beauty of the area, high fish abundance and few people were key characteristics of a quality angling experience. The Kispiox River is world-renowned for its large steelhead and holds the current world record for the largest fly-caught steelhead (Combs 1999) which creates and expectation of landing a large steelhead. The hope of landing a large steelhead shapes anglers expectations of a quality angling experience.

4.6.2.0 Ratings of Quality Angling Experiences

Anglers were asked, "*On a scale of 1-5, 1 being very poor and 5 being excellent how would you rate your quality angling experience today*?" The average angler rating of their quality angling experience was 3.8 (between fair and good), where one was very poor and five was excellent (Table 28). The majority of anglers rated their experience as excellent (31%) or

good (27%) and few anglers rated their experience as poor (8%) or very poor (4%). There was no difference in the mean ratings of the quality angling experience between residence categories, guided and non-guided anglers, drift boat or shore access method and those anglers using a fly or gear rod. These results differed than anglers on the Zymoetz (Copper) River in 1999 where guided anglers and drift boat-accessed had higher ratings of their experience than non-guided anglers or shore-accessed anglers (Morten 2000).

Table 28.   Mean ratings of the anglers quality angling experience by residence category, guided status, access method and angling method.

	Mean (n)[1,2] Rating	Standard Deviation	Statistical Test Result
All Anglers	3.8 (225)	1.1	NA
Residence			ANOVA $F = 0.160$, df $= 2$, $P \leq 0.852$
B.C.	3.9 (65)	1.2	
Canadian	4.0 (3)	1.7	
Non-Canadian	3.8 (137)	1.0	
Guided Status			$t = 0.994$, $P \leq 0.321$
Guided	4.0 (35)	1.0	
Non-Guided	3.8 (186)	1.2	
Access Method			$t = -0.57$, $P \leq 0.571$
Drift Boat	3.8 (111)	1.1	
Shore	3.8 (114)	1.2	
Angling Method[3]			$t = 1.6$, $P \leq 0.121$
Fly	3.8 (169)	1.1	
Gear	3.5 (42)	1.3	

1. The mean rating is derived from the scale of 1=Very Poor, 2=Poor, 3=Fair, 4=Good, 5=Excellent.
2. See Appendix 5.0 for the proportion of anglers in each rating group.
3. Anglers that used both fly and gear were eliminated from this analysis (n=15).

The proportion of anglers that rated their experience as excellent grew in the second half of the Classified Waters Period (Figure 13). In contrast, the proportion of anglers that rated their experience as fair (and not good or excellent) declined in the second half of the Classified Waters Period. Thus, it appeared that anglers were more likely to rate their trip as excellent during October than September. Few anglers rated their trip as excellent in the shoulder time periods (8-2 and 11-2). This result contrasts with the River Guardian study on the Zymoetz River where anglers were more likely to rate their experience as excellent outside of the Classified Waters Period (Morten 2000).

Investigation of the relationships between angler effort, catch rate, quality rating and Secchi depth (water conditions) with a correlation matrix did not provide clear results (Appendix 6.0). A weak positive relationship was found between catch rate and the rating of quality angling experience (Pearson R = 0.32). All other combinations of variables had no statistically significant relationships.
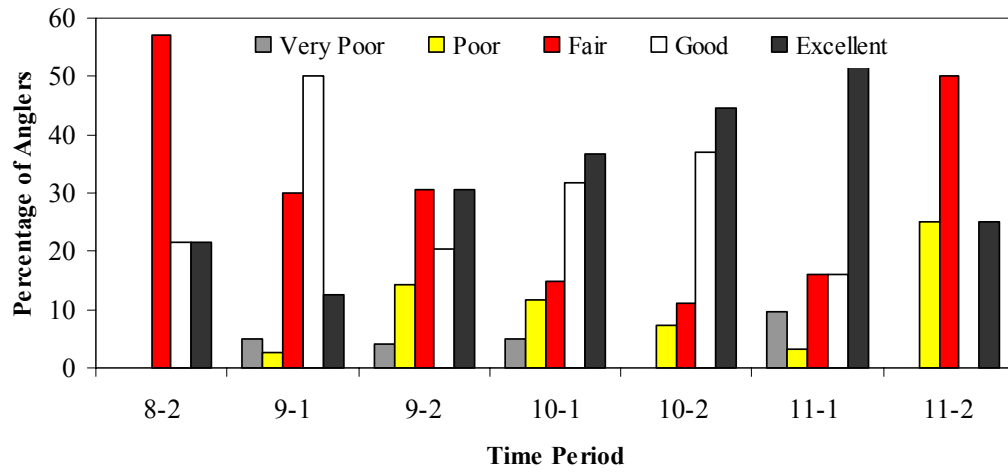
Figure 13. The proportion of anglers that rated their quality angling experience as very poor, poor, fair, good or excellent by time period.

4.7.0.0 Limitations of the Survey

As with any survey, the results presented here were susceptible to survey bias and must be interpreted with caution. In general, three types of survey errors exit; sampling, response and non-response (Pollock *et al.* 1994). All surveys are subject to error and the impacts sampling, response and non-response error on results presented here are discussed below.

4.7.1.0 Sampling Error

Sampling error occurs from several sources including; improper sample selection, incomplete sampling frames, duplication, avidity bias or length-of-stay bias (Pollock *et al.* 1994).

Improper sample selection was one source of sampling error in this study. Each week, one weekend day and weekday day was selected randomly for aerial counts. However, one flight in each stratum was insufficient to estimate stratum variance. Therefore, weekly strata were pooled into monthly strata, yet the day type stratification was maintained due to differences in angler residence compositions. Consequently, aerial counts were highly variable within strata because the strata spanned long time intervals, which resulted in large confidence intervals for effort and catch estimates.

In addition, too few angler interviews were conducted on some aerial count dates to estimate catch. The sampling plan for angler interviews endeavored to be spatially representative on dates with aerial surveys, and therefore survey effort was directed toward lower angler density areas on some dates. Also, poor shore access in some areas encouraged the River Guardians to access anglers by drift boats, thus, considerable time was spent moving between locations and anglers. In the end, too few anglers were interviewed in some strata to develop temporally and spatially representative catch estimates. For example, few anglers were interviewed on the weekend aerial count days in time periods 8-2 and 9-1 which yielded a catch rate estimate of zero steelhead per day. Accordingly, the stratum catch estimate was zero and presumably underestimated. However, the spatial and temporal distribution of all angler interviews was sufficient to collect representative angler characteristics (Figures 14 and 15).
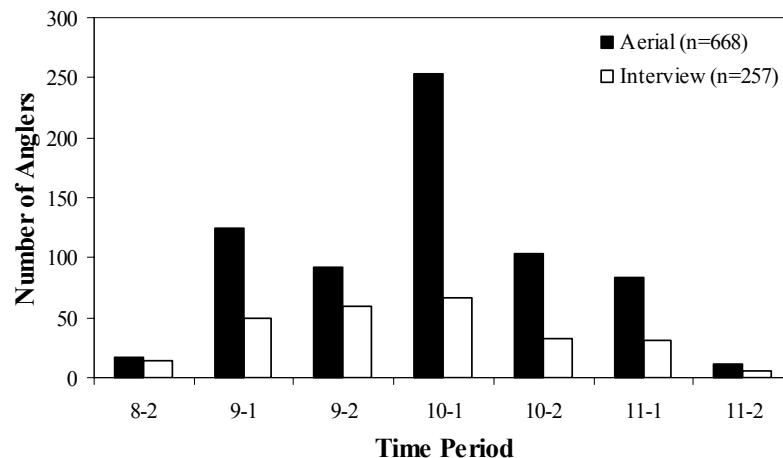
Figure 14. The number of anglers counted from aerial flights and the number of anglers interviewed in each time period of the whole study period.
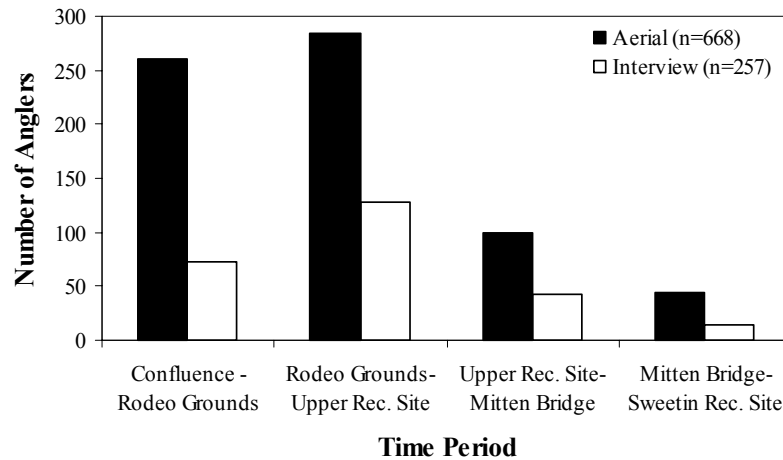
Figure 15. The number of anglers counted from aerial flights and the number of anglers interviewed in each river section.

The study area and study period chosen were representative of steelhead anglers on the Kispiox River and therefore, the sample frame was complete. Although, this study did not represent the few anglers that fished outside of the study period (August 27-November 18).

Aerial count observer efficiency (anglers not being counted on the flight because they were not seen) could have caused some sample error by underestimating angler effort because shore access anglers could have been driving to another access point during the aerial count and the sinuous nature of the Kispiox River.

Some anglers had a higher probability of being contacted due to the nature of a roving survey. Avidity bias may occur for anglers who fish more often and were therefore more likely to be interviewed (Schubert 1988; Pollock *et al.* 1994). Thus, anglers who fished more frequently than average anglers had a higher than average probability of being interviewed. Length of stay bias may occur for anglers when the probability of being interviewed increases with their trip length (Schubert 1988; Pollock *et al.* 1994). Thus, anglers who fished longer than average had a higher than average probability of being interviewed.

4.7.2.0 Non-Response Error

Non-response error was minimal due high proportion of anglers that agreed to participate in the interview (95%). A high proportion of anglers that did not participate in the interview were unable to speak good English and were therefore non-resident anglers. This result could bias the descriptive information towards anglers who were English speaking. This bias is slight as the proportion of anglers from non-English speaking countries was small and some information (mostly obtained from the angling license) was collected from these anglers.

4.7.3.0 Response Error

In addition to sampling non-response and errors, response errors may also have biased the survey results. The actual interviewing could have caused some reactivity by anglers, causing them to give responses that were not indicative of their actual perceptions. In addition, it was possible that anglers may have exaggerated the number of steelhead landed for prestige purposes. Other sources of response errors include rounding bias, intentional deception (strategic bias), question misinterpretation and species misidentification (Pollock *et al.* 1994; Connelly and Brown 2000). Recall bias was expected to be minimal because anglers were asked questions pertaining to the day of the interview.

5.0.0.0 Recommendations

1. The Ministry of WLAP should continue to administer a survey of Kispiox River anglers to monitor any changes in angler effort, demographics, angling characteristics and angler catch. Additional information will aid the Min of WLAP in the planning necessary to protect the quality of angling experiences offered by the Classified Waters designation.

2. Future angler surveys on the Kispiox River should include weekend and weekday stratification in their sampling plans due to the differences in proportions of residence categories by day type found here.

3. To decrease sampling error and variance in catch and effort estimates, the study period could be divided into two-week time intervals and further stratified into weekend and weekday days. At least three aerial counts should be randomly selected within each day type of each two-week time strata.

4. In future surveys, the River Guardians should try to collect more interviews on aerial count days to more accurately estimate catch. Additional interviews could be obtained by adding more River Guardians to the river on aerial count days or surveying river sections with high angler density.

5. To reduce the effect of observer efficiency (anglers not being counted on the flight because they were not seen), the River Guardians should ask anglers if they were on the river during the flight. The proportion of anglers not visible (but in the area) could be used to estimate daily observer efficiency.

6. Aerial counts should continue to be the primary method to estimate effort. Complete coverage is possible with aerial counts whereas complete study area river counts are virtually impossible from a drift boat on a daily basis.

7. Future angler surveys on the Kispiox River could estimate catch by access method (drift boat or shore) if the number of anglers per boat is recorded during the aerial count instead of only the number of drift boats.

6.0.0.0 Acknowledgments

HABITAT
CONSERVATION
TRUST FUND

7.0.0.0 Literature Cited

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8.0.0.0 Appendices

Appendix 1.0 The angler interview form, angler count data and aerial count form.

Gender   MALE   FEMALE   **Location**: SECTION 1   SECTION 2   SECTION 3   SECTION 4
People per party: _____   **Site Name (if known):** _____

Hello, my name is _ _ _ _ _ I am a River Guardian and we are collecting information from anglers on the Kispiox River. **Are you willing to allow me to examine your fishing license and answer a few questions for me?** The interview is voluntary and will only last about 5 minutes. All of your answers will be confidential.

YES   NOT APPLICABLE (*not angling*)   DOES NOT SPEAK ENOUGH ENGLISH   REFUSED

Have you been interviewed before?   NO   YES

Angler License #_____   **Classified Waters License #**_____   **Steelhead Stamp:** YES   NO

Angler Name _____   **Year of Birth** _____

Guided   YES   NO   If yes by WHO? _____

Residence   B.C. postal code _____, CDN province _____, NON-CDN country _____

License Class   1 DAY   8 DAY   ANNUAL   **Classified Days Purchased** _____

Observed License Violations   NONE   NO STEELHEAD STAMP   NO CLASSIFIED WATERS   NO LICENSE
                                                OTHER _____

Did you use a fly or gear rod today?   FLY   GEAR   BOTH   **Did you fish any other rivers today?** Skeena Bulkley
                                                                                                      Sweetin Nangeese Other:_____
How did you access the river today?   DRIFT BOAT   FOOT

When did you START fishing today? _____ AM/PM   **When did you QUIT fishing today?**_____ AM/PM

(If roving) **When do you expect to finish fishing today?** _____

Excluding driving, hiking and prep time how long did you fish the KISPIOX River? _____*hrs.*
            (If YES about fishing other rivers) **the above mentioned river?** _____*hrs.*

What species of fish have you landed today? How many did you keep or release?

Species	KISPIOX RIVER SECTION (1, 2, 3,or 4)	Rel./Kept	Fly or Gear	Time for each method

---

How many days have you already fished for steelhead on the Kispiox River this year? _____

How many *more* days do you plan to fish for steelhead on the Kispiox River this year? _____

Are you a member of a conservation club or organization? YES   NO

If YES, what organization(s) *(list first 3)* ? _____, _____, _____

What do you feel are the key characteristics of a high quality angling experience on the Kispiox River*(list top 3)*?

_____, _____, _____

On a scale of 1-5, 1 being very poor and 5 being excellent, how would you rate your quality angling experience today?
                        1   2   3   4   5   6 *(Don't Read)*
                  VERY POOR   POOR   FAIR   GOOD   EXCELLENT   NOT SURE

Kispiox River Guardian: Roving Survey Form

Interviewer: _____   **River Section:** _____   **Other:** _____

Date: _____   **Day Type:** Weekday   Weekend

Time Start: _____   **Time Stop:** _____

Weather: Sun   Partial Cloud   100% Overcast   Rain   Snow

Secchi Depth: _____   **S. Gauge Height**: _____

Water Level: Low   Rising   High   Flood

Route Description:

_____

_____

_____

Area	Anglers Observed	Drift Boats Observed	Anglers Interviewed	Time entered area	Time exited area
Section 1: Kispiox Confluence – Rodeo Grounds					
Section 2: Rodeo Grounds – Upper Rec Site					
Section 3: Upper Rec Site - Mitten Bridge					
Section 4: Mitten Bridge - Sweetin R. confluence					
Total					

Comments:

_____

_____

_____

_____

Kispiox River Guardian Project: Aerial Count Form

Personnel: _____   **Date:** _____   **Day Type:** Weekday   Weekend

Weather: Sun   Partial Cloud   100% Overcast   Rain   Snow

Water Clarity: Clear   Turbid   **Water Level:** Low   Rising   High   Flood

Time	Location	Total	Anglers Fly	Gear	Drift Boats	Guided?
	Leave Base					
	Section 1 **Confluence – Rodeo Grounds**					
	Section 2 **Rodeo Grounds – Upper Rec Site**					
	Section 3 **Upper Rec Site - Mitten Bridge**					
	Section 4 **Mitten Bridge - Sweetin confluence**					
	Return Base					
	Total					

PLEASE NOTE RIVER GUARDIAN CREW LOCATION & TIME OBSERVE

Appendix 2.0 Summary of all conservation clubs.

Table A1. The conservation club membership of anglers interviewed.

	n	% of Anglers (n= 74)
Trout Unlimited	20	27.03
Steelhead Society	13	17.57
Nature Conservancy	10	13.51
California Trout	8	10.81
Federation of Fly Fishermen	5	6.76
Ducks Unlimited	4	5.41
Wild Steelhead Coalition	4	5.41
Wild Steelhead Conservancy	3	4.05
Alaska Fly Fishermen's Association	2	2.70
Boise Flyfishermen Club	2	2.70
Greenpeace	2	2.70
Idaho Steelheaders	2	2.70
Steamboaters	2	2.70
Wildlife Forever	2	2.70
American Steelhead Federation	1	1.35
Autobaun Society	1	1.35
British Columbia Guide Association	1	1.35
British Columbia Wild Steelhead Federation	1	1.35
Clearwater Flycasters	1	1.35
First Nations	1	1.35
Fishing clubs in Ireland	1	1.35
Fly fishing club in Germany	1	1.35
Fraser River Sturgeon Conservation Society	1	1.35
Inland Empire Fly Fishing Club	1	1.35
Kispiox River Coalition	1	1.35
North West Steelheaders	1	1.35
Oregon Trout	1	1.35
Pheasants Forever	1	1.35
Sierra Club	1	1.35
Seymour Salmonid Society	1	1.35
Sierra Club	1	1.35
Steelhead Advisory Committee	1	1.35
Thompson River Federation of Fly Fishermen	1	1.35
Thompson River Steelhead Foundation	1	1.35
Tracy Flyfishing Club	1	1.35
Washington Steelheaders	1	1.35
Wildlife Federation	1	1.35
Steelhead and Trout Clubs	1	1.35
Sacramento River Trust	1	1.35
SCI	1	1.35
Rocky Mountain Elk Society	1	1.35
Olympic Guide Association	1	1.35
Babine River Trust	1	1.35

Appendix 3.0 The weather and water conditions during the study period.

Table A2.   A summary of weather and water conditions that were observed from the aerial flights and by the River Guardians.

Survey Date	Weather	Secchi Depth (m)	Staff Gauge Height (cm)	Water Level
30-Aug-01	100% Overcast	2.60	22	Rising
01-Sep-01	100% Overcast	2.40	20	Rising
02-Sep-01	100% Overcast	2.70	18	High
05-Sep-01	100% Overcast	0.00	39	High
06-Sep-01	Partial Cloud	2.10	36	High
07-Sep-01	Partial Cloud	1.70	39	High
08-Sep-01	Partial Cloud	2.10	22	Low
09-Sep-01	Sun	3.60	10	Low
10-Sep-01	Partial Cloud	3.50	6	Low
11-Sep-01	100% Overcast	2.90	4	Low
12-Sep-01	Partial Cloud	3.10	-2	Low
14-Sep-01	100% Overcast	2.60	0	Low
15-Sep-01	100% Overcast	2.40	1	Low
18-Sep-01	100% Overcast	2.30	4	Low
19-Sep-01	Partial Cloud	2.70	4	Rising
20-Sep-01	100% Overcast	2.60	4	Rising
21-Sep-01	100% Overcast	2.30	4	Rising
22-Sep-01	Rain	0.70	22	High
23-Sep-01	Rain	0.10	43	High
24-Sep-01	Rain	0.10	72	Flood
25-Sep-01	Rain	0.15	64	High
26-Sep-01	Rain	0.18	84	High
27-Sep-01	Partial Cloud	0.19	58	High
28-Sep-01	Partial Cloud	1.10	36	High
29-Sep-01	Partial Cloud	1.80	28	Low
30-Sep-01	Sun	2.20	26	Low
01-Oct-01	Partial Cloud	1.90	16	Low
02-Oct-01	100% Overcast	2.40	18	Low
03-Oct-01	100% Overcast	2.30	10	Low
04-Oct-01	Sun	3.40	0	Low
05-Oct-01	100% Overcast	4.10	-4	Low
06-Oct-01	100% Overcast	4.60	-4	Low
09-Oct-01	100% Overcast	4.70	2	Low
10-Oct-01	Rain	2.10	0	Rising
11-Oct-01	100% Overcast	3.30	-2	Low
11-Oct-01	100% Overcast	3.30	-2	Low
12-Oct-01	Partial Cloud	3.00	-2	Low
12-Oct-01	Partial Cloud	3.00	-2	Low
13-Oct-01	Partial Cloud	1.90	0	Low
17-Oct-01	100% Overcast	3.90	-2	Low
18-Oct-01	Partial Cloud	3.70	-2	Low
19-Oct-01	Partial Cloud	2.10	0	Low
20-Oct-01	100% Overcast	2.80	0	Low

Survey Date	Weather	Secchi Depth (m)	Staff Gauge Height (cm)	Water Level
23-Oct-01	Partial Cloud	0.00	0	Low
24-Oct-01	Partial Cloud	4.30	-6	Low
26-Oct-01	100% Overcast	3.90	-3	Low
27-Oct-01	Partial Cloud	3.70	-6	Low
28-Oct-01	100% Overcast	3.70	-10	Low
30-Oct-01	100% Overcast	3.20	-10	Low
31-Oct-01	100% Overcast	3.20	-10	Low
01-Nov-01	Partial Cloud	3.00	-5	Low
02-Nov-01	Partial Cloud	3.20	-5	Low
04-Nov-01	Rain	4.10	-14	Low
06-Nov-01	Partial Cloud	4.20	-12	Low
07-Nov-01	Rain	4.10	-12	Low
08-Nov-01	100% Overcast	3.80	-8	Low
10-Nov-01	100% Overcast	3.70	-8	Low
12-Nov-01	100% Overcast	1.40	-2	Low
13-Nov-01	100% Overcast	1.20	10	Rising
14-Nov-01	100% Overcast	0.80	18	Rising
15-Nov-01	100% Overcast	1.00	14	Low
16-Nov-01	Partial Cloud	1.60	12	Low
17-Nov-01	Partial Cloud	2.10	8	Low
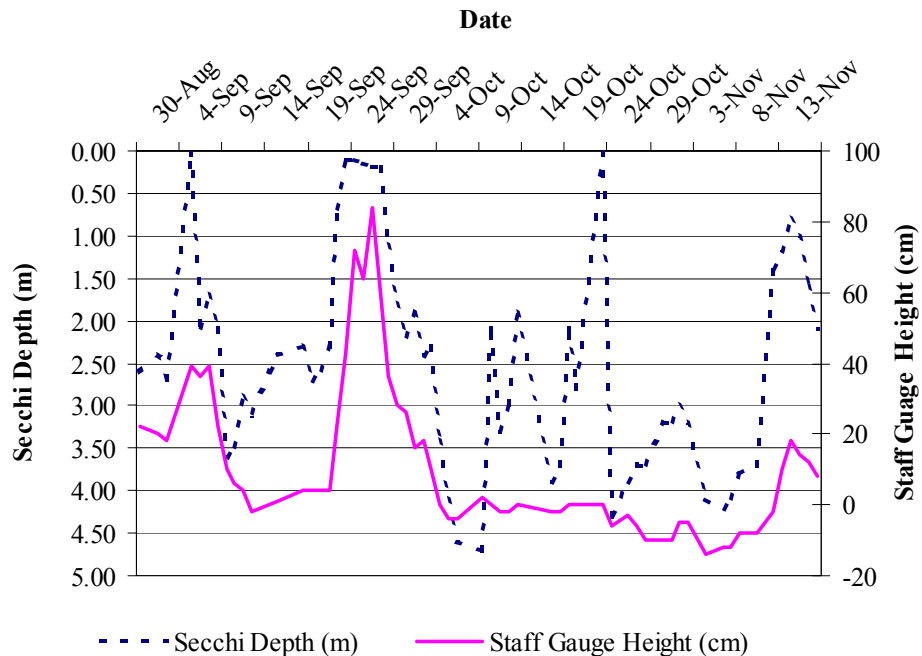
Figure A1.   Graphical representation of Secchi depth and staff guage data from Table A2.

Weather Notes:
1. The Kispiox River was 'out' and was not fishable for the major event from September 27-27.
2. Other small weather events did not cause a dramatic impact on the river and fishing was still possible.

Appendix 4.0 Detailed quality experience ratings.

Table A3. The proportion of Kispiox River anglers that rated their quality angling experience as very poor, poor, fair, good and excellent by residence, guided status, access method and angling method categories and time period.

| | On a scale of 1-5, 1 being very poor and 5 being excellent how would you rate your quality angling experience today? | | | | | | | | | | | |
| | Very Poor | | Poor | | Fair | | Good | | Excellent | | Total | Mean |
	n	%	n	%	n	%	n	%	n	%	n	Score
All Anglers	10	4.1	19	7.8	54	22.0	67	27.3	75	30.6	245	3.97
Residence												
B.C.	3	4.5	7	10.4	11	16.4	18	26.9	26	38.8	67	3.94
Cdn.	0	0.0	1	25.0	0	0.0	0	0.0	2	50.0	4	4.50
Non-Cdn.	4	2.6	9	5.9	39	25.5	44	28.8	41	26.8	153	4.03
Guided Status												
Yes	1	2.6	0	0.0	11	28.2	10	25.6	13	33.3	39	4.18
No	9	4.5	19	9.4	41	20.3	55	27.2	62	30.7	202	3.94
Access Method												
Drift Boat	5	4.3	5	4.3	34	29.1	36	30.8	31	26.5	117	3.86
Foot	5	3.9	14	10.9	20	15.6	31	24.2	44	34.4	128	4.07
Angling Method												
Fly	7	3.8	11	6.0	43	23.6	51	28.0	57	31.3	182	3.98
Gear	3	6.3	7	14.6	9	18.8	11	22.9	12	25.0	48	3.83
Both	0	0.0	1	6.7	2	13.3	5	33.3	6	40.0	15	4.27
Time Period												
8-2	0	0.0	0	0.0	8	57.1	3	21.4	3	21.4	14	3.64
9-1	2	4.5	1	2.3	12	27.3	20	45.5	5	11.4	44	3.84
9-2	2	3.6	7	12.7	15	27.3	10	18.2	15	27.3	55	3.85
10-1	3	4.5	7	10.6	9	13.6	19	28.8	22	33.3	66	4.03
10-2	0	.0	2	6.7	3	10.0	10	33.3	12	40.0	30	4.37
11-1	3	9.7	1	3.2	5	16.1	5	16.1	17	54.8	31	4.03
11-2	0	.0	1	20.0	2	40.0	0	0.0	1	20.0	5	3.80

1. 20 Anglers were unsure.

Table A4. Miscellaneous key characteristics.

Miscellaneous Key Characteristics
• Difficult to get classified license
• Dislikes garbage on river.
• Any day is a good day on the Kispiox river
• No garbage
• Keep it the way it is
• Good to see guardians on the river (2)
• Different place
• Nice accommodations
• Fun to fish
• Slow fishing season
• Worried about the river becoming a lottery
• Good camp sites

Appendix 6.0 Correlation matrix for key angling variables.
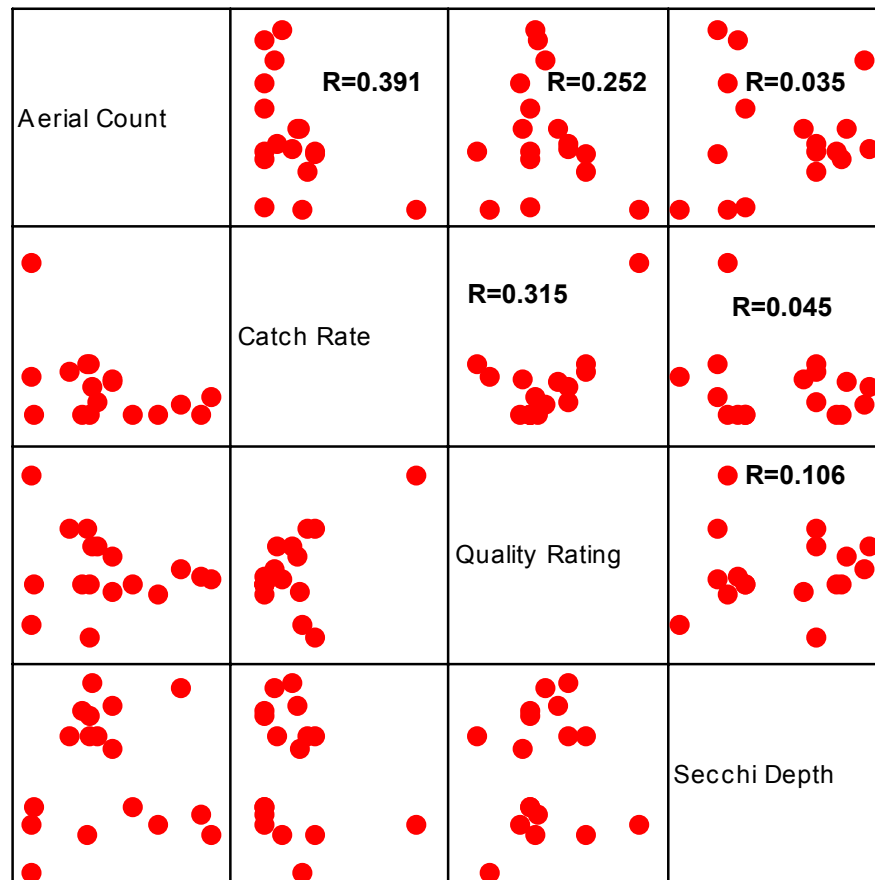

Figure A2. Correlation matrix for angler effort (aerial count), catch rate, quality rating and secchi depth.

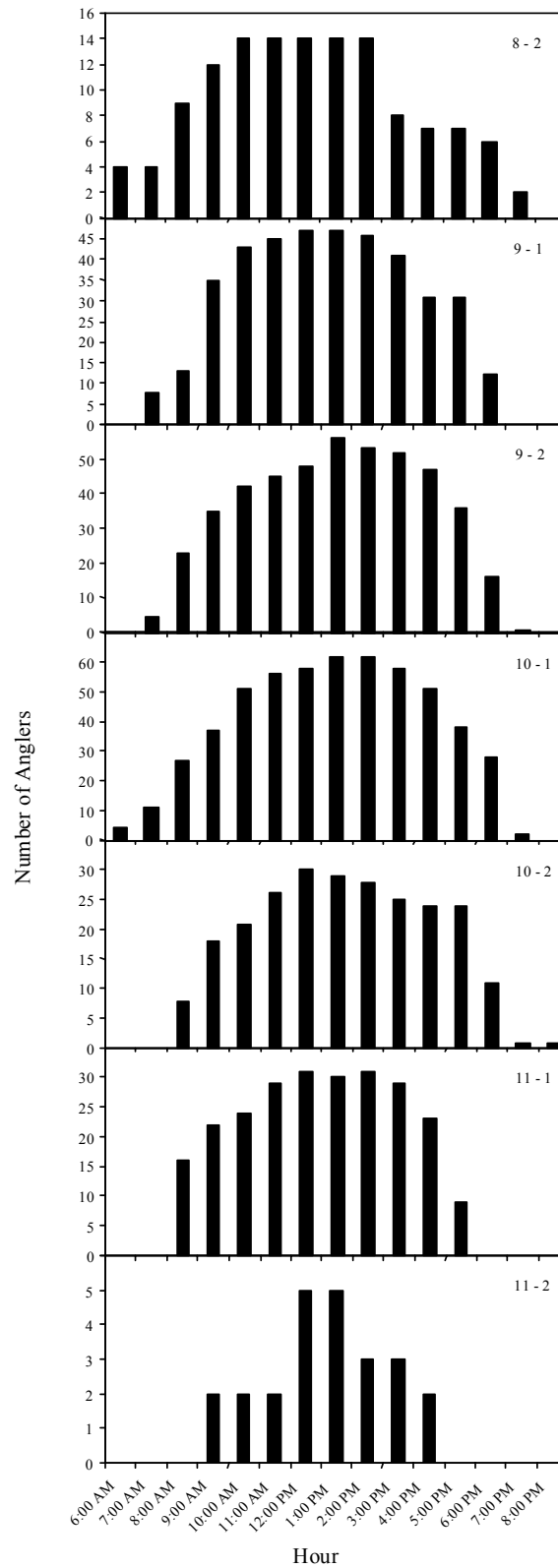**Appendix 7.0 The activity profiles by time period.**

Figure A3. Activity profile by time period. The bars represent the number of anglers on the river during each hour of the day and were obtained from angler interviews.

Appendix 8.0 Summary of flight data.

Table A5. Summary of aerial count data.

Flight Date	29-Aug	01-Sep	05-Sep	08-Sep	10-Sep	15-Sep	21-Sep	25-Sep cancelled	29-Sep	01-Oct	05-Oct	06-Oct	09-Oct	13-Oct	18-Oct	21-Oct	24-Oct	27-Oct	30-Oct	04-Nov	06-Nov	10-Nov	13-Nov	17-Nov	Totals
Weather	part. cloud	over cast	over cast	part. cloud	part. cloud	sun	overc ast	rain	part. cloud	sun	part. cloud	part. cloud	part. cloud	overc ast	part. cloud	part. cloud	part. cloud	part. cloud	overc ast	part. cloud	part. cloud	overc ast	rain	overc ast	
Water level	high	high	high	low	low	low	low	high	high	high	low	low	low	low	low	low	low	low	low	low	low	low	rising	high	
Water Clarity	clear	clear	turbid	clear	clear	clear	clear	turbid	p.turbid	clear	clear	clear	clear	clear	clear	clear	clear	clear	clear	clear	clear	clear	turbid	clear	
Section I Confluence with Skeena River- Rodeo Grounds																									
Anglers	2	4	1	22	9	21	20		6	20	24	25	8	8	14	17	12	13	0	8	14	5	3	4	**260**
Fly	0	0	0	15	8	14	14		3	18	16	18	2	2	6	9	8	7	0	3	7	1	2	1	**154**
Gear	0	4	1	7	1	2	5		3	2	6	7	2	6	8	8	4	6	0	5	6	4	0	3	**90**
Drift Boats	0	1	0	3	3	6	5		2	4	7	6	0	0	3	3	2	8	0	1	2	0	2	0	**58**
Guided	0	0	0	2	3	2	4		1	2	0	5	0	0	1	5	1	0	0	3	0	0	1	0	**30**
Section II Rodeo Grounds - Upper Rec Site																									
Anglers	8	3	4	15	18	10	31		16	32	20	17	8	10	6	25	11	7	14	9	7	8	3	2	**284**
Fly	2	1	4	15	12	6	21		12	28	18	16	8	10	5	14	7	0	14	5	7	2	2	2	**211**
Gear	6	2	0	0	4	4	8		4	4	2	1	0	0	1	11	4	7	0	4	0	6	1	0	**69**
Drift Boats	1	0	2	3	9	6	14		4	9	6	11	2	1	1	5	1	0	5	2	2	0	1	2	**87**
Guided	1	0	2	1	4	4	0		0	1	3	0	0	0	1	2	0	0	3	0	1	0	0	0	**23**
Section III Upper Rec Site - Mitten Bridge																									
Anglers	0	0	0	6	0	8	10		6	6	13	9	5	6	6	3	6	2	3	5	1	5	0	0	**100**
Fly	0	0	0	6	0	5	10		4	6	8	9	5	5	6	3	6	0	3	3	1	5	0	0	**85**
Gear	0	0	0	0	0	3	0		2	0	3	0	0	2	0	0	0	2	0	2	0	0	0	0	**14**
Drift Boats	0	0	0	2	0	4	5		3	4	4	6	2	2	4	3	4	0	0	1	0	3	0	0	**47**
Guided	0	0	0	0	0	1	0		2	0	3	3	1	1	1	0	0	0	0	0	0	0	0	0	**12**
Section IV Mitten Bridge – Sweetin Recreation Site																									
Anglers	0	0	2	4	5	0	0		3	6	2	3	5	0	1	2	3	3	2	3	0	0	0	0	**44**
Fly	0	0	2	0	0	0	0		3	6	0	3	4	0	1	2	3	3	2	2	0	0	0	0	**31**
Gear	0	0	0	0	5	0	0		0	0	2	0	1	0	0	0	0	0	1	0	0	0	0	0	**9**
Drift Boats	0	0	0	1	1	0	0		1	2	0	1	1	0	1	0	2	3	1	1	0	0	0	0	**15**
Guided	0	0	0	0	0	0	0		0	2	0	3	0	0	1	0	0	2	0	0	0	0	0	0	**8**
Total																									
Anglers	**10**	**7**	**7**	**47**	**32**	**39**	**61**		**31**	**64**	**59**	**54**	**26**	**24**	**27**	**47**	**32**	**25**	**19**	**25**	**22**	**18**	**6**	**6**	**688**
Fly	**2**	**1**	**6**	**36**	**20**	**25**	**45**		**22**	**58**	**42**	**46**	**19**	**17**	**18**	**28**	**24**	**10**	**19**	**13**	**15**	**8**	**4**	**3**	**481**
Gear	**6**	**6**	**1**	**7**	**10**	**9**	**13**		**9**	**6**	**13**	**8**	**3**	**8**	**9**	**19**	**8**	**15**	**0**	**12**	**6**	**10**	**1**	**3**	**182**
Drift Boats	**1**	**1**	**2**	**9**	**13**	**16**	**24**		**10**	**19**	**17**	**24**	**5**	**3**	**9**	**11**	**9**	**11**	**6**	**5**	**4**	**3**	**3**	**2**	**207**
Guided	**1**	**0**	**2**	**3**	**7**	**7**	**4**		**3**	**5**	**6**	**11**	**1**	**1**	**4**	**7**	**1**	**2**	**3**	**3**	**1**	**0**	**1**	**0**	**73**

Appendix 9.0 Steelhead Harvest Analysis data.

Table A5. Steelhead Harvest Analysis (SHA) rod day and catch data from 1984-2000 by residence category, mean and 95% confidence interval presented for all years, by category.

	BC		CDN		Non-CDN		Total	
	Rod Days	Catch	Rod Days	Catch	Rod Days	Catch	Rod Days	Catch
2001	1469	1642	36	14	2376	2092	3881	3748
2000	871	594	140	107	1984	37	2995	738
1999	1214	1301	46	66	2515	2973	3775	4340
1998	524	291	41	5	1259	1175	1825	1471
1997	641	284	99	37	1964	1541	2705	1862
1996	809	757	138	128	2109	1699	3056	2584
1995	1036	752	134	148	1346	1258	2516	2158
1994	219	73	120	31	1105	994	1444	1098
1993	739	572	121	42	808	662	1668	1276
1992	650	306			676	364	1326	670
1991	1308	458	109	44	1335	730	2752	1232
1990	1076	495	318	131	2600	1500	3994	2126
1989	1669	1195	823	321	2487	1986	4979	3502
1988	1888	1224	335	190	1756	1215	3979	2629
1987	1715	1640	335	155	1388	1643	3438	3438
1986	1424	988	238	64	1040	894	2702	1946
1985	1185	816	169	50	769	548	2123	1414
1984	937	386	287	26	847	445	2071	857
mean	1076	765	205	92	1576	1209	2846	2060
± 95% CI	393.4	410	96.7	41.6	351.9	364.2	508.8	555