River Guardian Compliance Monitoring and Angler Survey on 7 East Kootenay Classified Waters - 2006 Quality Waters Strategy (River Guardian Program)

K. D. Heidt

British Columbia Ministry of Environment,
Environmental Stewardship Division,
Fish and Wildlife Section,
Kootenay Region
205 Industrial Road G, Cranbrook, B.C. V1C 7G5

This project was funded by the Habitat Conservation Trust Fund

May, 2007

EXECUTIVE SUMMARY

A compliance monitoring project and angler survey was conducted over a 106 day period by 3 River Guardians on seven classified streams in the East Kootenay Region from July 1 to October 14, 2006. River Guardians were mandated to provide a fisheries presence for compliance monitoring, public relations and educational purposes. River Guardians assisted the Conservation Officer Service (C.O.S.) in an enforcement capacity, working with Conservation Officers to deal with any serious regulation infractions encountered while in the field. The angler survey collected detailed information from guided and non-guided anglers including: hours fished, fish caught and released by species, trip length, angling methods, place of residence, licence details, river access and quality of angling experience.

A total of 1,023 anglers (+ 2 repeat interviews) were checked by River Guardians during the 2006 summer/fall angling season. Of the 1,023 total anglers checked, there were 209 anglers in non-compliance (20% of all interviews) and 346 angler infractions documented by River Guardians for an overall non-compliance rate of 34%. These infractions varied from barbed hooks and angling licence issues to illegal harvest. The percentage of infraction occurance varied significantly by classified stream system.

Overall, anglers fished for a total of 2,948 hours, 179 were guided and 844 were non-guided. They caught 3,655 fish over the survey, including 3,403 westslope cutthroat trout (WCT), 161 bull trout (BT), 60 mountain whitefish (MW), 20 rainbow trout (RB), 11 kokanee (KO) and 1 eastern brook trout (EB), for a catch per unit effort (CPUE) of 1.24 overall. Only 15 fish were harvested among anglers interviewed during this survey for a release rate of 99.6%.

Of the 1,023 anglers, 665 were Canadian (65%), 347 were from the United States (34%), 10 anglers were from Europe (1%) and 1 angler was from Asia (<1%). British Columbian anglers account for 43% of all anglers, while anglers from Alberta, Washington, Montana and California round out the top five provinces/states with 18%, 7%, 7% and 5% of all anglers respectively.

The 1,023 anglers interviewed in the survey were also asked to rate the quality of their angling experience, number of other anglers seen and their perception of crowding levels on their trip. A total of 951 anglers responded to the question of angling experience, with 685 anglers rating the experience as excellent (72%), 188 as good (20%), 57 as fair (6%), 18 as poor (2%) and 3 anglers said they were not sure of their response (<1%). A total of 940 anglers responded when asked the number of other anglers they had seen: 545 saw 0-2 other anglers, 251 saw 3-5 anglers, 126 saw 6-12 anglers and 18 saw more than 12 anglers on their trip. A total of 940 anglers responded to the crowding question, with 811 rating the level of crowding not at all crowded (86%), 103 as slightly crowded (11%), 22 as moderately crowded (2.5%) and 4 as extremely crowded (0.5%).

ACKNOWLEDGEMENTS

The author would like to thank the River Guardians for their efforts and dedication in the field to find anglers in difficult terrain and conditions, monitor compliance and gather the survey data presented in this report. Thanks also to Herb Tepper (Regional Fisheries Biologist, MOE, East Kootenay Region) for assistance in the field and contribution to data analysis. Special thanks should also be given to the B.C. Conservation Officer Service (East Kootenay Region) for support and cooperation in the field.

This project was funded by the Habitat Conservation Trust Fund (HCTF). The HCTF was created by an act of legislature to preserve, protect, restore and enhance key areas of habitat for fish and wildlife throughout British Columbia.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

Seven streams systems were monitored during the 2006 summer/fall angling season including: Bull River, Elk River, Michel Creek, Skookumchuck Creek, St. Mary River, White River and Wigwam River. All seven of these streams are located in the southern portion of the East Kootenay Region of British Columbia (Fish and Wildlife Management Region 4). Native sport fish species in these systems include bull trout (*Salvelinus confluentus*), burbot (*Lota lota*), mountain whitefish (*Prosopium williamsoni*) and westslope cutthroat trout (*Oncorhynchus clarki lewisi*). Non-native sport fish in these streams include eastern brook trout (*Salvelinus fontinalis*), kokanee (*Oncorhynchus nerka*) and rainbow trout (*Oncorhynchus myskiss*). Non-sport fish species in these streams include northern pikeminnow (*Ptychocheilus oregonensis*), longnose sucker (*Catostomus catostumus*), largescale sucker (*Catostomus macrocheilus*) and sculpin (*Cottis sp.*) (Heidt, 2004).

Previous to the 1980's, most rivers in the East Kootenay (EK) region were managed very liberally. Native sport fish densities, particularly among westslope cutthroat trout and bull trout, were alarmingly low and there was a significant decrease in size and age class in many regional stream systems (Westover, 1993). In response to this, during the mid 1980's fisheries managers implemented far more restrictive regulatory strategies for the region. This conservative management approach has evolved and continued to present, resulting in many world class streams with healthy sport fish populations and the unique opportunity to catch trophy size westslope cutthroat trout and bull trout. Bull trout and westslope cutthroat trout are both sensitive species, threatened or endangered in many watersheds within their historical ranges throughout western Canada and the United States. The Canadian portion of the upper Kootenay River drainage above the Montana border remains one of the last strongholds for both bull trout and westslope cutthroat trout, with several populations of each species utilizing all seven of the streams designated as quality waters for the East Kootenay. The unique qualities of both these species attract anglers from all over the world to this region, although the majority of angler effort is targeted towards westslope cutthrout trout, particularly by fly anglers.

Fly fishing as a sport has seen an ever increasing popularity which also contributes to the attractiveness of the EK streams. Several of the EK's best stream fisheries have been either designated "fly fishing only" or have portions that are restricted to "fly fishing only" and offer quality opportunities for fly anglers, including a long dry fly season. The diverse and unique fishing opportunities that EK stream fisheries offer to all anglers have led to a substantial growth in angler numbers overall, particularly fly anglers, and the region has welcomed a growing number of non-resident and alien anglers as a result. The close proximity of the East Kootenays to both the Albertan and American borders and access to both regional and international airports within a relatively short distance also makes the area attractive to anglers from outside the region.

In addition to an increase in general angler numbers, there is now a very well established angling guide industry in the region. The past ten years has seen the angling guide industry explode in the EK region. Several EK streams have been advertised through television, magazines and the internet, throughout North America and Europe, which has also contributed to the growth of the guiding industries cliental, and corresponding growth in new angling guide and related business starts over the past decade.

Beyond the pristine, quality fisheries that the East Kootenay region offers, several additional factors have led to a vast increase in angler pressure on East Kootenay streams of late. In recent years, the East Kootenay Region has seen significant growth in recreational based development and a resulting increase in the number of people frequenting the area. Recreational opportunities including many world class golf courses, ski hills and pristine mountain wilderness areas within the region all contribute to this growth. Many individuals from outside the region, particularly Albertans and Americans, are buying properties in the region and making the East Kootenays their recreational destination.

An angler survey was conducted from July 1 to October 14, 2006 on all seven classified systems. This survey was conducted by 3 River Guardians in the course of providing a fisheries presence and monitoring angler compliance on the classified streams. Various

data were collected from anglers including effort and catch statistics, residence information, access and quality of angling experience. These data provide information to MOE Fisheries Section relevant to effective monitoring and management of the classified waters in the East Kootenay Region. The 2006 survey is the third year all seven classified waters in the East Kootenay have been monitored; however, for the 2006 season in Region 4 funding and staff (2 additional River Guardians) allocation was increased (through HCTF) in order to focus more time and resources on the classified waters.

2.0 BACKGROUND

2.1 Overview

By the late 1990's, successful fish population recovery in the British Columbia portion of the upper Kootenay River watershed had led to a vast increase in angler use and angling guide operations on several East Kootenay streams, especially the Elk River (Heidt, 2002). On the Elk River, angling pressure and the number of guides operating on the system seemed likely to exceed a healthy angling capacity of the river and its sport fish populations. Due to increasing angler trends and evidence that this pressure would continue to increase and expand to include smaller systems, concerns were raised pertaining to the sustainability of these stream fisheries over time and the quality of the fisheries as a result of overcrowding. Resident anglers were especially concerned about the crowding issue, feeling that they had lost their streams and that the pristine qualities of the EK fisheries were threatened. As no regional management system existed to adequately deal with these issues, an angling guide moratorium was put in place in March, 2003 and an East Kootenay Angling Management Plan (EKAMP) was initiated. The moratorium was implemented as a temporary 18 month measure to suspend new angling-guide licences for regional streams, until a viable plan (EKAMP) could be put in place to deal effectively with the guiding industry and angling pressure in general.

2.2 East Kootenay Angling Management Plan

The EKAMP is a comprehensive angler use plan for seven East Kootenay streams based on the Provincial Quality Waters Strategy. The plan was formulated by a committee in cooperation with all levels of government and various stakeholder groups. The committee goals for the EKAMP process were fourfold: to sustain the quality and quantity of wild fish stocks, to sustain the quality of the fishing experience for all classes of anglers, to have the use of the fishing resources contribute to the local and provincial economy through user fees and tourism expenditures, and to generate revenue from these seven quality waters through licences and fees for increased management of these waters (i.e., enforcement and education). The committee itself was made up of 1 BC Ministry of Environment fisheries biologist, 4 local resident anglers, 4 local angling guides and 1 First Nations representative. In addition, there were several venues and opportunities for input from the general public through the draft stages of this plan. The plan identified four major topics of concern: conservation, angler crowding and associated problems,

compliance with regulations and enforcement issues and an appropriate business environment for the angling guide industry to operate efficiently. Through committee discussions, public meetings and surveys, an in-depth list of concerns was compiled which fit into the four categories established above including: crowding, enforcement and compliance (lack of), quality of fisheries, quality of guide industry, river access, required membership in angling guide association and identification issues (accountability), number of boats on rivers, illegal guiding, illegal harvest, licence cost issues, angler courtesy and ethics on rivers, fish diseases, harassment and injuries (including post-hooking mortality), angler education and protection of threatened native species. The EKAMP document was drafted in response to these concerns and its framework includes: benchmarks for angler day thresholds on each of the seven identified special waters and their tributaries, benchmarks for rod days for various angler classes, benchmarks to ensure efficient, manageable, conservation minded guiding operations (including allocated guide rod days for each special water), introducing a new licence fee system which varies for angler residency, promoting increased compliance monitoring and enforcement on special waters, increasing a fisheries presence on special waters and placing more emphasis on angler education (EKAMP, 2003).

2.3 Classification

To implement the recommendations and benchmarks established by the EKAMP, provincial legislation was needed to give fisheries managers, among other tools, the ability to allocate rod days and set stream specific angler day thresholds. The B.C. classified waters system was the only legislated system in place which would accomplish the goals of the EKAMP. Classified waters of BC are highly productive trout streams which are classified as Class I or Class II (Quality Waters Strategy, 2005). This stream classification system was created to preserve the unique fishing opportunities provided by these waters. Under this system, anglers require a separate water specific classified licence in order to fish on a classified stream and its tributaries (unless otherwise noted in the regulation tables). As mentioned, this system also allows angler rod day quotas to be established, allocation of guided rod days and angler thresholds. In addition to empowering fisheries staff with more effective general management tools for stream fisheries, classification also generates revenue through the Habitat Conservation Trust Fund (HCTF), which ideally translates into increased compliance monitoring, education and scientific data

collection on classified streams. Given that East Kootenay quality waters are non-tidal, non-anadromous systems and the region is unique from others in B.C. utilizing the classification system, the desire initially was to create a system which would address the requirements of this specific region. Technical and legal issues made this endeavour incredibly difficult. As a result, the classification system was adopted and the seven East Kootenay quality waters and their tributaries (Bull River, Elk River, Skookumchuck Creek, St. Mary River, Upper Kootenay River, White River and Wigwam River) were listed as Class II waters in the spring of 2005. The 2006 summer angling season was the second angling season to see this system implemented in our region.

2.4 Issues with classification

Given that classification in this region is in its infancy, and that Region 4 is unique from others employing the system, negative feedback and problems with the system were anticipated. Response from anglers (all residences and classes), the general public, members of the East Kootenay business communities and colleagues in natural resource protection and management were gathered via the 2005 angler survey, communication by emails, letters and phone calls to MOE staff, meetings with MOE staff, and response from various government representatives at federal, provincial and municipal levels. Among the many concerns identified are a lack of education among vendors selling classified licences, inconvenience experienced as a result of the day and system specific licence requirements, non-resident fee structures, insufficient fisheries staff seen in the field, and various serious enforcement issues pertaining to weaknesses in the system (i.e. honour reporting system for permitted guide rod days). At the time of this report, several aspects of the system are being reviewed and discussion is underway involving several levels of government and various stakeholder groups, in an attempt to streamline the system and maximize its effectiveness for this region, as well as finding an acceptable level of support from all angler classes enjoying these stream fisheries.

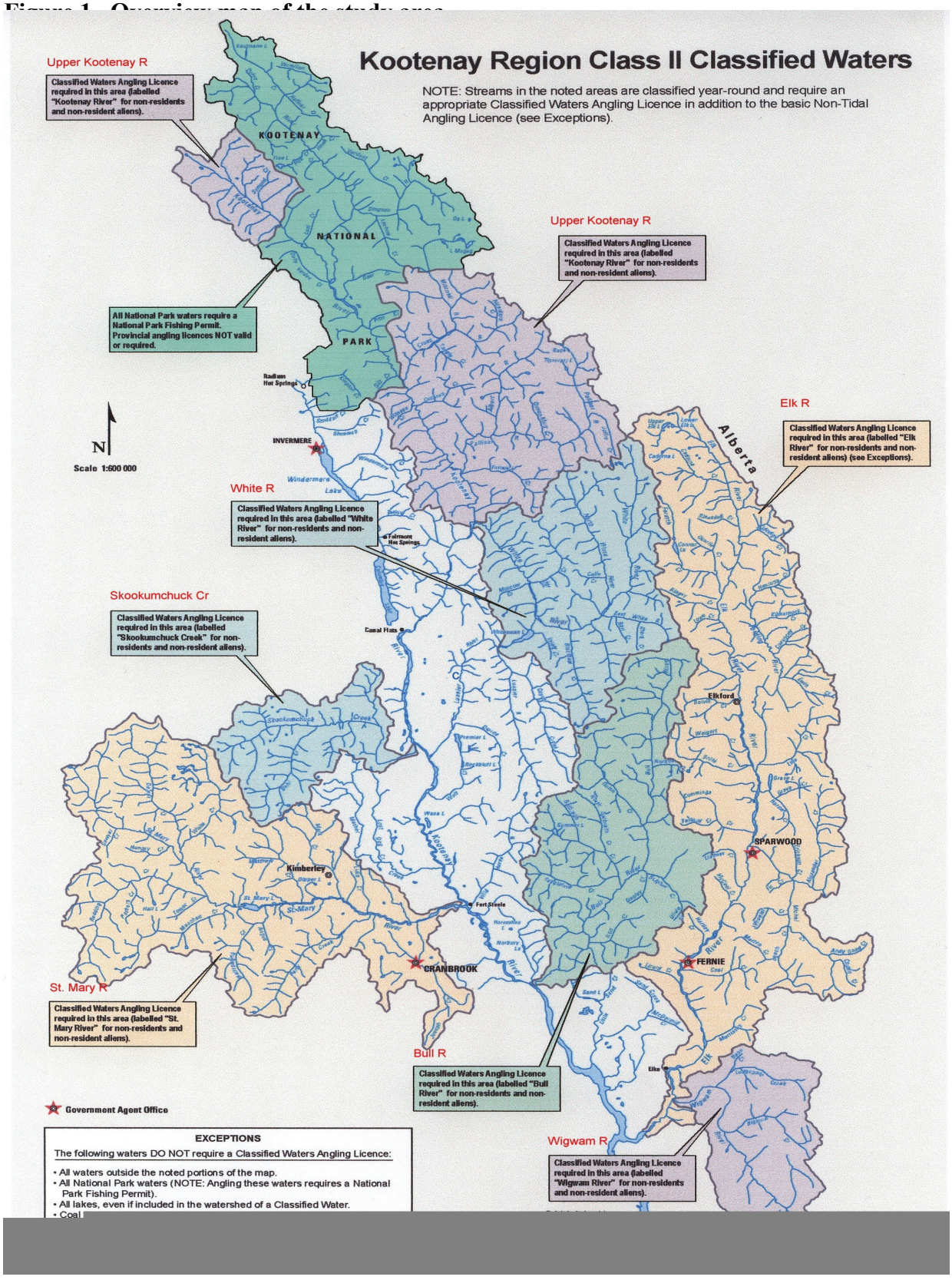
3.0 STUDY AREA

The streams included in this survey are all located in the southern portion of the East Kootenay Region of British Columbia (Fish and Wildlife Management Region 4). The study area covers a significant portion of the Rocky Mountain Trench (approximately 17,000 km^2), reaching from the Purcell Mountains in the West (headwaters of the St. Mary River and Skookumchuck Creek) to the Rocky Mountains in the East (headwaters of the Bull River, Elk River, Michel Creek, White River and Wigwam River), north to the boundary of Kootenay National Park and south to the upper reaches of the Wigwam River (just north of the Montana border) (Figure 1). The close proximity of the study area to both the Albertan and American borders makes these fisheries attractive to many anglers from outside the region.

All but two of these streams (Michel Creek and the Wigwam River are tributaries to the Elk River) are direct tributaries to the Kootenay River, the major river system flowing through the southern portion of the Rocky Mountain Trench. Other major tributaries to the Kootenay River within the study area and not included in the survey are Findlay Creek, Lussier River, Matther Creek, Wildhorse Creek, Sand Creek, Kikomun Creek and Gold Creek.

Angler access is fairly good throughout the study area, with a number of major and secondary highways and forest service roads (FSRs) intersecting the various streams throughout their lengths. Angling from a boat is limited primarily to the Elk and St. Mary Rivers, but shore anglers are able to access all the streams included in this survey at many points throughout their lengths.

Figure 1. Overview map of the study area.



4.0 METHODS

4.1 Study Design

The compliance monitoring project and angler survey was conducted over a 106 day period from July 1 to October 14, 2006. There were a total of 87 days sampled during this period. The project included seven classified stream systems, although a majority of the River Guardian effort (55%) was focused on the St. Mary and Elk Rivers (29% and 26% of interview days, respectively) due to these systems high angler use as shown in previous angler surveys (Heidt 2002, 2003). The Bull River, Wigwam River, Michel Creek, Skookumchuck Creek and White River were patrolled at approximately 18%, 13%, 7%, 4% and 3%, respectively. Survey days were stratified by day type (weekend vs. weekday) and by am and pm checks. As the survey was not designed to account for extrapolated effort, sampling was weighted only to include a representative portion of anglers over weekday/weekend days and am/pm time periods.

4.2 Patrols

River patrols were conducted by three River Guardians, who travelled the approximately 17,000 km^2 study area by truck and foot and interviewed anglers. Guardians also used pontoon boats on 21 days to float sections of the St. Mary, Elk, Bull, White and Wigwam Rivers. This method has proven effective in maximizing angler contact over a given stretch of water, especially with boat anglers, and locating anglers in remote stretches of water. Several boat exit interview points were also established along the St. Mary and Elk Rivers. These points were used by River Guardians to gain complete trip data and check licence information from boat anglers near the end of pm shifts. Road checks were also employed on Forest Service Roads on 4 occasions in remote areas to interview anglers and check licence information. Start and end points for shifts on the various classified streams varied between zones to maintain random design and enable River Guardians to provide a random distributed level of compliance monitoring on each stream.

4.3 Angler contact

Anglers encountered by River Guardians were required to produce both a valid BC freshwater angling licence and classified waters licence upon request. The Guardians also inspected angling gear and confirmed that angler harvest was within the designated parameters for both species and limits. Any infractions found were recorded on a River Guardian infraction sheet along with

personal information relevant to the non-compliant angler and entered electronically at the Ministry of Environment office in Cranbrook (Appendix I). This information was then sent to the Conservation Officer Service in the district where the offence occurred.

4.4 Results Methodology

4.4.1 Angler survey data

Angler survey data collected by the River Guardians included: hours fished, fish caught and released by species, place of residence, angling methods (i.e. fly/gear), guided vs. non-guided angler statistics, access methods (ie. boat/shore) and quality of angling experience (Appendix II).

4.4.2 Post-hooking mortality

A factor which was considered when looking at catch results was post-hooking mortality, which varies significantly for different angling methods. A study conducted in 1977 by Wydoski using various angling methods with single barbed hooks found that angling with bait had an average post hooking mortality of 25% (3.3% – 61.5% n=2,859), while angling with lures had an average post hooking mortality of 6.1% (1.7% - 42.6% n=3,625) and with artificial flies an average post hooking mortality of 4.05% (0.0% - 11.3% n=2,713). Debate still exists regarding the benefit of barbless hooks in reducing post hooking mortalities. Several studies have reached conflicting conclusions regarding the use of barbless hooks as a fisheries conservation management tool (Wydoski 1977, Mongillo 1984, Taylor and White 1992, Schill and Scarpella 1997). In several studies, barbless hooks did not have any direct mortality reducing effects on fish caught when compared to barbed hooks of the same size and similar angling method (Wydosk 1977i, Schill and Scarpella 1997). However, there is general agreement that the use of barbless hooks can significantly reduce handling of released fish, thereby reducing stress and recovery time, factors which can greatly influence the chances of post catch survival. This factor becomes particularly significant in systems with sustained angling pressure, where fish are likely being caught and released many times through the course of an angling season. Current regulations for the seven streams in this survey take these factors into account with single barbless hook restrictions all year, bait bans from June 15 to October 31 and fly fishing only restrictions on sections of Skookumchuck Creek and the St. Mary, White and Wigwam Rivers. Given these restrictions and that 83% of anglers surveyed were fly anglers, it is likely that post hooking mortality rates

are low (0.5% - 5% est.). As it is not possible to concisely determine post-catch mortality rates for fish caught and released during this survey, a range of 0.5% - 5% is used to estimate mortalities as a means to exemplify the potential impact even minimal post-catch mortalities could have on fish populations.

4.4.3 Guided vs. non-guided angler statistics

Guided and non-guided angler data in this survey are taken primarily from the St. Mary and Elk River interviews (148 guided angler days). There were three other streams (Bull River, Michel Creek and Wigwam River) which accounted for an additional 31 guided angler days (19, 4 and 8 guided angler days, respectively) among all anglers interviewed during this survey.

4.4.4 Boat vs. shore anglers

Data pertaining to boat anglers in this survey are also taken primarily from the St. Mary and Elk River interviews. Only two other streams (Bull and Wigwam Rivers) accounted for any boat angler effort (15 and 1 angler days, respectively) among all angler interviews during this survey.

4.4.5 Angling experience

Anglers interviewed during the creel survey were asked to rate the quality of their angling experience. A scale of 1 to 5 was used with 1 being very poor, 2 poor, 3 fair, 4 good and 5 excellent.

Anglers were also asked to list the top three factors which led to their quality of angling experience rating. These factors were correlated with a list from A-H in the angler survey form (Table1).

Table 1. List of factors contributing to the quality of angling experience.

Letter	Environment and Setting Feature
A	Quantity of fish caught
B	Quality of fish caught
C	Water conditions
D	Surrounding scenery
E	Quality of access to the water
F	Number of other anglers
G	Number of boats on the water
H	Other (including response to the classification system)

In addition, anglers were asked how many other anglers they had seen during their fishing trip. Answers were listed under 5 categories: (1) 0-2, (2) 3-5, (3) 6-12, (4) more than 12 anglers and (5) not sure/can't recall. Anglers were then asked to rate the level of crowding they felt based on their response to the number of anglers seen. The level of crowding was on a scale from 1 to 4: (1) not at all crowded, (2) slightly crowded, (3) moderately crowded and (4) extremely crowded. As angler response to "other anglers seen" influences the crowd rating response, analysis of these data required linking response from both questions. Three aspects of these data are analyzed in this report: Summary of all angler response related to crowding, the perception of crowding by angler residency, and a crowding response comparison between 4 of the major classified streams.

4.5 Data analysis

Survey data were entered into a database created using Microsoft Access 2002 and several queries were subsequently generated to produce the survey results presented in this report. Regional rainfall statistics were imported from Environment Canada's climate data website and graphed using Microsoft Excel. Additional analysis and graphs found in this report utilized Microsoft Excel.

5.0 ELEMENTS INFLUENCING RESULTS

5.1 Weather

Summer and early fall (Sept-Oct) in the Rocky Mountain Trench area of the East Kootenay Region is typically quite hot and arid, with warm summer daytime temperatures often lasting into mid-October. Rainfall for this time period is historically minimal, and during September and early October, significant insect hatches occur, making stream fishing ideal throughout this time period (particularly attractive to fly anglers). During the 2006 summer/fall angling season, two weather anomalies occurred which influenced angling effort on all seven classified systems. July rainfall levels were higher than typical norms, resulting in extended freshet conditions including high levels of turbidity in most streams (Figure 2). As a result, angling pressure was delayed on some streams in the region until late July, despite all streams opening to angling on June 15. Unusually high rainfall occurred again at the end of September and continued heavily throughout October. In addition to severe rainfall, a rain on snow event occurred in October which contributed to extremely high flows and turbidity levels (Figure 3). These factors limited the angling season during late fall, which typically sustains some angling pressure during October on all classified waters in the region (Heidt, 2003, 2004).

Figure 2. July rainfall statistics for the East Kootenay Region (1971-2006)

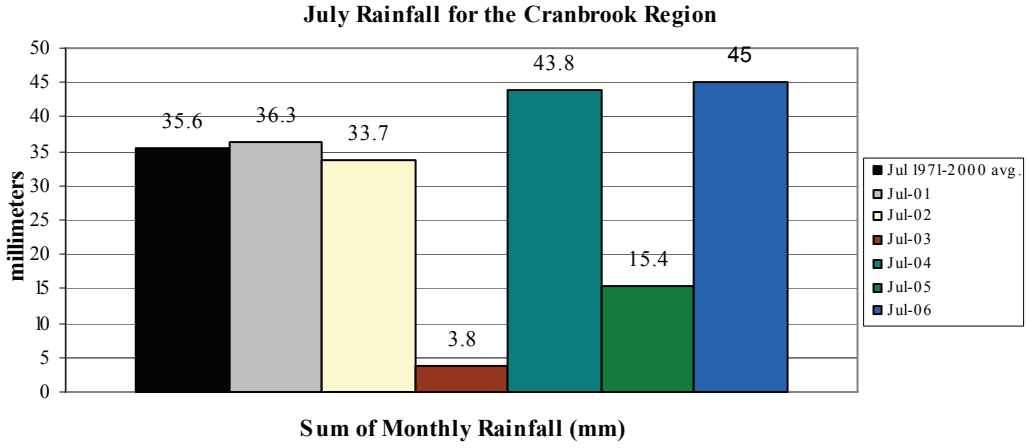
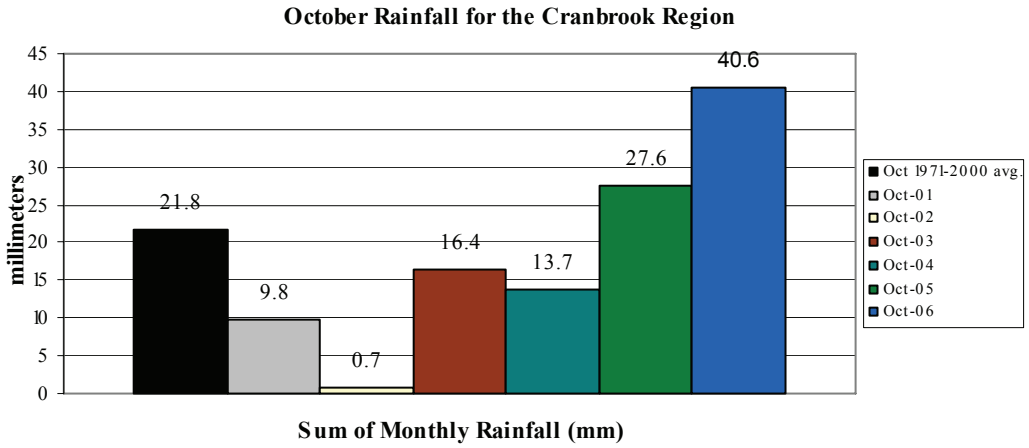


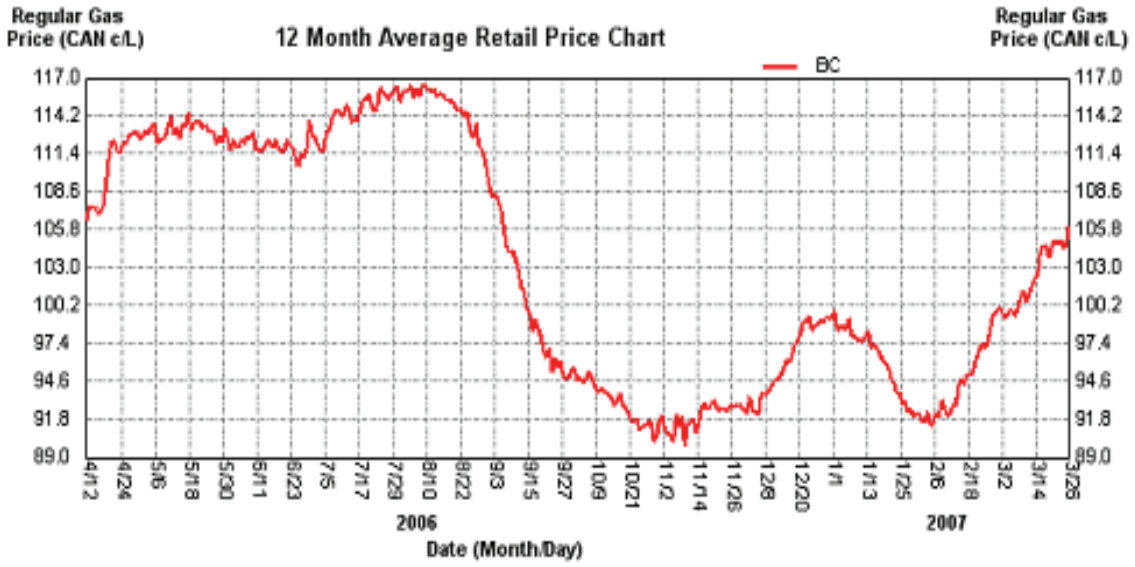
Figure 3. October rainfall statistics for the East Kootenay Region (1971-2006)



5.2 Gas prices

Several factors have influenced global oil prices over the past two years, resulting in escalating gas prices for consumers at the pump. Lowering trend occurrences in late fall of 2005 and winter of 2006 were countered by gas prices which continued to climb throughout the summer and fall of the 2006 survey (Figure 4). Consumer gas prices at the pump soared well over a dollar per litre and made travel extremely expensive. This factor may have been a significant hindrance to vehicle travel, especially RV travel, and may have influenced the numbers of tourists travelling to this region from traditional origins in the U.S. and Canada.

Figure 4. Consumer gas prices at the pump in British Columbia (Apr 06 – Mar 07).



5.3 Non-resident response to classified waters

Primarily due to the increase in non-resident licence fees, and day and water specific requirements of classified licences for non-residents, many non-resident anglers were unhappy with the new classified system, particularly anglers from Alberta (identified in previous surveys as the origin of highest angler numbers of any province/state for East Kootenay quality streams) (Heidt, 2004). Several attempts were (and continue to be) made by a specific coalition of Albertan anglers to apply pressure at senior provincial government levels to increase parity of licence fees for non-resident Canadians with resident British Columbian anglers. Due to the perception that classified licence fees and requirements for non-resident Canadians are unfair, a "boycott B.C." strategy was adopted by some Albertan anglers and recreational enthusiasts to pressure a resolution to their concerns. Results from the 2006 angler survey show slightly reduced Albertan angler numbers over the past season when compared to previous reports (Heidt 2004, 2005). While three years of trend data are not sufficient to predict whether "boycott B.C." strategies and general non-resident disillusionments were factors, or whether other factors (i.e. gas prices and weather anomalies) influenced Albertan angler numbers, it is nonetheless one factor to be considered when interpreting results.

6.0 COMPLIANCE MONITORING & ENFORCEMENT

6.1 Overview

One of the primary issues raised during the EKAMP process and identified in the Quality Waters Strategy is compliance and enforcement. There is overwhelming consensus and support among all angler groups and stakeholders that an increased fisheries presence is needed and that any increase in licence fees should be reflected directly by an increase in fisheries presence on the regions classified streams. River Guardians are committed to compliance monitoring, assisting in enforcement in cooperation with the C.O. service, promoting public education and conservation awareness, providing a liaison between anglers and MOE Fisheries Section and monitoring angler use and catch trends on classified streams. During the 2006 summer/fall fishery on Region 4 classified waters, there were 3 River Guardians (funded by classified licence revenues through the quality waters subfund of HCTF) employed to patrol all reaches of the seven classified systems. Angler response, gathered by Guardians during the 2006 survey, indicates an overwhelming support for the presence of Guardians and an increase in funding so River Guardians can effectively cover the large area represented by all seven classified systems.

6.2 Results

During the 2006 angler survey, River Guardians encountered 209 anglers in non-compliance (20% of all anglers interviewed) and 346 infractions (infraction occurrence/non-compliance rate of 34%) among 1,023 anglers checked on seven classified streams in Region 4 (Figures 5 & 6, respectively). These infractions include everything from use of illegal gear to illegal fish harvest. Given that 10% is used by the C.O. Service as a general provincial non-compliance benchmark for anglers, the non-compliance rate found by River Guardians in Region 4 is of concern.

Figure 5. Percentage by stream of 346 infraction occurences (documented by River Guardians from anglers (n=1023) interviewed on 7 classified waters in the East Kootenay Region – 2006).

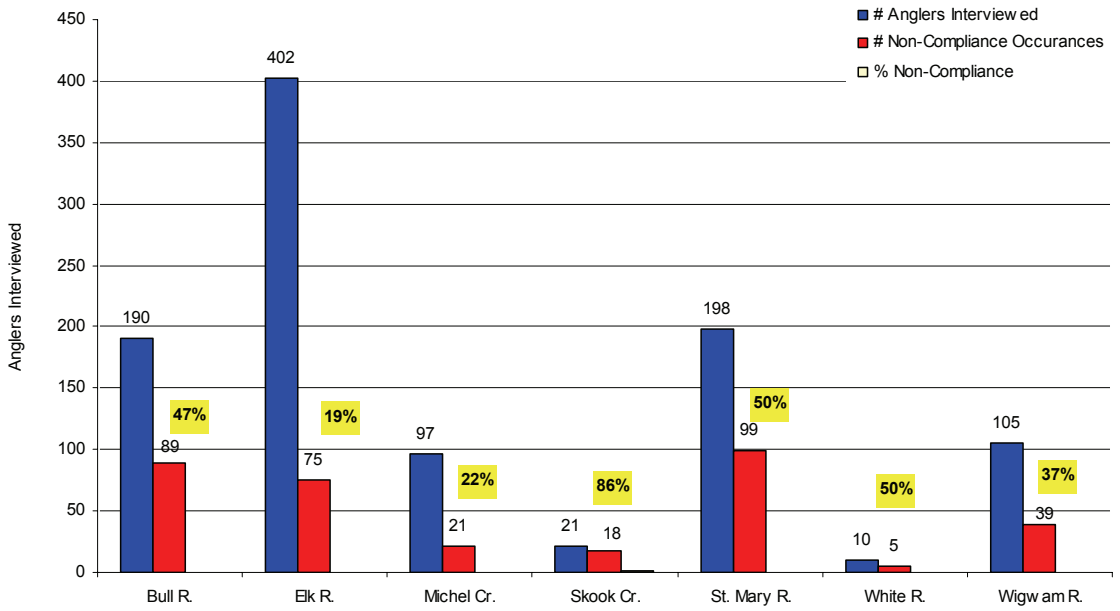
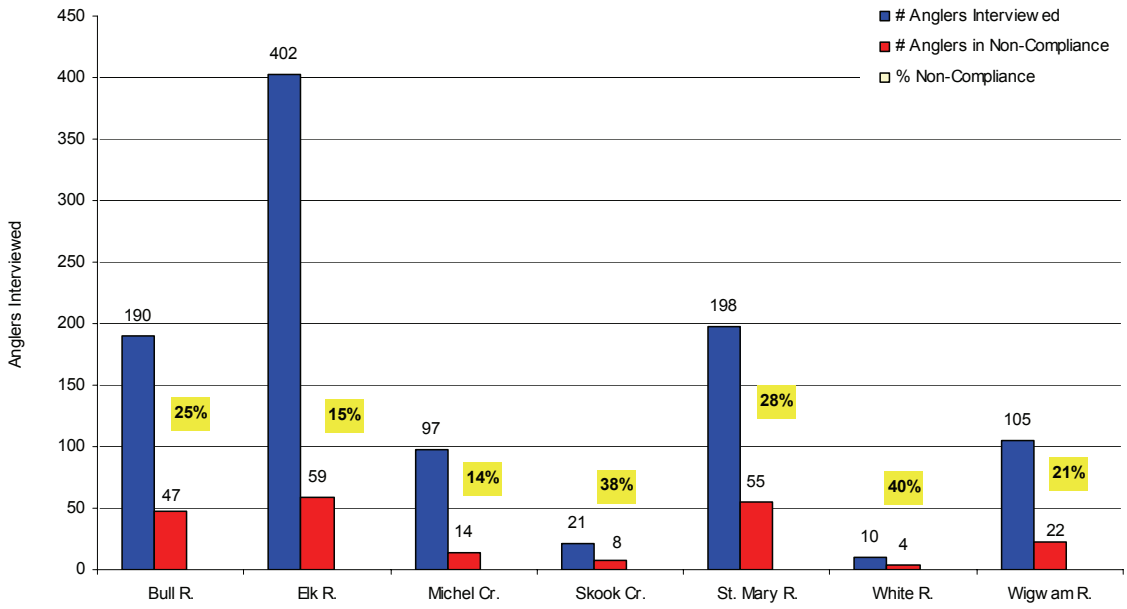
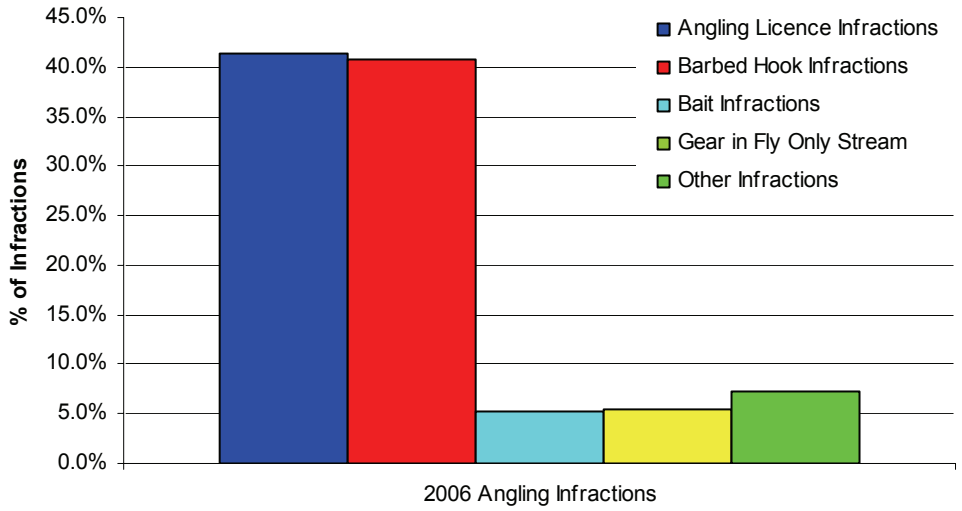


Figure 6. Percentage by stream of 209 anglers in non-compliance (documented by River Guardians from anglers (n=1023) interviewed on 7 classified waters in the East Kootenay Region – 2006).



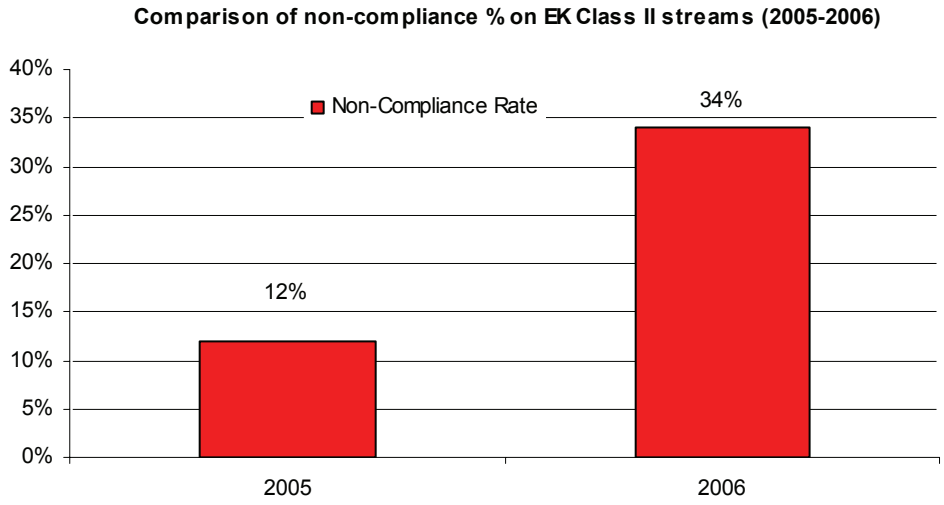
While primary concerns raised by such high non-compliance rates obviously pertain to fish stock sustainability and resource protection, these results also reflect dramatically on the potential loss of revenue to the province through licence sales. Analysis of the infraction data shows licence infractions composed 41.3% of all infractions (Figure 7). If extrapolated, this would result in significant potential economic loss to the province.

Figure 7. Percentage of River Guardian infractions by category from the East Kootenay classified waters – 2006.



The infraction occurrences and non-compliance rates found by River Guardians in 2006 were significantly higher than those found on the same waters in 2005 (Figure 8). Two major factors have influenced these results: First, the addition of an extra Guardian (total of 3 for Region) for 2006 enabled more of the survey area to be patrolled with greater frequency (2005: n=464, 2006: n=1,023). This also gave Guardians the ability to patrol more remote areas of stream systems and frequent areas that were difficult to visit in previous years due to time and staff constraints. Second, the compliance monitoring aspect of this program has been evolving over the past few seasons. In 2006, the River Guardian program focused more attention on angler compliance and streamlined in-field techniques, strategies and recording policies.

Figure 8. River Guardian non-compliance results (%) for 2005 and 2006.



7.0 ANGLER SURVEY RESULTS SUMMARY (non-extrapolated)

7.1 Effort and catch

A total of 1,023 anglers were interviewed during the survey from July 1 to October 14, 2006. They angled for 2,948 hours on seven streams and caught 3,656 fish: 161 bull trout (BT), 1 eastern brook trout (EB), 11 kokanee (KO), 60 mountain whitefish (MW), 20 rainbow trout (RB) and 3,403 westslope cutthroat trout (WCT), for an overall catch per unit effort (CPUE) of 1.24 fish per rod hour (Table 2).

Table 2. Total angler effort and catch success on all streams.

Angler Days	Hours Fished	BT	EB	KO	MW	RB	WCT	CPUE
1,023	2,948	161	1	11	60	20	3,403	1.24

Of the 3,656 fish caught on all seven streams during this survey, 15 fish were harvested while 3,641 fish were released (99.6% release rate) (Table 3).

Table 3. Total number of fish released and harvested by species.

Species	Total Catch	% of Catch	Catch & Release	Harvest	% Release Rate
BT	161	4%	160	1	99.4%
EB	1	<1%	1	0	100%
KO	11	<1%	9	2	82%
MW	60	2%	57	3	95%
RB	20	<1%	20	0	100%
WCT	3,403	93%	3,394	9	99.7%
Total	3,656	n/a	3,641	15	99.6%

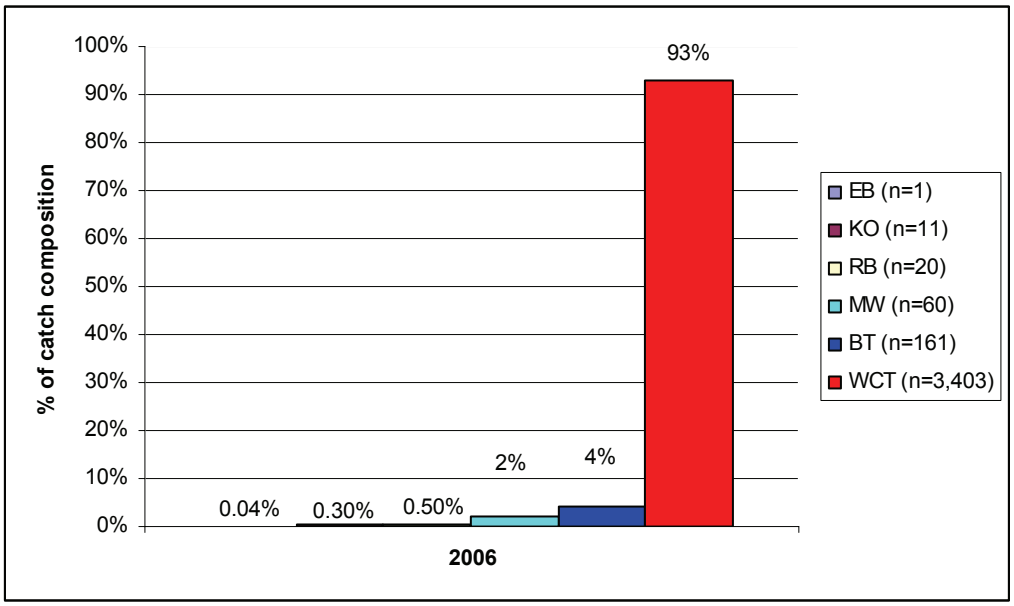
Potential post-hooking mortality numbers for all fish caught and released on the seven classified systems range from 18 to 182 fish (Table 4).

Table 4. Total number of fish released, harvested and post-hooking mortalities on all streams.

Catch and Release	Post-Hooking Mortality		Harvest
	0.5%	5%	
3,641	18	182	15

Westslope cutthroat trout composed 93% of the catch in the summer/fall fishery, with bull trout, mountain whitefish, eastern brook trout, kokanee and rainbow trout comprising 4%, 2%, <1%, <1%, and <1% of the total catch, respectively (Figure 9).

Figure 9. Catch composition for the 2006 Class II summer/fall fisheries.



7.2 Guided vs. non-guided anglers

Of the 1,023 anglers interviewed during this survey, 179 were guided (17%) and 844 were non-guided (83%). Guides and assistant guides were assumed not to be fishing and are not included in these statistics (Table 5).

Table 5. Total angler days for guided and non-guided anglers on all streams.

Guided Angler Days		Non-Guided Angler Days		Total Angler Days
Shore	Boat	Shore	Boat	
38	141	693	151	1,023

Guided anglers fished for 707 hours (24% of total hours fished), while non-guided anglers fished for 2,241 hours (76% of total hours fished). Guided anglers primarily fished from a boat (78% of all guided hours), while a majority of non-guided anglers fished from shore (73% of all non-guided hours) (Table 6).

Table 6. Total angler effort in hours for guided and non-guided anglers on all streams.

Guided Angler Hours		Non-Guided Angler Hours		Total Angler Hours
Shore	Boat	Shore	Boat	
157	550	1,640	601	2,948

Guided anglers caught 1,013 fish, while non-guided anglers caught 2,642 (28% and 72% of the total catch, respectively). Catch per unit effort (CPUE) was significantly higher overall for guided anglers at 1.43 fish per rod hour, while the CPUE for non-guided anglers was 1.18 fish per rod hour (Table 7).

Table 7. Overall effort, catch and CPUE for guided vs. non-guided anglers on all streams.

Status	Angler Days	Angler Hours	Total Fish Caught	CPUE
Guided	179	707	1,013	1.43
Non-Guided	844	2,241	2,642	1.18
Total	1,023	2,948	3,655	1.24

Of the 179 guided anglers interviewed, 127 were from the United States, 43 were from Canada (33 from Alberta, 5 from B.C. and 5 from Ontario) and 9 anglers were from Europe (Table 8).

Table 8. Number of guided anglers by residence on all streams surveyed.

Place of Residence	Total Number of Angler Days	Number of Guided Anger Days	% of Anglers Guided	% Guided of Total Anglers Interviewed
United States	347	127	37%	12%
Alberta	187	33	18%	3%
British Columbia	436	5	1%	0.5%
Other Cdns.	42	5	12%	0.5%
Europe	10	9	90%	1%
Asia	1	0	0%	0%
Total	1,023	179		17%

7.3 Boat vs. shore anglers

Boat angler days comprised 292 of the 1,023 angler days (29%), while shore angler days accounted for 731 of the total angler days (71%). Anglers fished from a boat for 1,151 hours (39%), while shore anglers fished for 1,797 hours (61%). The CPUE for boat anglers was slightly higher at 1.34 fish per rod hour, while the CPUE for shore anglers was 1.17 (Table 9).

Table 9. Overall effort, catch and CPUE for boat vs. shore fishermen on all streams.

Angler Class	Angler Days	Angler Hours	Total Fish Caught	CPUE
Boat Anglers	292	1,151	1,546	1.34
Shore Anglers	731	1,797	2,109	1.17
Total	1,023	2,948	3,655	1.40

7.4 Trip length

Overall, anglers spent an average of 5.17 hours fishing per day through the course of the survey. Boat anglers spent an average of 7.27 hours fishing per day, while shore anglers averaged 3.88 hours per day. Guided boat anglers fished for an average of 7.54 hours per day, while non-guided boat anglers averaged 7.02 hours per trip. Guided shore anglers fished for an average of 7.82 hours per trip, while non-guided shore anglers averaged 3.62 hours per day (Table 10).

Table 10. Average hours fished per trip by various angler classes on all streams (complete trip data only).

All Anglers (n = 260)	Boat Anglers (n = 99)	Shore Anglers (n = 161)	Guided Anglers		Non-Guided Anglers	
			Boat (n = 49)	Shore (n = 10)	Boat (n = 50)	Shore (n = 151)
5.17	7.27	3.88	7.54	7.82	7.02	3.62

7.5 Angling methods

There were significantly more fly anglers than gear anglers interviewed during the period of this study. Of the 1,023 total angler interviews, 854 were fly anglers (83%), 152 were gear anglers (15%) and 17 anglers used both angling methods during their trip (2%) (Table 11).

Table 11. Fishing methods by place of residence for all streams.

Place of Residence	Fly	Gear	Both
British Columbia	295	133	8
United States	342	1	4
Alberta	168	14	5
Other Canadians	38	4	0
Other Countries	11	0	0
Total	854	152	17

Of the guided anglers interviewed during this study, 100% were fly anglers, while 80% of the non-guided anglers interviewed were fly anglers, 18% used gear and 2% used both. Of all boat anglers interviewed, 98% were fly anglers, 0.5% used gear and 1.5% used both, while 77% of shore anglers were fly anglers, 21% used gear and 2% used both (Table 12).

Table 12. Fishing methods by angler class for all streams.

Angler Type	Fly	Gear	Both
Guided Angler	179	0	0
Non-Guided Angler	675	152	17
Boat Angler	287	1	4
Shore Angler	567	151	13

7.6 Angler residency

Of the 1,023 total anglers interviewed, 65% were Canadian, 34% were American and 1% were from Asia and Europe. Canadian anglers were from British Columbia, Alberta, Ontario, Manitoba, Saskatchewan and Quebec (43%, 18%, 2%, 1%, <1% and <1% of all anglers, respectively). American anglers were primarily from Washington, Montana, California and Texas (7%, 6%, 5% and 2% of all anglers, respectively), with 26 additional states represented (Table 13).

Table 13. Place of residence for anglers fishing all streams included in the 2006 survey.

Country of Residence	Total Anglers	%	Province/State	Number of Anglers	%
Canada	665	65%	British Columbia	436	43%
			Alberta	187	18%
			Ontario	25	2%
			Manitoba	7	1%
			Saskatchewan	5	<1%
			Quebec	5	<1%
United States	347	34%	Washington	73	7%
			Montana	67	6%
			California	47	5%
			Texas	23	2%
			Arizona	14	1%
			Idaho	10	1%
			Michigan	10	1%
			New York	9	1%
			Pennsylvania	9	1%
			Colorado	8	1%
			Minnesota	8	1%
			Wisconsin	8	1%
			Nevada	7	1%
			Oregon	6	<1%
			Florida	5	<1%
			Massachusetts	5	<1%
			Tennessee	5	<1%
			Georgia	4	<1%
			North Carolina	4	<1%
			Wyoming	4	<1%
			Virginia	4	<1%
			Maine	3	<1%
			Ohio	3	<1%
			Indiana	2	<1%
			Kentucky	2	<1%
			New Mexico	2	<1%
			Oklahoma	2	<1%
			Arkansas	1	<1%
			Hawaii	1	<1%
			South Carolina	1	<1%
Europe	10	1%	France	6	<1%
			England	3	<1%
			Germany	1	<1%
Asia	1	<1%	Japan	1	<1%

7.7 Angling experience

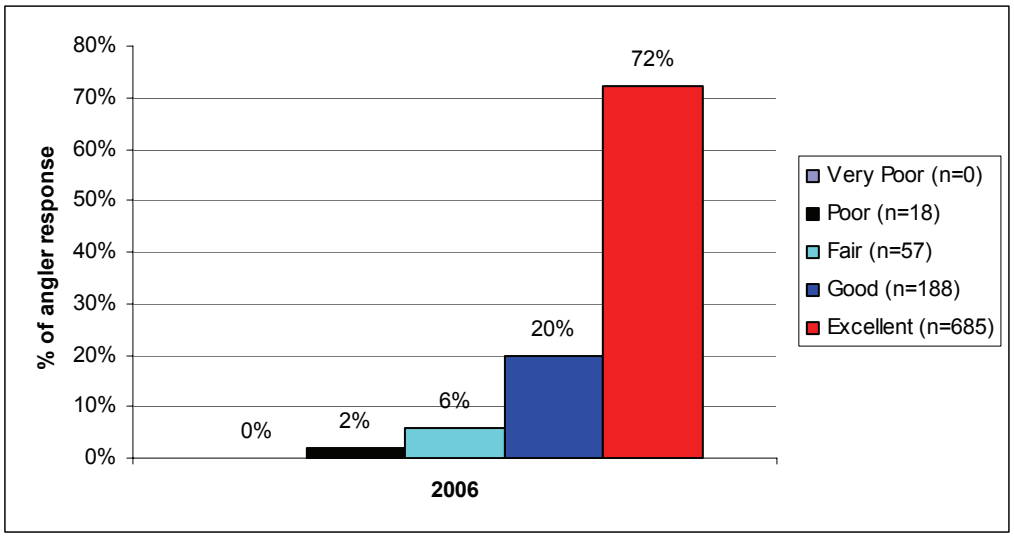
7.7.1 Quality of the angling experience

Of the 1,023 anglers who were asked to rate their quality of angling experience, 951 responded; however, 3 of the anglers were "not sure" of their response and are not included in the response analysis (n=948). A total of 18 anglers rated their experience as poor, 57 as fair, 188 as good and 685 as excellent. (2%, 6%, 20% and 72%, respectively) (Table 14 & Figure 10).

Table 14. Quality of angling experience on all streams by residence.

Residence	Very Poor	Poor	Fair	Good	Excellent
B.C.	0	9	34	125	235
U.S.	0	3	16	29	285
Alberta	0	3	7	26	132
Other CDN.	0	3	0	8	28
Other	0	0	0	0	5
Total	0	18	57	188	685

Figure 10. Quality of angling experience response from all streams combined.



The quality of angling experience response was interpreted using a list of potential criteria. There were a total of 2,649 responses categorized into this list. There were 759 responses relating to scenery and the pristine qualities of the area, 523 responses pertaining to the quality of fish caught, 446 listed water conditions, 383 pertained to the quantity of fish caught, 258 listed the number of other anglers as a factor (positive and negative), 180 responses pertained to the quality of access to the water, 60 responses were "other", which often included comments on the

classification system, and 40 responses pertained to the number of boats seen (many anglers included this comment under "other anglers seen") (Table 15).

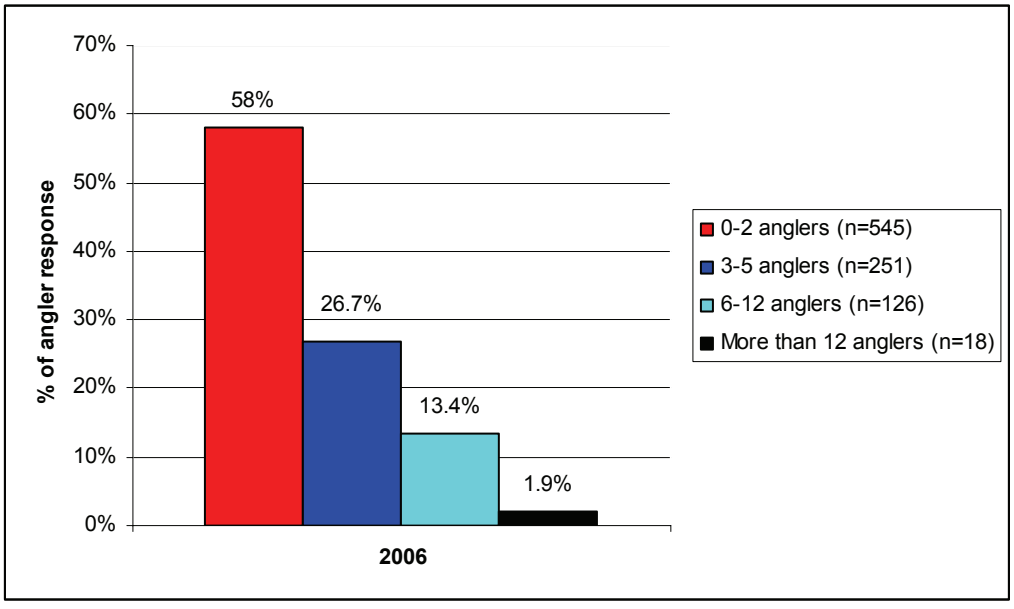
Table 15. Summary of factors contributing to the quality of angling experience.

Factor 1		Factor 2		Factor 3		Sum of Factors	
A	382	D	341	D	306	D (Surrounding scenery)	759
B	227	B	288	F	211	B (Quality of fish caught)	523
C	198	C	177	E	147	C (Water conditions)	446
D	112	F	41	C	71	A (Quantity of fish caught)	383
H	7	E	31	G	40	F (Number of other anglers)	258
F	6	H	22	H	31	E (Quality of access to water)	180
E	2	A	1	B	8	H (Other)	60
G	0	G	0	A	0	G (Number of boats on water)	40

7.7.2 Other anglers seen

Of the 1,023 anglers interviewed in this survey, 940 anglers responded to the question of how many other anglers they saw on their trip. Of these anglers, 545 saw 0-2 other anglers, 251 saw 3-5 anglers, 126 saw 6-12 anglers and 18 saw more than 12 anglers on their trip (Figure 11).

Figure 11. Number of other anglers seen by anglers interviewed on all systems.



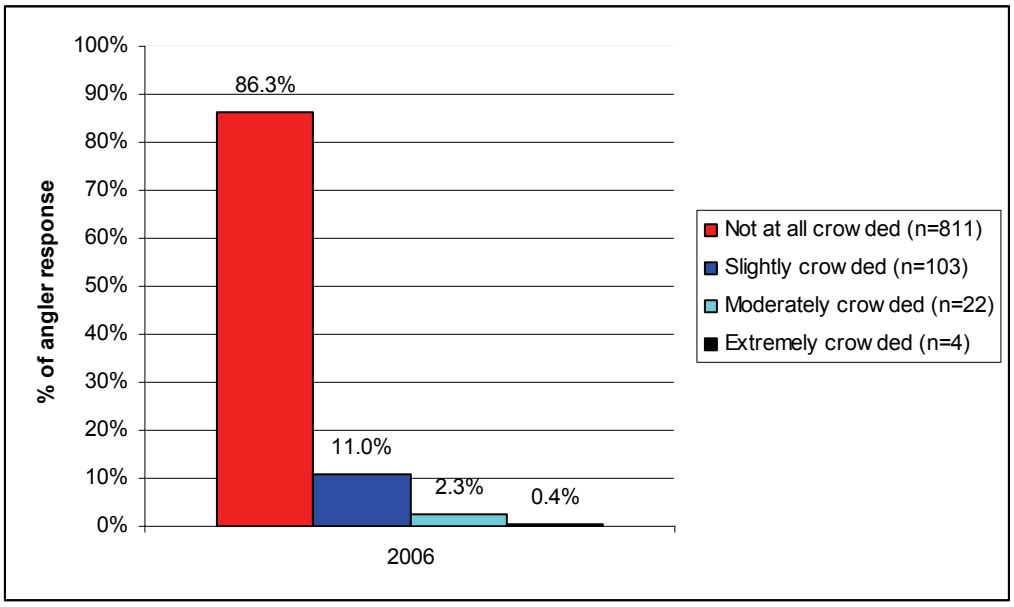
7.7.3 Crowding response

Of the 1,023 anglers, 940 anglers responded to the crowding questions. Overall, anglers did not feel that crowding was a significant issue (Figure 12). Of the 940 anglers, 811 rated the crowding level "not at all crowded", 103 rated it as "slightly crowded", 22 rated it as "moderately crowded", and 4 anglers rated it as "extremely crowded" (Table 16).

Table 16. Summary of angler response related to crowding.

Crowding Description	Number of Anglers	Percent of Angler Response
Not at all Crowded	811	86%
Slightly Crowded	103	11%
Moderately Crowded	22	2.5%
Extremely Crowded	4	0.5%

Figure 12. Angler crowding rating on the 7 classified waters.



8.0 BULL RIVER

8.1 Study area

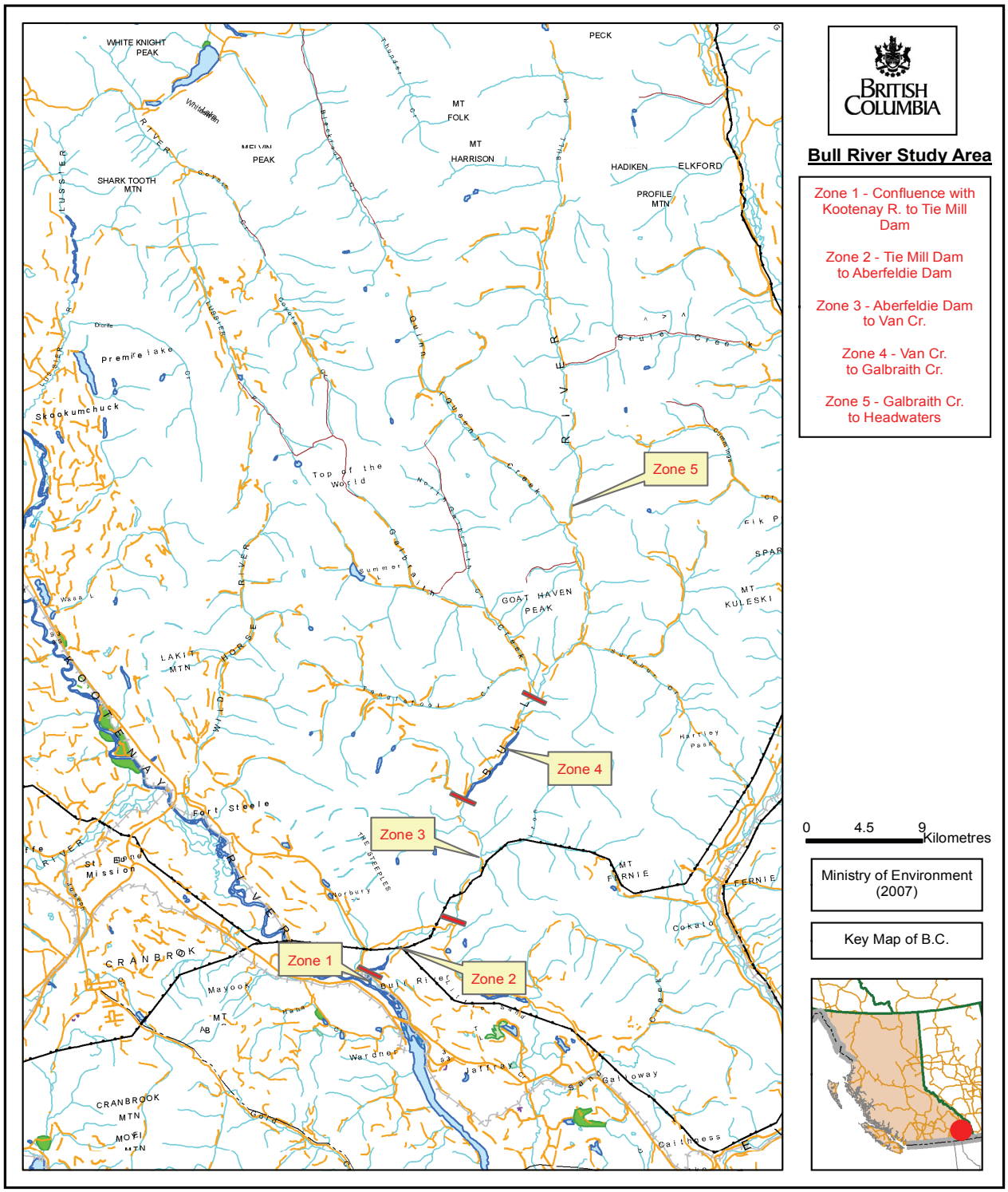
The Bull River originates within the Park and Front Ranges of the Southern Rocky Mountains, northwest of Fernie, B.C. From its headwaters, the stream flows east for approximately 8.5 km, at which point it flows south/southwest, continuing for approximately 81 km to its confluence with the Kootenay River (Figure 13). BC Hydro operates the Aberfeldie Dam approximately 11 km upstream of the Kootenay River confluence, which prevents upstream fish migration and divides the river into the lower and upper Bull.

The Bull River has a drainage area of approximately 1530 km^2 with a mean annual discharge of 32.9m^3/s (Water Survey of Canada). Significant tributaries to the Bull River include Quinn (Queen) Creek, Sulpher Creek, Galbraith Creek, Van Creek and Iron Creek.

The main portion of the Bull River included in this survey is approximately 50 river kms and extends from its confluence with the Kootenay River to approximately 5 km above the Quinn (Queen) Creek confluence, although some time was spent patrolling the area from Quinn Creek to the Bull River headwaters. The study area was divided into 5 zones which correspond with catch and release zones established in the freshwater fishing regulations for Region 4 (BC Regulations Synopsis). Zone 1 (harvest) extends from the Kootenay River confluence to the Tie Mill Dam. Zone 2 (catch and release) extends from the Tie Mill Dam to the BC Hydro Aberfeldie Dam. Zone 3 (harvest) extends from the Aberfeldie Dam to the confluence of Van Creek. Zone 4 (catch and release) extends from Van Creek to the confluence of Galbraith Creek and Zone 5 (harvest) extends from Galbraith Creek to the Bull River headwaters, although the main study area extended approximately 5 km above Quinn Creek.

Road access to the lower Bull River is limited to the Bull River/Wardner Road, a paved secondary highway which crosses the river a few kilometres above its confluence. A forest service road generally parallels the lower river, but river access from this road requires hiking through steep terrain. The Bull River Forest Service Road (FSR) runs parallel to the upper Bull River to its headwaters, providing access points in several places along the upper river. There are a few canyon reaches in the upper river which are difficult to access.

Figure 13. Map of the Bull River study area.



8.2 Results

8.2.1 Effort and Catch

A total of 187 anglers were interviewed over 26 days on the Bull River during the survey. They fished for 531 hours and caught 17 bull trout, 9 kokanee, 4 mountain whitefish, 9 rainbow trout and 646 westslope cutthroat trout, for an overall catch per unit effort of 1.29 fish per rod hour (Table 17).

Table 17. Total angler effort and catch success on the Bull River.

Angler Days	Hours Fished	BT	KO	MW	RB	WCT	CPUE
187	531	17	9	4	9	646	1.29

Of the 685 fish caught by anglers interviewed on the Bull River, 5 fish were harvested while 680 fish were released (99.3% release rate) (Table 18).

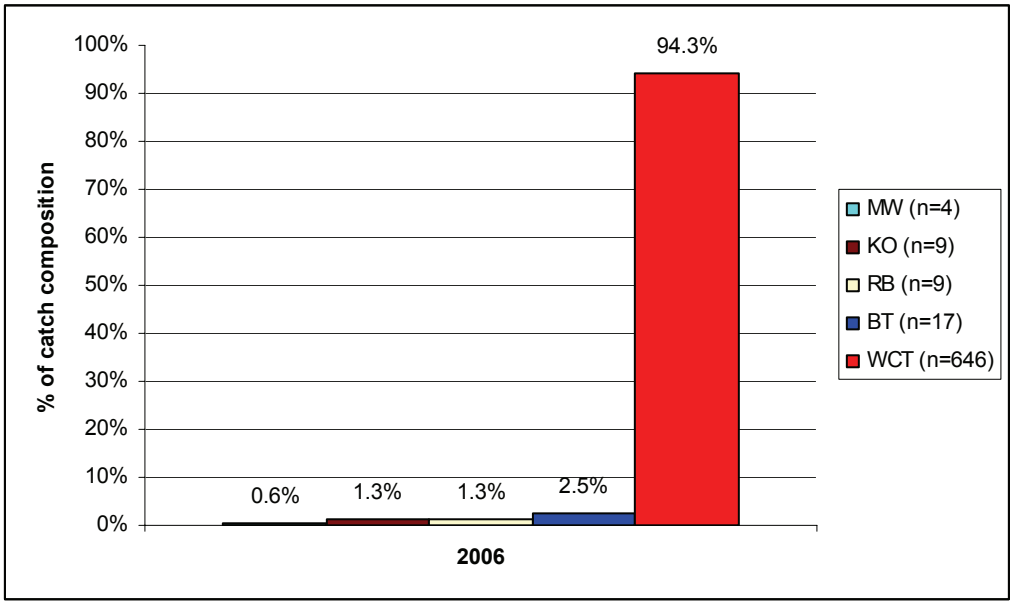
Table 18. Total number of fish released and harvested by species on the Bull River.

Species	Total Catch	% of Catch	Catch & Release	Harvest	% Release Rate
BT	17	2.5%	16	1	94.1%
KO	9	1.3%	9	0	100%
MW	4	0.6%	0	4	0.0%
RB	9	1.3%	9	0	100%
WCT	646	94.3%	646	0	100%
Total	685		680	5	99.3%

It should be noted that when analyzing effort and catch data from the Bull River, there are two distinct sections on this river. Below the B.C. Hydro Aberfeldie Dam, anglers tend primarily to use gear and target bull trout. In contrast, the Bull River above the Aberfeldie Dam attracts far more fly anglers (including some guided anglers), and all anglers in the upper section are targeting westslope cutthroat trout or mountain whitefish (there is no documented evidence of bull trout in the upper river above the BC Hydro Dam). From a compliance standpoint, there are historically far more infractions in the lower section of the river due to the accessibility, target species and angler demographics (per conversation with C.O. service). Over the course of the survey, River Guardians spent significantly more time patrolling zones in the upper section of the Bull River, and therefore, data representing harvest and post-catch mortalities on this river are assumed to be biased and should be interpreted accordingly.

Westslope cutthroat trout composed 94.3% of the catch during the Bull River summer/fall fishery, with bull trout, kokanee, rainbow trout and mountain whitefish comprising 2.5%, 1.3%, 1.3% and 0.6% of the total catch, respectively (Figure14).

Figure 14. Catch composition for the 2006 summer/fall Bull River fishery.



Potential post-hooking mortality numbers for all fish caught and released on the Bull River range from 3 to 34 fish (Table 19).

Table 19. Total number of fish released, harvested and post-hooking mortalities on the Bull River.

Catch and Release	Post-Hooking Mortality		Harvest
	0.5%	5%	
680	3	34	5

8.2.2 Guided vs. non-guided anglers

Of the 187 anglers interviewed on the Bull River, 19 were guided (10%) and 168 were non-guided (90%) (Table 20).

Table 20. Total angler days for guided and non-guided anglers on the Bull River.

Guided Angler Days		Non-Guided Angler Days		Total Angler Days
Shore	Boat	Shore	Boat	
12	7	160	8	187

Guided anglers fished for 77 hours (% of total hours fished), while non-guided anglers fished for 455 hours (% of total hours fished) (Table 21).

Table 21. Total angler effort in hours for guided and non-guided anglers on the Bull River.

Guided Angler Hours		Non-Guided Angler Hours		Total Angler Hours
Shore	Boat	Shore	Boat	
41	36	423	32	532

Guided anglers caught 206 fish, while non-guided anglers caught 479 (30% and 70% of the total catch, respectively). Catch per unit effort for guided anglers (CPUE) was 2.67 fish per rod hour, while the CPUE for non-guided anglers was 1.05 fish per rod hour (Table 22).

Table 22. Effort, catch and CPUE for guided vs. non-guided anglers on the Bull River.

Status	Angler Days	Angler Hours	Total Fish Caught	CPUE
Guided	19	77	206	2.67
Non-Guided	168	455	479	1.05
Total	187	532	685	1.29

8.2.3 Boat vs. shore anglers

Boat angler days comprised 15 of the 187 angler days on the Bull River (8%), while shore angler days accounted for 172 of the total angler days (92%). Anglers fished from a boat for 68 hours (13%) and caught 225 fish, while shore anglers fished for 464 hours (87%) and caught 460 fish. CPUE for boat anglers was 3.31 fish per rod hour, while the CPUE for shore anglers was 0.99 (Table 23).

Table 23. Overall effort, catch and CPUE for boat vs. shore anglers on the Bull River.

Angler Class	Angler Days	Angler Hours	Total Fish Caught	CPUE
Boat Anglers	15	68	225	3.31
Shore Anglers	172	464	460	0.99
Total	187	532	685	1.29

8.2.4 Trip length

Overall, anglers interviewed on the Bull River spent an average of 3.85 hours fishing per day through the course of the survey. Boat anglers spent an average of 6.39 hours fishing per day, while shore anglers averaged 3.57 hours per day. Guided boat anglers fished for an average of 8.69 hours per day (limited sample size, n=4), while non-guided boat anglers averaged 3.33

hours per trip (limited sample size, n=3). Guided shore anglers fished for an average of 7.25 hours per trip (limited sample size, n=3), while non-guided shore anglers averaged 3.38 hours per day (Table 24).

Table 24. Average trip length by various angler classes on the Bull River (complete trip data only).

All Anglers (n=69)	Boat Anglers (n=7)	Shore Anglers (n=62)	Guided Anglers		Non-Guided Anglers	
			Boat (n=4)	Shore (n=3)	Boat (n=3)	Shore (n=59)
3.85	6.39	3.57	8.69	7.25	3.33	3.38

8.2.5 Angling methods

Of the 187 anglers interviewed on the Bull River, 117 were fly anglers (62%), while 69 used gear (37%) and 1 angler used both fly and gear (1%) (Table 25).

Table 25. Fishing methods by place of residence on the Bull River.

Place of Residence	Fly	Gear	Both
British Columbia	53	62	1
United States	52	1	0
Alberta	9	6	0
Other Canadians	2	0	0
Other Countries	1	0	0
Total	117	69	1

8.2.6 Angler residency

Of the 187 anglers interviewed on the Bull River, 133 were Canadian (71%), 53 were American (28%), and 1 angler was from Europe (1%). Canadian anglers were from British Columbia, Alberta and Ontario, American anglers represented seventeen different states and the European angler was from England (Table 26).

Table 26. Place of residence for anglers fishing the Bull River.

Country of Residence	Total Anglers	%	Province/State	Number of Anglers	%
Canada	133	71%	British Columbia	116	62%
			Alberta	15	8%
			Ontario	2	1%
United States	53	28%	Montana	7	4%
			Washington	7	4%
			Wisconsin	7	4%
			California	5	3%
			Pennsylvania	5	3%
			Michigan	4	2%
			Nevada	4	2%
			Oregon	3	2%
			Ohio	2	1%
			Texas	2	1%
			Hawaii	1	<1%
			Maine	1	<1%
			Massachusetts	1	<1%
			Minnesota	1	<1%
			N. Carolina	1	<1%
			Tennessee	1	<1%
			Virginia	1	<1%
Europe	1	1%	England	1	<1%

8.2.7 Angling experience

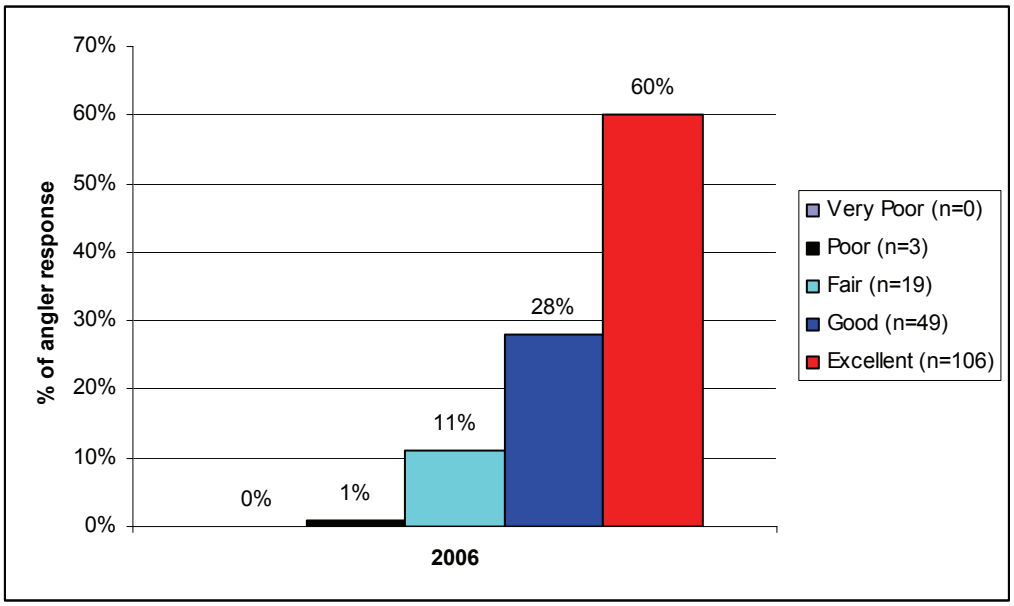
8.2.7.1 Quality of the angling experience

Of 187 anglers who were asked to rate their angling experience, 177 responded. A total of 3 anglers rated their experience as poor, 19 as fair, 49 as good and 106 as excellent (1%, 11%, 28% and 60%, respectively) (Table 27 & Figure 15).

Table 27. Quality of angling experience on all streams by residence.

Residence	Very Poor	Poor	Fair	Good	Excellent
B.C.	0	0	15	44	49
U.S.	0	3	2	4	44
Alberta	0	0	2	1	10
Other CDN.	0	0	0	0	2
Other	0	0	0	0	1
Total	0	3	19	49	106

Figure 15. Quality of angling experience response from anglers on the Bull River.



Anglers were also asked to list the top three factors which led to their quality of angling experience rating. There were a total of 503 responses categorized into this list. There were 152 responses pertaining to the surrounding scenery, 115 related to water conditions, 74 to the quality of fish caught, 68 which listed the number of other anglers as a factor (positive and negative), 62 responses relating to the quantity of fish caught, 30 pertaining to the quality of water access and 2 responses were listed under "other" (Table 28).

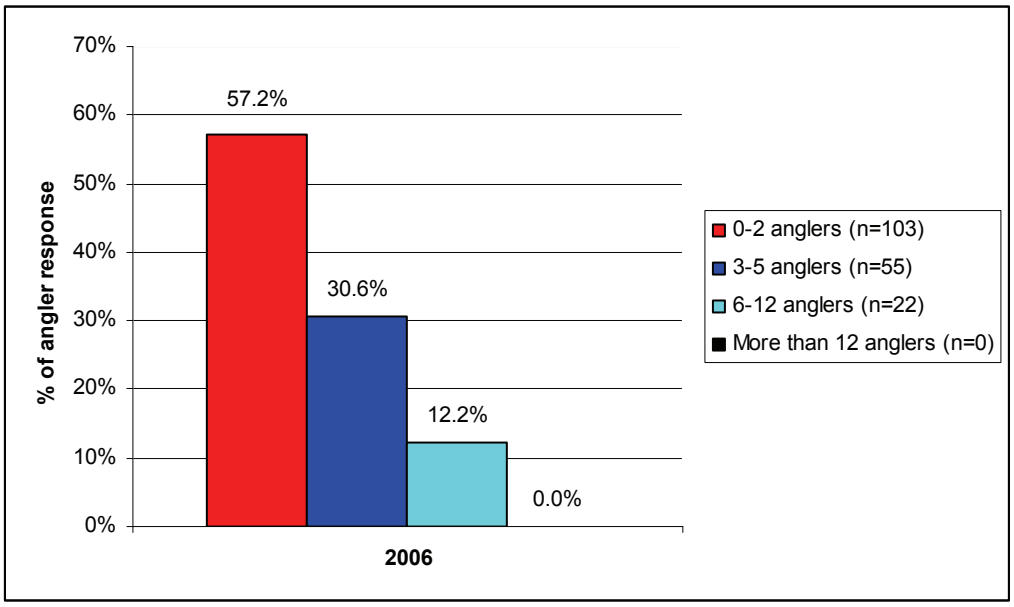
Table 28. Summary of factors contributing to the quality of angling experience for the Bull River.

Factor 1		Factor 2		Factor 3		Sum of Factors	
C	63	D	88	F	60	D (Surrounding scenery)	152
A	61	B	39	D	45	C (Water conditions)	115
B	30	C	31	E	26	B (Quality of fish caught)	74
D	19	F	8	C	21	F (Number of other anglers)	68
H	1	E	4	B	5	A (Quantity of fish caught)	62
		A	1			E (Quality of access to water)	30
		H	1			H (Other)	2

8.2.7.2 Other anglers seen

Of the 187 anglers interviewed on the Bull River, 180 anglers responded to the question of how many other anglers they saw on their trip. Of these anglers, 103 saw 0-2 other anglers, 55 saw 3-5 anglers, 22 saw 6-12 anglers and no anglers saw more than 12 anglers on their trip (Figure 16).

Figure 16. Other anglers seen by anglers interviewed on the Bull River.



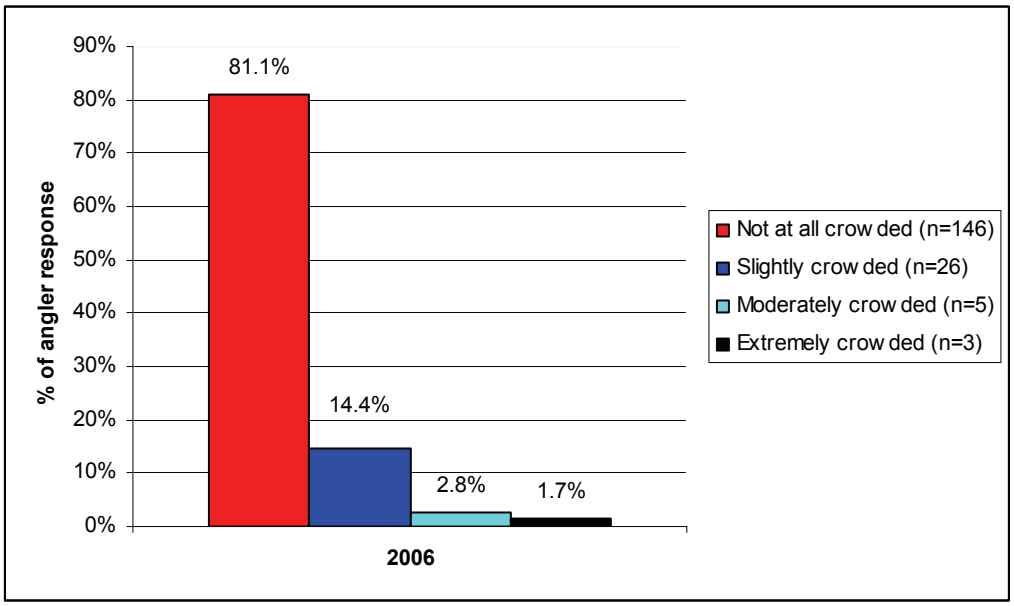
8.2.7.3 Crowding response

Of the 187 anglers interviewed on the Bull River, 180 anglers responded to the crowding questions. Overall, anglers did not feel that crowding was a significant issue (Figure 17). Of the 180 anglers, 146 rated the crowding level "not at all crowded", 26 rated it as "slightly crowded", 5 rated it as "moderately crowded" and 3 anglers rated it as "extremely crowded" (Table 29).

Table 29. Summary of angler response related to crowding on the Bull River.

Crowding Description	Number of Anglers	Percent of Angler Response
Not at all Crowded	146	81%
Slightly Crowded	26	14%
Moderately Crowded	5	3%
Extremely Crowded	3	2%

Figure 17. Angler crowding rating on the Bull River.



9.0 ELK RIVER

9.1 Study area

The Elk River originates from the glacier-fed waters of Elk Lakes within the Front and Elk Ranges of the Southern Rocky Mountains. From its headwaters in Elk Lakes Provincial Park, the Elk River flows approximately 115 km south/southeast to Sparwood. The river then flows in a south/southwest direction for approximately 70 km through a broad valley. Just north of Elko, this valley narrows as it enters the Rocky Mountain Trench, confining much of the lower Elk River (approximately 28 km) to steep canyons until its confluence with the Kootenay River at Lake Koocanusa (Figures 18-20). At Elko, a BC Hydro dam (built on a natural barrier) isolates the upper Elk River from the lower Elk and Kootenay River systems.

The Elk River has a drainage area of 4,450 km^2 with a mean annual discharge of 77 m^3/s (Water Survey of Canada). There are several significant tributaries to the Elk River: Cadorna Creek, Forsyth Creek, Michel Creek and the Fording River flow into the Elk River above Sparwood. Coal Creek, Lizard Creek and Morrissey Creek flow into the Elk between Sparwood and Elko, and the Wigwam River enters the lower Elk River several kilometers downstream of the Elko Dam.

The primary portion of the Elk River included in this survey is approximately 70 kms in length and extends from the Elk River Forest Service Road (FSR) Bridge just above the BC Hydro Dam at Elko, to the Sparwood CPR Bridge, approximately 1 km above the Michel Creek Confluence at Sparwood. Secondary sections of the Elk River included in this survey encompass the rest of the entire Elk River system (approximately 143 kms). In all, the study area was divided into three sections (lower, middle and upper river) which were broken out primarily by differences in targeted species, effort and access. The study area was also divided into eight zones, which correspond with catch and release zones established in the freshwater fishing regulations for Region 4 (BC Regulations Synopsis): Zone 1 (harvest) extends from the Elk River confluence at Lake Koocanusa to the BC Hydro dam at Elko, Zone 2 (catch and release) extends from the dam at Elko to the Morrissey Bridge, Zone 3 (harvest) extends from the Morrissey Bridge to the Hwy 3 North Fernie Bridge, Zone 4 (catch and release) extends from the Hwy 3 North Fernie Bridge to the Hwy 3 Bridge at Hosmer, Zone 5 (harvest) extends from the Hwy 3 Bridge at Hosmer to

the Sparwood CPR bridge (approximately 1 km above the Michel Creek confluence at Sparwood), Zone 6 (catch and release) extends from the Sparwood CPR bridge to Line Creek, Zone 7 (harvest) extends from Line Creek to Forsyth Creek and Zone 8 (catch and release) extends from Forsyth Creek to lower Elk Lakes at Elk Lakes Provincial Park.

The river is very accessible to anglers. Highway #3 parallels the Elk River from Elko to Sparwood. From Sparwood, a paved secondary road parallels sections of the river to Elkford and a gravel forest service road parallels the river from Elkford close to its headwaters in Elk Lakes Provincial Park. The Elk River FSR parallels the east side of the Elk River from just below Morrissey to the Elko Dam. Access to the lower Elk (below the dam) is limited mainly to hike-in access points until Highway 93 crosses it just above its confluence with Lake Koocanusa.

Figure 18. Map of the Elk River study area (Zone 1).

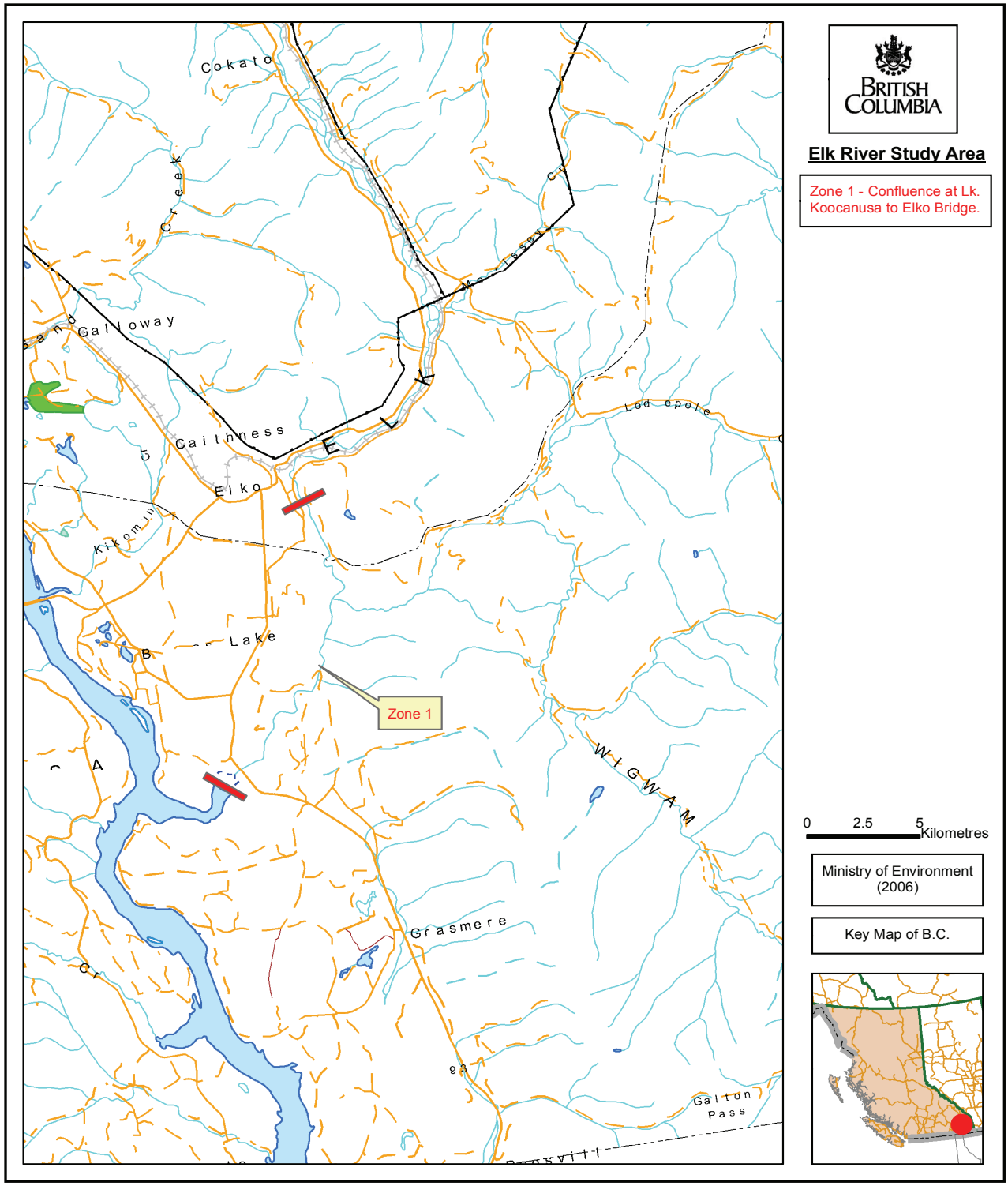


Figure 19. Map of the Elk River study area (Zones 2-5).

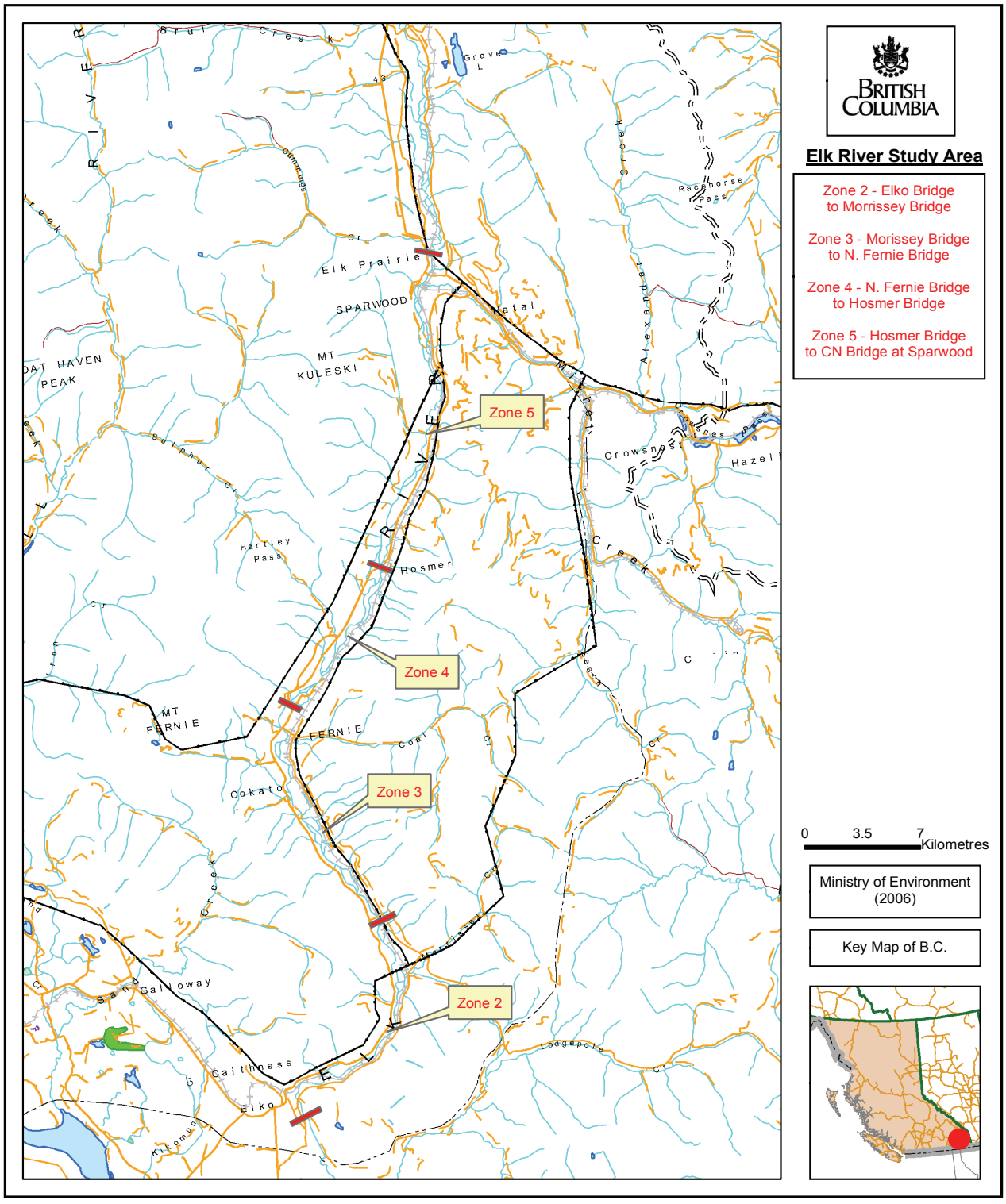
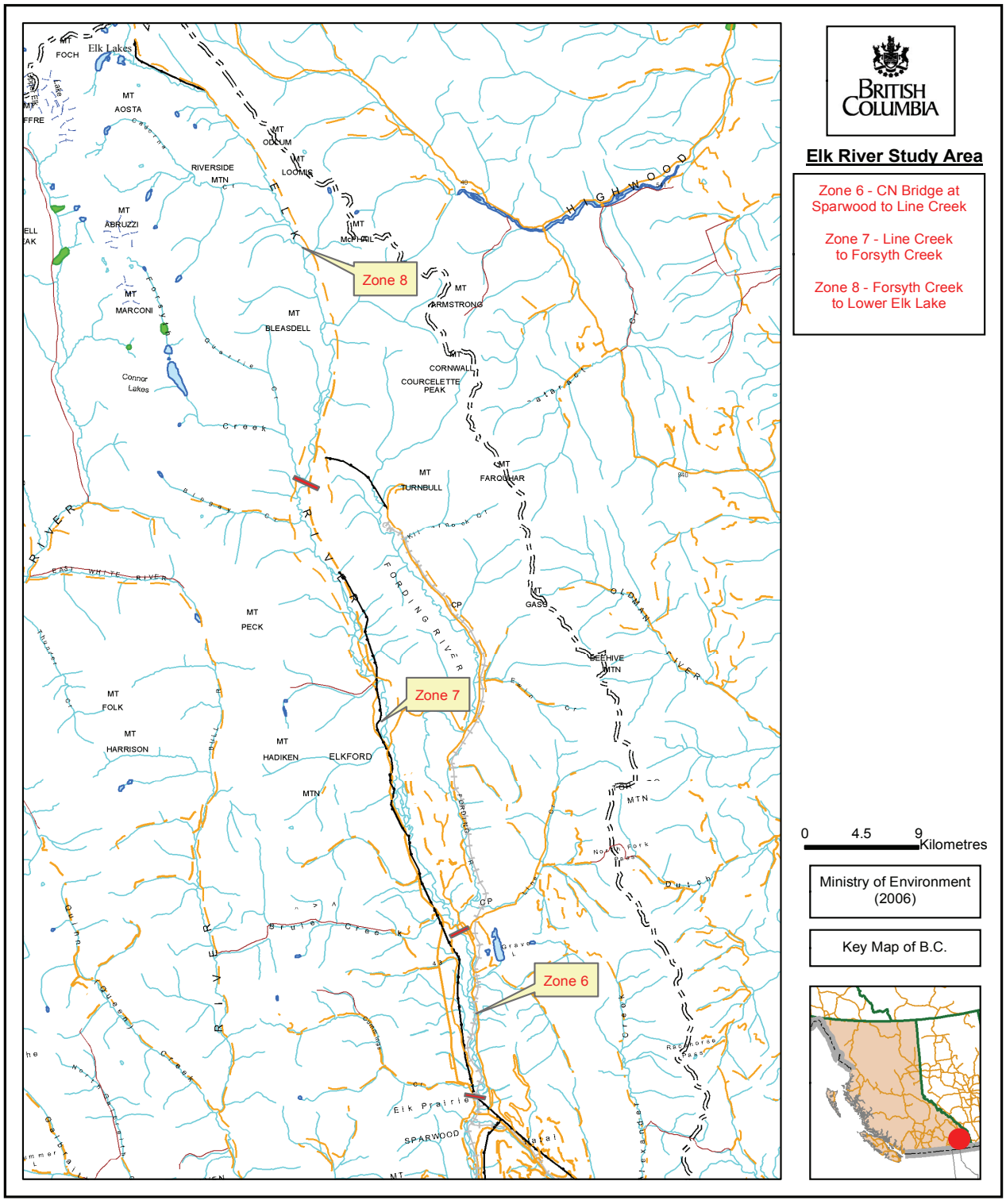


Figure 20. Map of the Elk River study area (Zones 6-8).



9.2 Results

9.2.1 Effort and Catch

A total of 402 anglers were interviewed over 39 days on the Elk River during the survey. They fished for 1,049 hours and caught 35 bull trout, 15 mountain whitefish and 915 westslope cutthroat trout, for an overall catch per unit effort of 0.92 fish per rod hour (Table 30).

Table 30. Total angler effort and catch success on the Elk River.

Angler Days	Hours Fished	BT	MW	WCT	CPUE
402	1,049	35	15	915	0.92

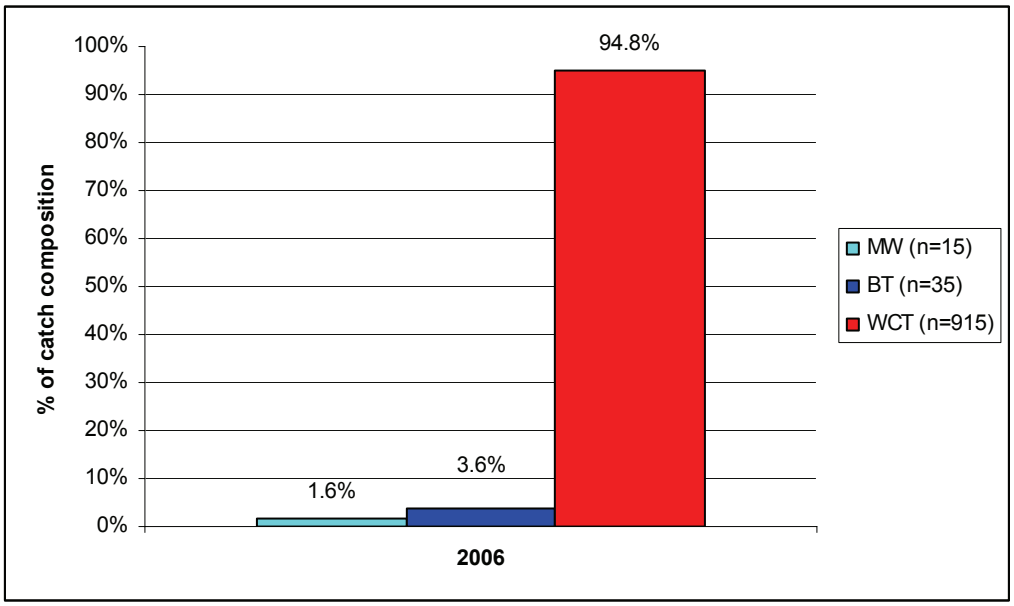
Of the 965 fish caught by anglers interviewed on the Elk River, all were released (100% release rate) (Table 31).

Table 31. Total number of fish released and harvested by species on the Elk River.

Species	Total Catch	% of Catch	Catch & Release	Harvest	% Release Rate
BT	35	4%	35	0	100%
MW	15	1%	15	0	100%
WCT	915	95%	915	0	100%
Total	965		965	0	100%

Westslope cutthroat trout composed 94.8% of the catch during the Elk River summer/fall fishery, with bull trout and mountain whitefish comprising 3.6% and 1.6% of the total catch, respectively (Figure 21).

Figure 21. Catch composition for the 2006 summer/fall Elk River fishery.



Potential post-hooking mortality numbers for all fish caught and released on the Elk River range from 5 to 48 fish (Table 32).

Table 32. Total number of fish released, harvested and post-hooking mortalities on the Elk River.

Catch and Release	Post-Hooking Mortality		Harvest
	0.5%	5%	
965	5	48	0

9.2.2 Guided vs. non-guided anglers

Of the 402 anglers interviewed on the Elk River, 93 were guided (23%) and 309 were non-guided (77%) (Table 33).

Table 33. Total angler days for guided and non-guided anglers on the Elk River.

Guided Angler Days		Non-Guided Angler Days		Total Angler Days
Shore	Boat	Shore	Boat	
9	84	191	118	402

Guided anglers fished for 264 hours (25% of total hours fished), while non-guided anglers fished for 785 hours (75% of total hours fished) (Table 34).

Table 34. Total angler effort in hours for guided and non-guided anglers on the Elk River.

Guided Angler Hours		Non-Guided Angler Hours		Total Angler Hours
Shore	Boat	Shore	Boat	
22	242	332	453	1,049

Guided anglers caught 234 fish, while non-guided anglers caught 731 (24% and 76% of the total catch, respectively). Catch per unit effort for guided anglers (CPUE) was 0.87 fish per rod hour, while the CPUE for non-guided anglers was 0.93 fish per rod hour (Table 35).

Table 35. Effort, catch and CPUE for guided vs. non-guided anglers on the Elk River.

Status	Angler Days	Angler Hours	Total Fish Caught	CPUE
Guided	93	264	234	0.87
Non-Guided	309	785	731	0.93
Total	402	1,049	965	0.92

9.2.3 Boat vs. shore anglers

Boat angler days comprised 202 of the 402 angler days on the Elk River (50%), while shore angler days accounted for 200 of the total angler days (50%). Anglers fished from a boat for 695 hours (66%) and caught 682 fish, while shore anglers fished for 354 hours (34%) and caught 283 fish. CPUE for boat anglers was 0.98 fish per rod hour, while the CPUE for shore anglers was 0.80 (Table 36).

Table 36. Overall effort, catch and CPUE for boat vs. shore anglers on the Elk River.

Angler Class	Angler Days	Angler Hours	Total Fish Caught	CPUE
Boat Anglers	202	695	682	0.98
Shore Anglers	200	354	283	0.80
Total	402	1,049	965	0.92

9.2.4 Trip length

Overall, anglers interviewed on the Elk River spent an average of 5.9 hours fishing per day on the Elk River through the course of the survey. Boat anglers spent an average of 7.4 hours fishing per day, while shore anglers averaged 1.9 hours per day. Guided boat anglers fished for an average of 7.5 hours per day, while non-guided boat anglers averaged 7.4 hours per trip. Non-guided shore anglers averaged 1.6 hours per day (there was only 1 guided shore angler interview and therefore not included in trip length) (Table 37).

Table 37. Average trip length by various angler classed on the Elk River (complete trip data only).

All Anglers (n=80)	Boat Anglers (n=58)	Shore Anglers (n=22)	Guided Anglers		Non-Guided Anglers	
			Boat (n=24)	Shore (n=1)	Boat (n=34)	Shore (n=21)
5.9	7.4	1.9	7.5	n/a	7.4	1.6

9.2.5 Angling methods

Of the 402 anglers interviewed on the Elk River, 352 were fly anglers (87%), while 43 used gear (11%) and 7 anglers used both fly and gear (2%) (Table 38).

Table 38. Fishing methods by place of residence on the Elk River.

Place of Residence	Fly	Gear	Both
British Columbia	77	36	0
United States	161	0	4
Alberta	88	6	3
Other Canadians	18	1	0
Other Countries	8	0	0
Total	352	43	7

9.2.6 Angler residency

Of the 402 anglers interviewed on the Elk River, 229 were Canadian (57%), 165 were American (41%), and 8 anglers were from Europe (2%). Canadian anglers were primarily from British Columbia and Alberta, with 4 other provinces represented, while American anglers represented 26 different states and the European anglers were from England and France (Table 39).

Table 39. Place of residence for anglers fishing the Elk River.

Country of Residence	Total Anglers	%	Province/State	Number of Anglers	%
Canada	229	57%	British Columbia	113	28%
			Alberta	97	24%
			Ontario	9	2%
			Quebec	5	1%
			Saskatchewan	3	<1%
			Manitoba	2	<1%
United States	165	41%	Washington	41	10%
			Montana	30	7%
			California	21	5%
			Texas	17	4%
			Colorado	8	2%
			Arizona	7	2%
			Idaho	7	2%
			Minnesota	5	1%
			Tennessee	4	1%
			Michigan	3	<1%
			Indiana	2	<1%
			Kentucky	2	<1%
			New Mexico	2	<1%
			N. Carolina	2	<1%
			Oregon	2	<1%
			Wyoming	2	<1%
			Florida	1	<1%
			Georgia	1	<1%
			Maine	1	<1%
			Massachusetts	1	<1%
			Nevada	1	<1%
			New York	1	<1%
			Ohio	1	<1%
			Pennsylvania	1	<1%
			S. Carolina	1	<1%
			Wisconsin	1	<1%
Europe	8	2%	France	6	1%
			England	2	<1%

9.2.7 Angling experience

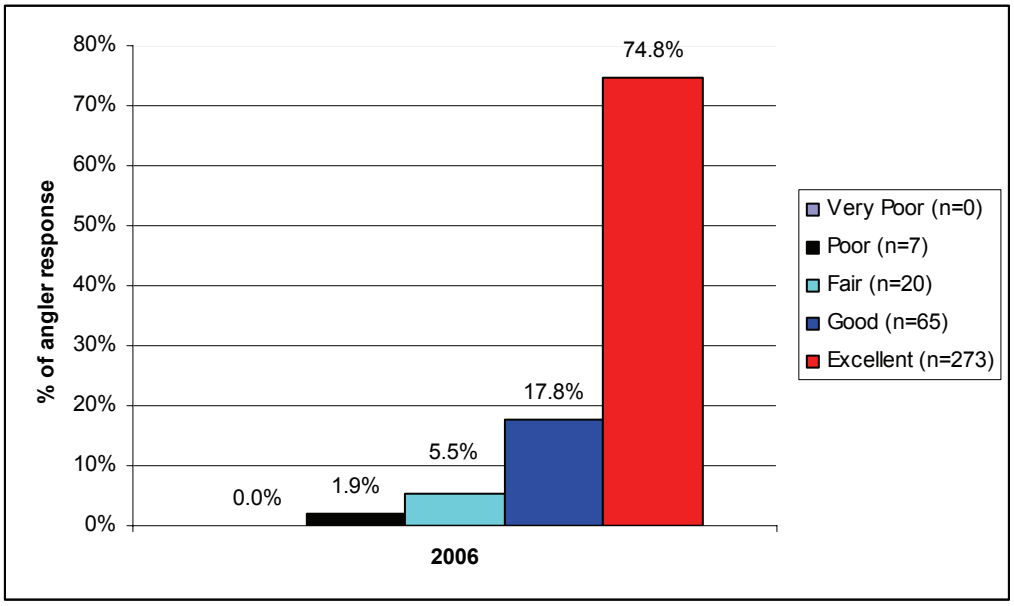
9.2.7.1 Quality of the angling experience

Of anglers who were asked to rate their angling experience, 365 responded. A total of 7 anglers rated their experience as poor, 20 as fair, 65 as good and 273 as excellent (2%, 5%, 18% and 75%, respectively) (Table 40 & Figure 22).

Table 40. Quality of angling experience on the Elk River by residence.

Residence	Very Poor	Poor	Fair	Good	Excellent
B.C.	0	5	8	27	63
U.S.	0	0	7	17	130
Alberta	0	0	5	14	68
Other CDN.	0	2	0	7	10
Other	0	0	0	0	2
Total	0	7	20	65	273

Figure 22. Quality of angling experience response from anglers on the Elk River.



Anglers were also asked to list the top three factors which led to their quality of angling experience rating. There were a total of 987 responses categorized into this list. There were 290 responses pertaining to the surrounding scenery, 199 to the quality of fish caught, 145 relating to water conditions, 141 responses relating to the quantity of fish caught, 96 pertaining to the quality of water access, 68 which listed the number of other anglers as a factor (positive and negative), 27 responses were related to the number of boats on the water and 21 responses were listed under "other" (Table 41).

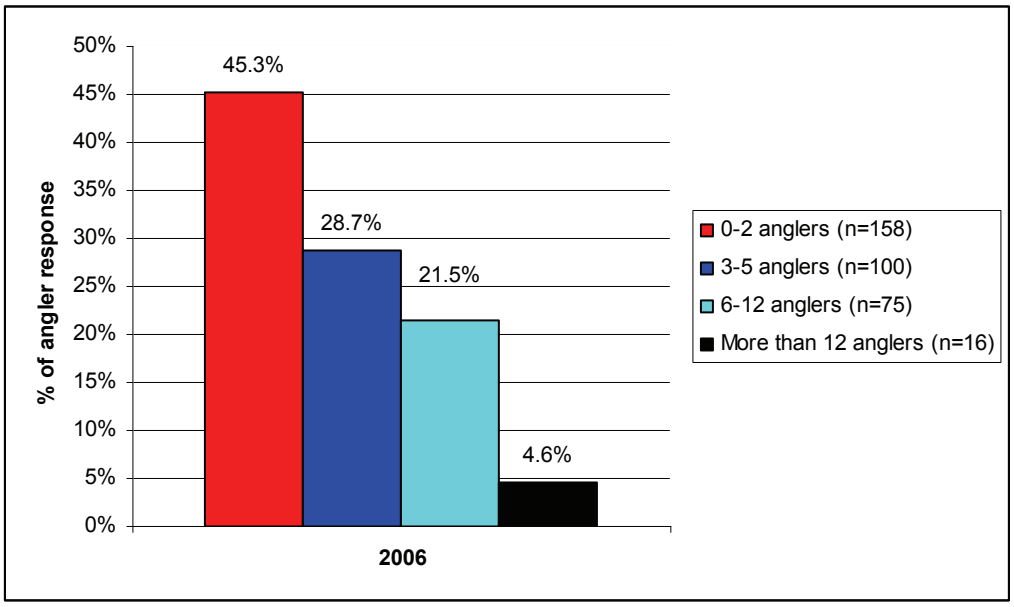
Table 41. Summary of factors contributing to the quality of angling experience for the Elk River.

Factor 1		Factor 2		Factor 3		Sum of Factors	
A	141	D	129	D	111	D (Surrounding scenery)	290
B	97	B	102	E	74	B (Quality of fish caught)	199
C	61	C	62	F	55	C (Water conditions)	145
D	50	E	21	G	27	A (Quantity of fish caught)	141
H	4	F	12	C	22	E (Quality of access to water)	96
E	1	H	10	H	7	F (Number of other anglers)	68
F	1					G (Number of boats on water)	27
						H (Other)	21

9.2.7.2 Other anglers seen

Of the 402 anglers interviewed on the Elk River, 349 anglers responded to the question of how many other anglers they saw on their trip. Of these anglers, 158 saw 0-2 other anglers, 100 saw 3-5 anglers, 75 saw 6-12 anglers and 16 anglers saw more than 12 anglers on their trip (Figure 23).

Figure 23. Other anglers seen by anglers interviewed on the Elk River.



9.2.7.3 Crowding response

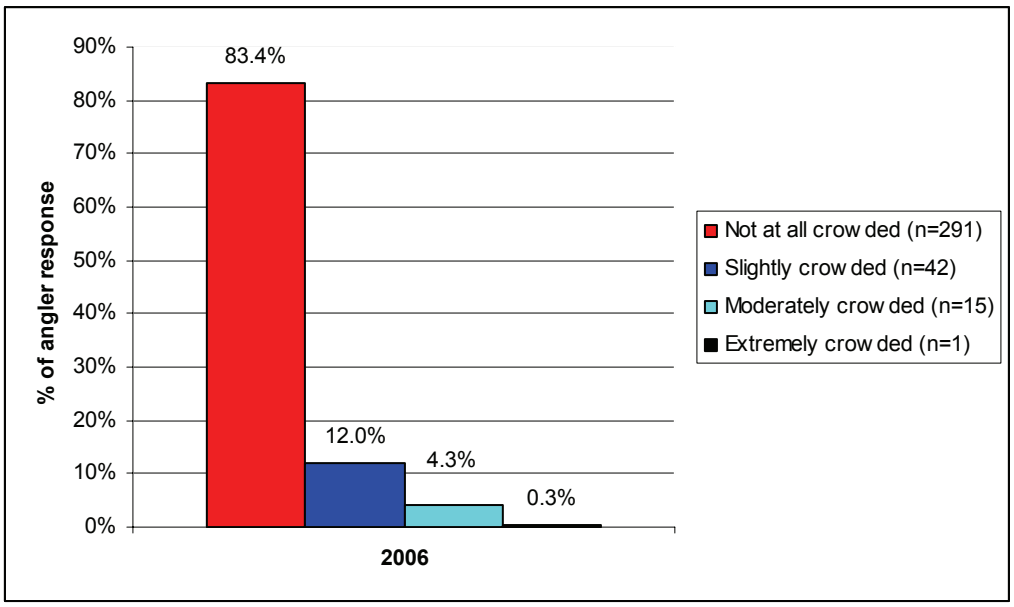
Of the 402 anglers interviewed on the Elk River, 349 anglers responded to the crowding questions. Overall, anglers did not feel that crowding was a significant issue (Figure 24). Of the

349 anglers, 291 rated the crowding level “not at all crowded”, 42 rated it as “slightly crowded”, 15 rated it as “moderately crowded”, and 1 angler rated it as “extremely crowded” (Table 42).

Table 42. Summary of angler response related to crowding on the Elk River.

Crowding Description	Number of Anglers	Percent of Angler Response
Not at all Crowded	291	83.4%
Slightly Crowded	42	12%
Moderately Crowded	15	4.3%
Extremely Crowded	1	0.3%

Figure 24. Angler crowding rating on the Elk River.



10.0 MICHEL CREEK

10.1 Study area

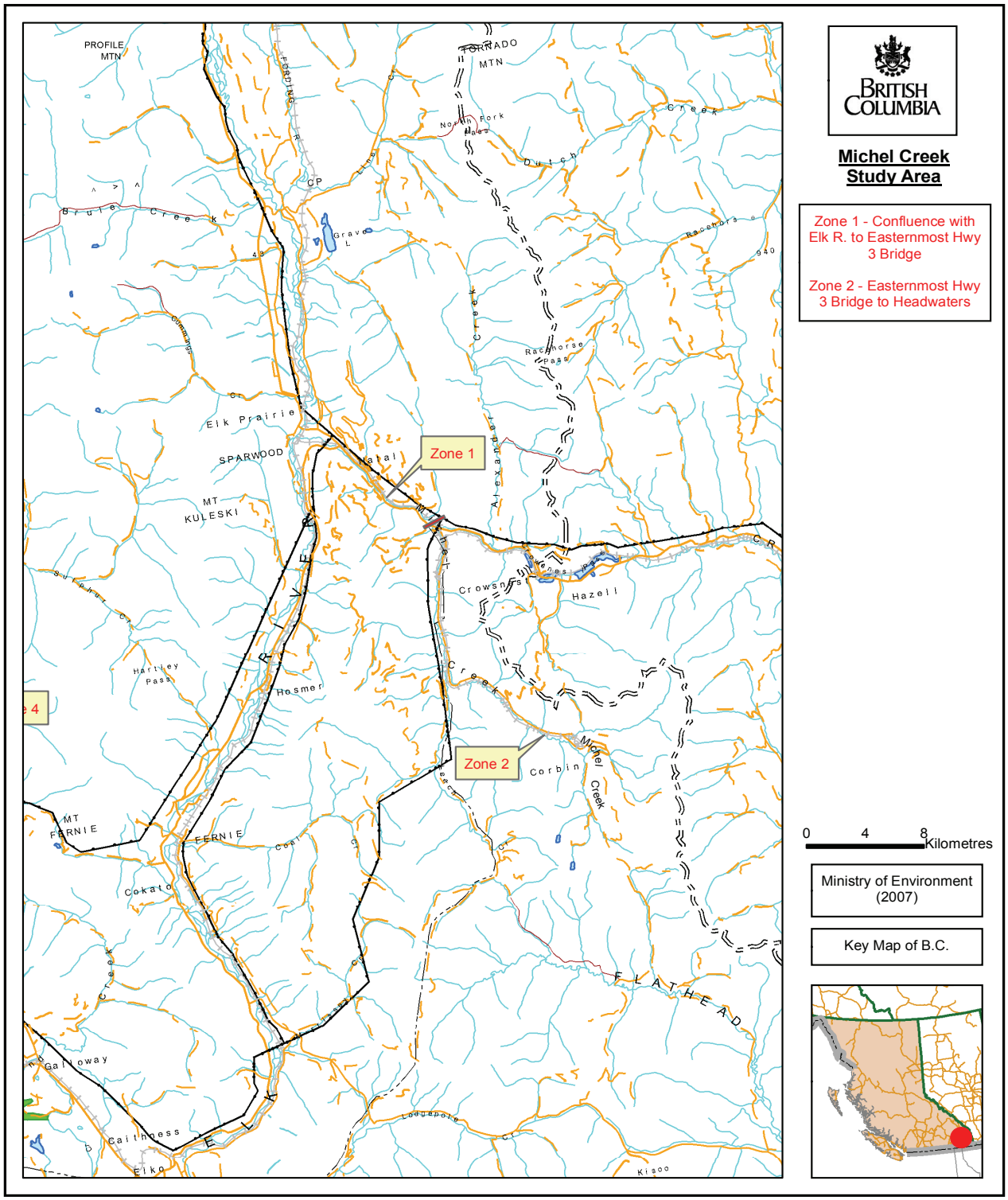
Michel Creek originates in the Taylor Range of the Southern Rocky Mountains. From its headwaters, Michel Creek flows approximately 46.5 km north/northwest to its confluence with the Elk River at Sparwood (Figure 25).

Michel Creek has a drainage area of 638 km^2 with a mean annual discharge of 11m^3/s. Significant tributaries to Michel Creek include Corbin Creek, Leech Creek and Alexander Creek.

The portion of Michel Creek included in this survey is approximately 40 river kms and extends from its confluence with the Elk River at Sparwood to approximately 2 km above the Corbin Creek confluence. The study area was divided into two zones which correspond with catch and release zones established in the freshwater fishing regulations for Region 4 (BC Regulations Synopsis). Zone 1 (harvest) extends from the confluence of Michel Creek with the Elk River to the East Hwy 3 Bridge. Zone 2 (catch and release) extends from the East Hwy 3 Bridge to the Michel Creek headwaters, although the area of the study only extended approximately 2 km above Corbin Creek.

Michel Creek is very accessible to anglers, closely paralleled by Hwy 3 from Sparwood to the East Hwy 3 bridge just above the confluence of Alexander Creek. A paved secondary highway runs beside Michel Creek from the East Hwy 3 bridge to the Corbin Creek confluence and the Michel Creek Forest Service Road (FSR) provides access from the Corbin Creek confluence to the upper reaches of the system.

Figure 25. Map of the Michel Creek study area.



10.2 Results

10.2.1 Effort and Catch

A total of 97 anglers were interviewed over 11 days on Michel Creek during the survey. They fished for 207 hours and caught 2 bull trout, 2 mountain whitefish and 407 westslope cutthroat trout, for an overall catch per unit effort of 1.98 fish per rod hour (Table 43).

Table 43. Total angler effort and catch success on the Michel Creek.

Angler Days	Angler Hours	BT	MW	WCT	CPUE
97	207	2	2	407	1.98

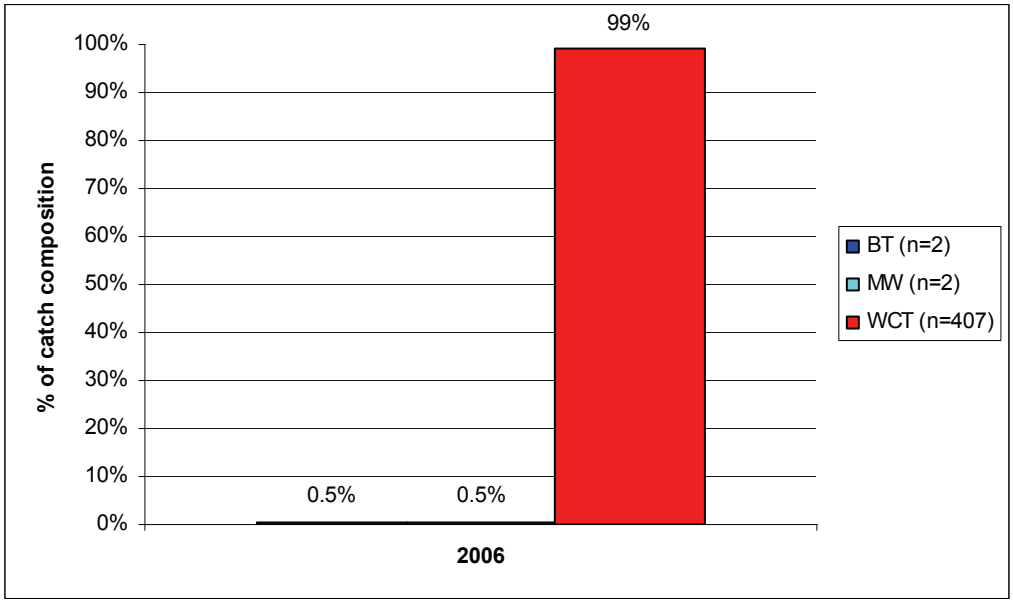
Of the 411 fish caught by anglers interviewed on Michel Creek, 1 fish was harvested while 410 fish were released (99.7% release rate) (Table 44).

Table 44. Total number of fish released and harvested by species on Michel Creek.

Species	Total Catch	% of Catch	Catch & Release	Harvest	% Release Rate
BT	2	0.5%	2	0	100%
MW	2	0.5%	2	0	100%
WCT	407	99%	406	1	99.7%
Total	411		410	1	99.7%

Westslope cutthroat trout composed 99% of the catch during summer/fall fishery on Michel Creek, with bull trout and mountain whitefish comprising 0.5% and 0.5% of the total catch, respectively (Figure 26).

Figure 26. Catch composition for the 2006 summer/fall Michel Creek fishery.



Potential post-hooking mortality numbers for all fish caught and released on Michel Creek range from 2 to 20 fish (Table 45).

Table 45. Total number of fish released, harvested and post-hooking mortalities on Michel Creek.

Catch and Release	Post-Hooking Mortality		Harvest
	0.5%	5%	
410	2	20	1

10.2.2 Trip length

Overall, anglers interviewed on Michel Creek spent an average of 4.8 hours fishing per day through the course of the survey (Complete trip data only n=13).

10.2.3 Angling methods

Of the 97 anglers interviewed on Michel Creek, 86 were fly anglers (89%), while 4 used gear (4%) and 7 anglers used both fly and gear (7%) (Table 46).

Table 46. Fishing methods by place of residence on Michel Creek.

Place of Residence	Fly	Gear	Both
British Columbia	30	4	5
United States	34	0	0
Alberta	17	0	2
Other Canadians	4	0	0
Other Countries	1	0	0
Total	86	4	7

10.2.4 Angler residency

Of the 97 anglers interviewed on Michel Creek, 62 were Canadian (64%), 34 were American (35%), and 1 angler was from Asia (1%). Canadian anglers were from British Columbia, Alberta and Manitoba, American anglers represented 9 different states and the Asian angler was from Japan (Table 47).

Table 47. Place of residence for anglers fishing Michel Creek.

Country of Residence	Total Anglers	%	Province/State	Number of Anglers	%
Canada	62	64%	British Columbia	39	40.2%
			Alberta	19	19.6%
			Manitoba	4	4.1%
United States	34	35%	California	8	8.2%
			New York	8	8.2%
			Washington	7	7.2%
			Florida	2	2.1%
			Minnesota	2	2.1%
			Montana	2	2.1%
			Pennsylvania	2	2.1%
			Wyoming	2	2.1%
			Oklahoma	1	1%
Europe	1	1%	England	1	1%

10.2.5 Angling experience

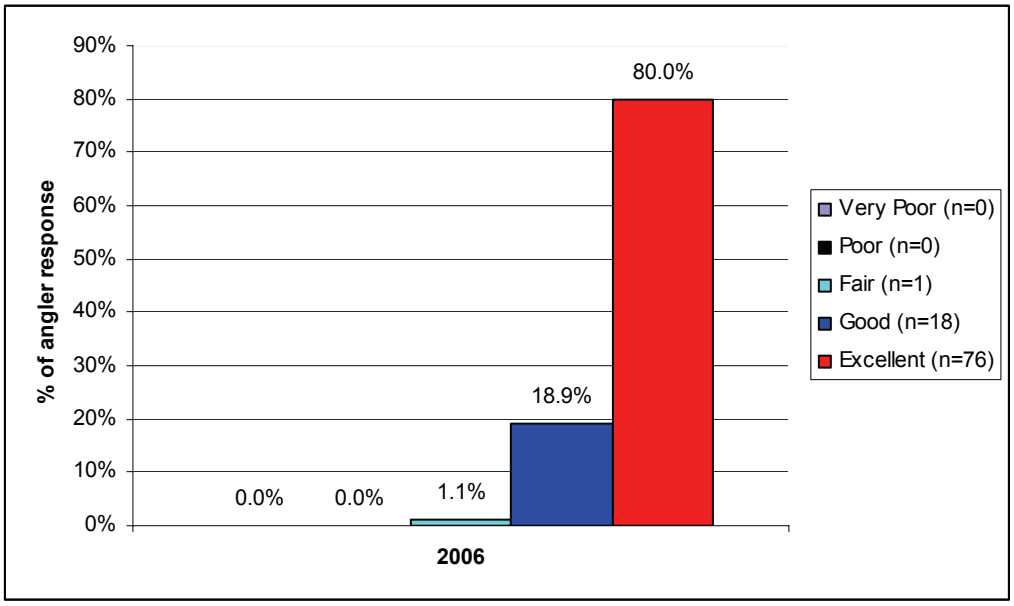
10.2.5.1 Quality of the angling experience

Of the 97 anglers who were asked to rate their angling experience, 95 responded. A total of 1 angler rated their experience as fair, 18 as good and 76 as excellent (1%, 19% and 80%, respectively) (Table 48 & Figure 27).

Table 48. Quality of angling experience on Michel Creek by residence.

Residence	Very Poor	Poor	Fair	Good	Excellent
B.C.	0	0	0	13	26
U.S.	0	0	1	0	33
Alberta	0	0	0	5	12
Other CDN.	0	0	0	0	4
Other	0	0	0	0	1
Total	0	0	1	18	76

Figure 27. Quality of angling experience response from anglers on Michel Creek.



Anglers were also asked to list the top three factors which led to their quality of angling experience rating. A total of 278 responses were categorized into this list. There were 71 responses pertaining to the surrounding scenery, 70 to the quality of fish caught, 62 responses relating to the quantity of fish caught, 36 related to water conditions, 24 pertaining to the quality of water access, 13 which listed the number of other anglers as a factor (positive and negative) and 2 responses were listed under "other" (Table 49).

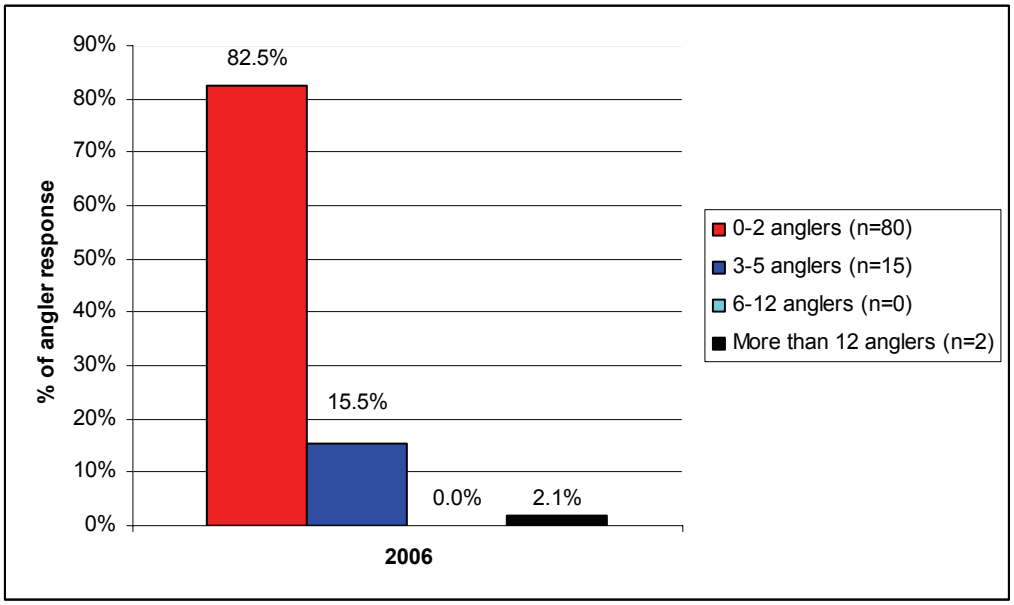
Table 49. Summary of factors contributing to the quality of angling experience on Michel Creek.

Factor 1		Factor 2		Factor 3		Sum of Factors	
A	62	B	56	D	47	D (Surrounding scenery)	71
B	14	D	19	E	19	B (Quality of fish caught)	70
C	14	C	14	F	10	A (Quantity of fish caught)	62
D	5	E	4	C	8	C (Water conditions)	36
E	1	F	2	H	2	E (Quality of access to water)	24
F	1					F (Number of other anglers)	13
						H (Other)	2

10.2.5.2 Other anglers seen

Of the 97 anglers interviewed on Michel Creek, all anglers responded to the question of how many other anglers they saw on their trip. Of these anglers, 80 saw 0-2 other anglers, 15 saw 3-5 anglers, no anglers responded that they saw 6-12 anglers and 2 anglers saw more than 12 anglers on their trip (Figure 28).

Figure 28. Other anglers seen by anglers interviewed on Michel Creek.



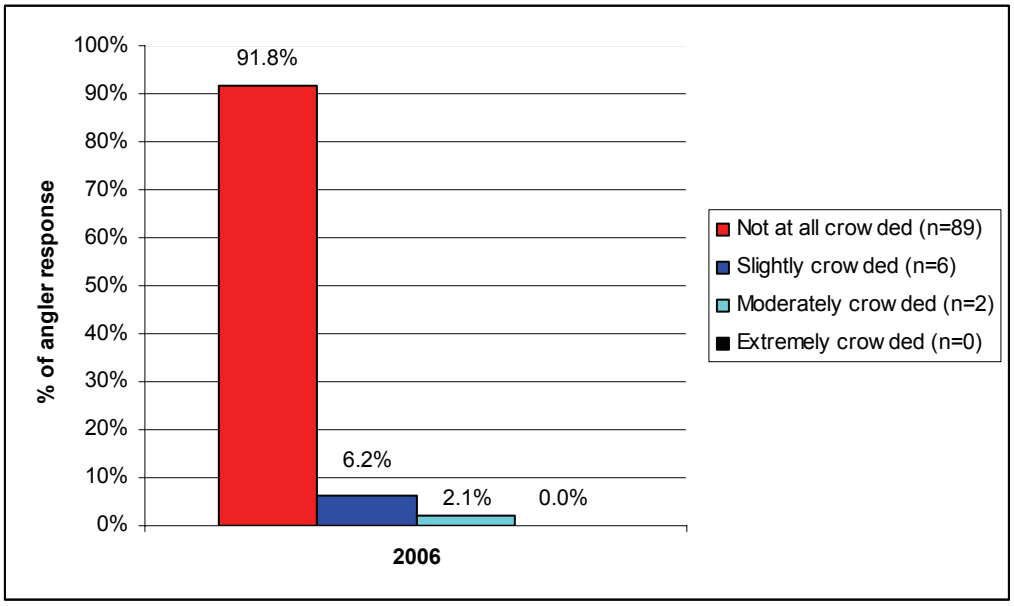
10.2.5.3 Crowding response

Of the 97 anglers interviewed on Michel Creek, all 97 anglers responded to the crowding questions. Overall, anglers did not feel that crowding was a significant issue (Figure 29). Of the 97 anglers, 89 rated the crowding level "not at all crowded", 6 rated it as "slightly crowded" and 2 anglers rated it as "moderately crowded" (Table 50).

Table 50. Summary of angler response related to crowding on Michel Creek.

Crowding Description	Number of Anglers	Percent of Angler Response
Not at all Crowded	89	92%
Slightly Crowded	6	6%
Moderately Crowded	2	2%
Extremely Crowded	0	0%

Figure 29. Angler crowding rating on Michel Creek.



11.0 SKOOKUMCHUCK CREEK

11.1 Study area

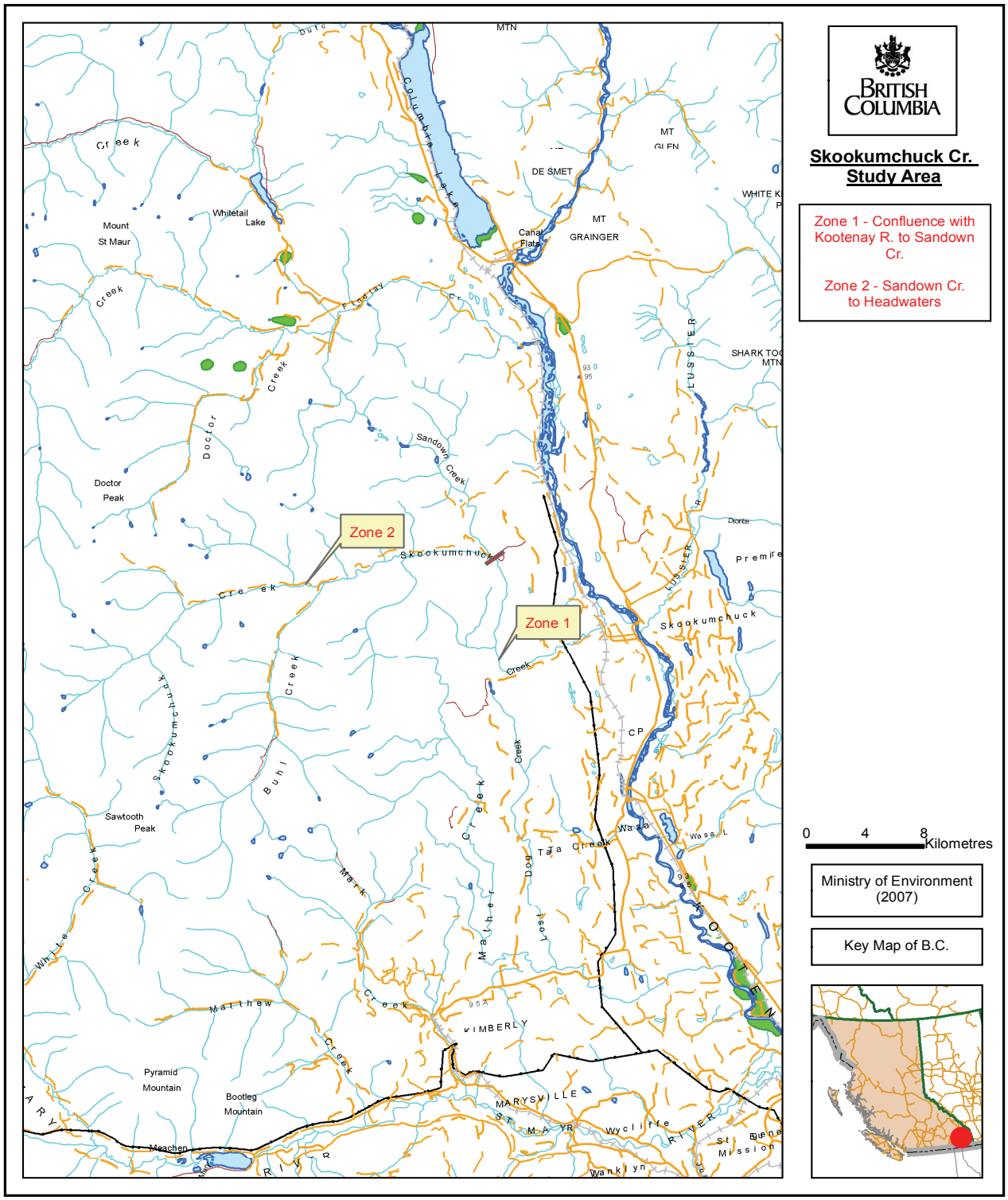
Skookumchuck Creek originates in the Purcell Mountains within the Purcell Wilderness Conservancy. From its headwaters, the stream flows east/northeast for approximately 62 km to its confluence with the upper Kootenay River (Figure 30). There is a fish barrier waterfall just above the Buhl Creek confluence, which prevents upstream fish migration.

Skookumchuck Creek has a drainage area of approximately 637 km^2, with a mean annual discharge of 10.3 m^3/s (Water Survey of Canada). Significant tributaries to Skookumchuck Creek include Buhl Creek, Bradford Creek and Sandown Creek.

The portion of Skookumchuck Creek included in this survey is approximately 33 river kms and extends from its confluence with the Kootenay River to just below the Buhl Creek confluence. The study area was divided into two zones which correspond with specific restrictions established in the freshwater fishing regulations for Region 4 (BC Regulations Synopsis). Zone 1 (catch and release) extends from the Kootenay River to the Sandown Creek confluence. Zone 2 (catch and release/fly fishing only/Sept 1-Oct 31 partial closure) extends from Sandown Creek to the headwaters of Skookumchuck Creek, although the area of the study ended at Buhl Creek.

Angler access to Skookumchuck Creek is limited to hike-in access in the lower section of the system near the Tembec Skookumchuck Pulp Mill to its confluence with the Kootenay River, and the mid portions of the river between the Torrent Forest Service Road (FSR) bridge above the Pulp Mill to the Sandown Creek confluence. From the Sandown Creek confluence to Buhl Creek, the system can be accessed by the Skookumchuck FSR, which parallels most of the upper river.

Figure 30. Map of the Skookumchuck Creek study area.



11.2 Results

11.2.1 Effort and Catch

A total of 21 anglers were interviewed over 5 days on Skookumchuck Creek during the survey. They fished for 79 hours and caught 13 bull trout and 89 westslope cutthroat trout, for an overall catch per unit effort of 1.29 fish per rod hour (Table 51).

Table 51. Total angler effort and catch success on the Skookumchuck Creek.

Angler Days	Angler Hours	BT	WCT	CPUE
21	79	13	89	1.29

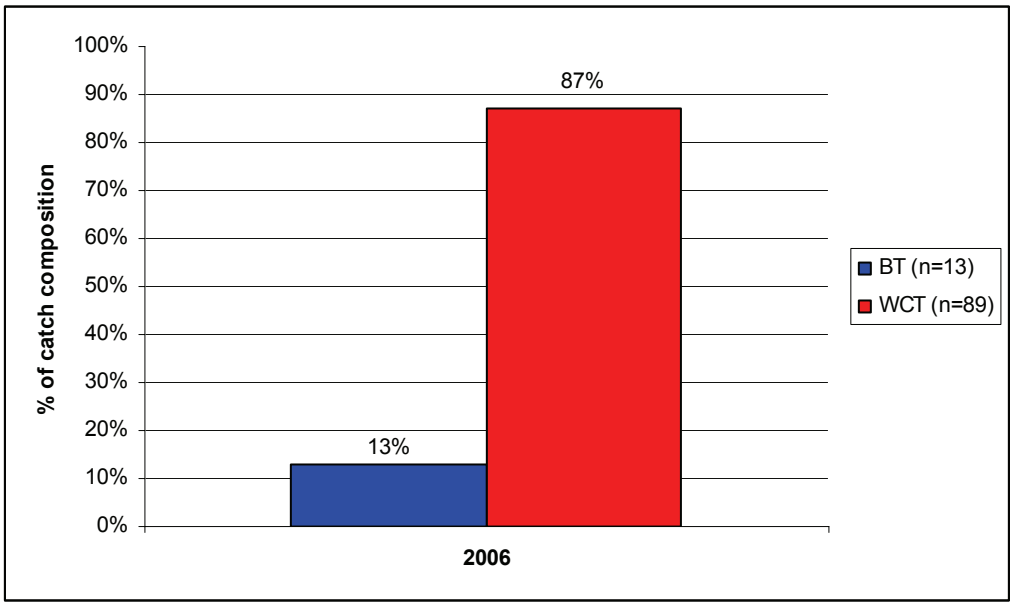
Of the 102 fish caught by anglers interviewed on Skookumchuck Creek, 1 fish was harvested while 101 fish were released (99% release rate) (Table 52).

Table 52. Total number of fish released and harvested by species on Skookumchuck Creek.

Species	Total Catch	% of Catch	Catch & Release	Harvest	% Release Rate
BT	13	13%	13	0	100%
WCT	89	87%	88	1	98.9%
Total	102		101	1	99%

Westslope cutthroat trout composed 87% of the catch during summer/fall fishery on Skookumchuck Creek, with bull trout comprising 13% of the total catch (Figure 31).

Figure 31. Catch composition for the 2006 summer/fall Skookumchuck fishery.



Potential post-hooking mortality numbers for all fish caught and released on Skookumchuck Creek range from <1 to 5 fish (Table 53).

Table 53. Total number of fish released, harvested and post-hooking mortalities on Skookumchuck Creek.

Catch and Release	Post-Hooking Mortality		Harvest
	0.5%	5%	
101	<1	5	1

11.2.2 Angling methods

Of the 21 anglers interviewed on Skookumchuck Creek, 15 were fly anglers (71%), while 6 used gear (29%) (Table 54).

Table 54. Fishing methods by place of residence on Skookumchuck Creek.

Place of Residence	Fly	Gear	Both
British Columbia	8	5	0
Alberta	2	1	0
Other Canadians	5	0	0
Total	15	6	0

11.2.3 Angler residency

Of the 21 anglers interviewed on Skookumchuck Creek, all were Canadian (100%) (Table 55).

Table 55. Place of residence for anglers fishing Skookumchuck Creek.

Country of Residence	Total Anglers	%	Province/State	Number of Anglers	%
Canada	21	100%	British Columbia	13	62%
			Ontario	5	24%
			Alberta	3	14%

11.2.4 Angling experience

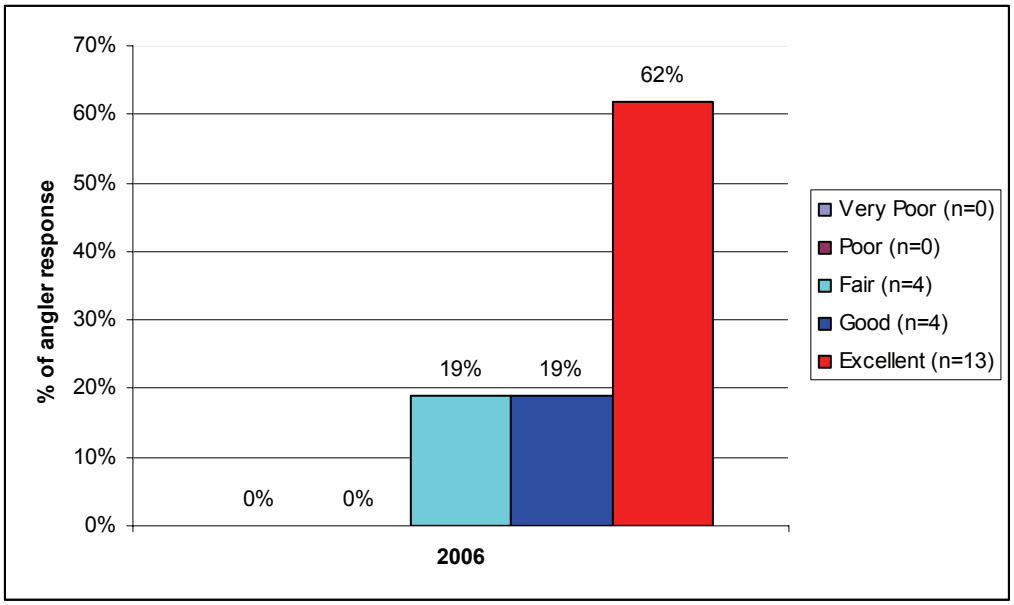
11.2.4.1 Quality of the angling experience

Of the 21 anglers who were asked to rate their angling experience, all 21 responded. A total of 4 anglers rated their experience as fair, 4 as good and 13 as excellent (19%, 19% and 62%, respectively) (Table 56 & Figure 32).

Table 56. Quality of angling experience on Skookumchuck Creek by residence.

Residence	Very Poor	Poor	Fair	Good	Excellent
B.C.	0	0	3	4	6
Alberta	0	0	1	0	2
Other CDN.	0	0	0	0	5
Total	0	0	4	4	13

Figure 32. Quality of angling experience response from anglers on Skookumchuck Creek.



Anglers were also asked to list the top three factors which led to their quality of angling experience rating. A total of 63 responses were categorized into this list. There were 19 responses which listed the number of other anglers as a factor, 17 were related to the quality of fish caught, 14 pertained to water conditions, 5 responses related to the surrounding scenery, 4 to the quantity of fish caught and 4 responses were listed under "other" (Table 57).

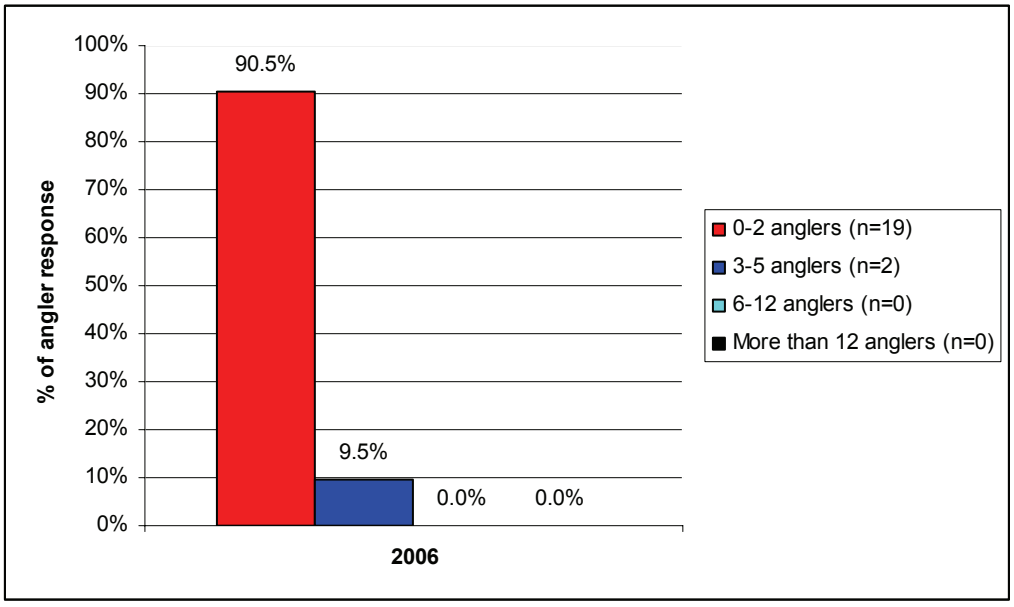
Table 57. Summary of factors contributing to the quality of angling experience on Skookumchuck Creek.

Factor 1		Factor 2		Factor 3		Sum of Factors	
B	13	C	12	F	15	F (Number of other anglers)	19
A	4	B	4	H	4	B (Quality of fish caught)	17
D	4	F	4	C	2	C (Water conditions)	14
		D	1			D (Surrounding scenery)	5
						A (Quantity of fish caught)	4
						H (Other)	4

11.2.4.2 Other anglers seen

Of the 21 anglers interviewed on Skookumchuck Creek, all anglers responded to the question of how many other anglers they saw on their trip. Of these anglers, 19 saw 0-2 other anglers, 2 saw 3-5 anglers and no anglers saw more than 6 other anglers on their trip (Figure 33).

Figure 33. Other anglers seen by anglers interviewed on Skookumchuck Creek.



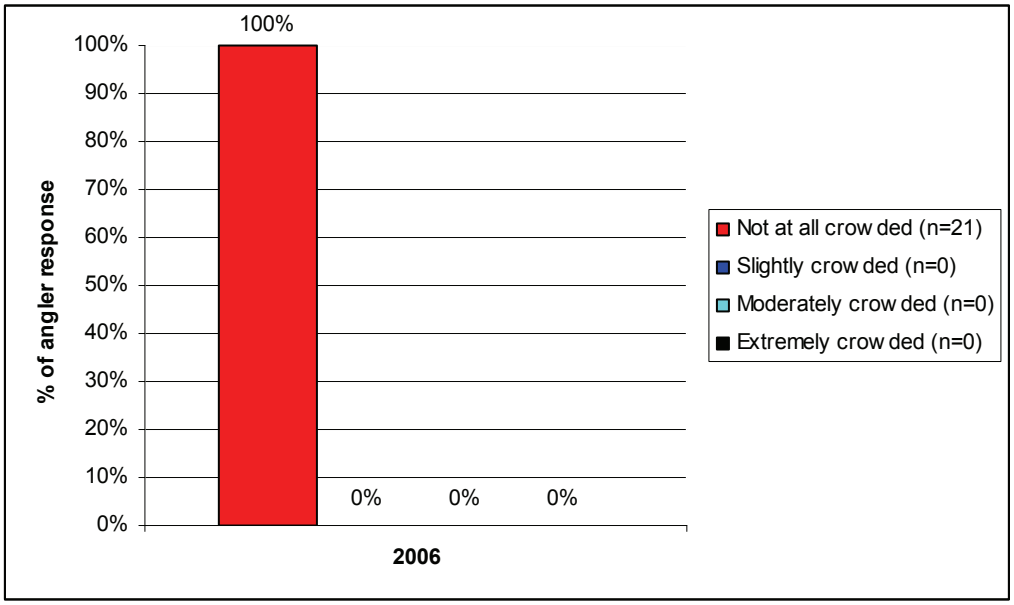
11.2.4.3 Crowding response

Of the 21 anglers interviewed on Skookumchuck Creek, all 21 anglers responded to the crowding questions. Anglers did not feel that crowding was a significant issue, with all 21 rating the crowding level "not at all crowded" (Table 58 and Figure 34).

Table 58. Summary of angler response related to crowding on Skookumchuck Creek.

Crowding Description	Number of Anglers	Percent of Angler Response
Not at all Crowded	21	100%
Slightly Crowded	0	0%
Moderately Crowded	0	0%
Extremely Crowded	0	0%

Figure 34. Angler crowding rating on Skookumchuck Creek.



12.0 ST. MARY RIVER

12.1 Study Area

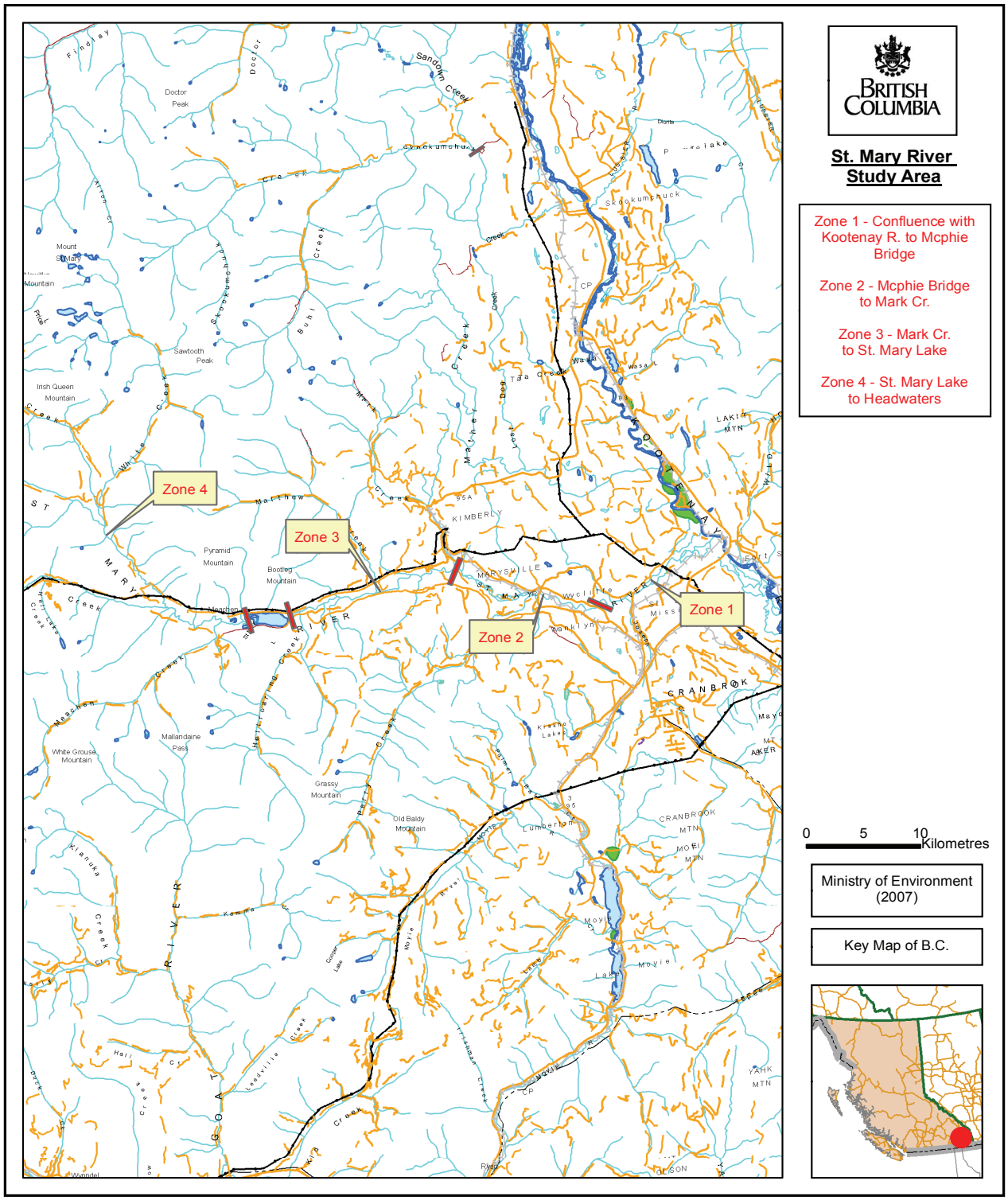
The St. Mary River originates in the Purcell Mountains of southeastern British Columbia, flowing approximately 106 km from its headwaters in a southeastern direction, joining the upper Kootenay River near Fort Steele, B.C. (Figure 35). The river is separated into two sections by St. Mary Lake: the upper St. Mary River (approximately 58 km) and the lower St. Mary River (approximately 48 km).

The St. Mary River has a drainage area of 2,715 km^2 with a mean annual discharge of 54.3m^3/s (Water Survey of Canada). Several major tributaries flow into both the upper and lower St. Mary River. Dewar, White, Redding and Meachen Creeks enter the river above St. Mary Lake and Hellroaring, Matthew, Mark, Perry and Joseph Creeks enter the river below St. Mary Lake.

The portion of the St. Mary River included in this survey is approximately 71 river kms and extends from its confluence with the Kootenay River near Fort Steele, to the White and Dewar Creek confluence above St. Mary Lake. The study area was divided into four zones which correspond with catch and release zones established in the freshwater fishing regulations for Region 4 (BC Regulations Synopsis). Zone 1 (harvest) extends from the confluence of the St. Mary and Kootenay Rivers to the Hwy 95A Bridge (Mcphee Br.) northwest of Cranbrook. Zone 2 (catch and release) extends from the Hwy 95A Bridge to the Mark Creek confluence at Marysville. Zone 3 (harvest) extends from the confluence of Mark Creek to St. Mary Lake and Zone 4 (catch and release) extends from St. Mary Lake to the confluence of White and Dewar Creeks.

Angler access to the St. Mary River is provided by several roads which parallel or intersect much of the system. The lower St. Mary River can be accessed in places along Highway 95A, the Mission Road and the St. Mary River Forest Service Road (FSR). The upper river can be accessed along the St. Mary River FSR, which parallels most of the upper river. Boat access is somewhat limited as entry and exit points are infrequent or privately owned, but river access for shore anglers is found throughout the study area.

Figure 35. Map of the St. Mary River study area.



12.2 Results

12.2.1 Effort and Catch

A total of 198 anglers were interviewed over 44 days on the St. Mary River during the survey. They fished for 666 hours and caught 9 bull trout, 1 eastern brook trout, 2 kokanee, 39 mountain whitefish, 11 rainbow and 964 westslope cutthroat trout, for an overall catch per unit effort of 1.54 fish per rod hour (Table 59).

Table 59. Total angler effort and catch success on the St. Mary River.

Angler Days	Hours Fished	BT	EB	KO	MW	RB	WCT	CPUE
198	666	9	1	2	39	11	964	1.54

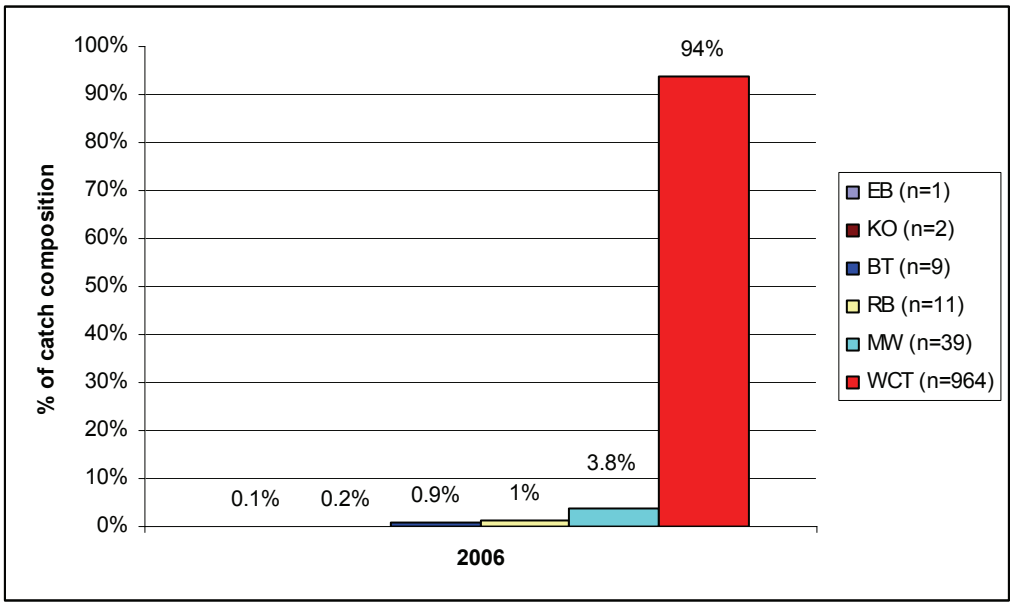
Of the 1,026 fish caught by anglers interviewed on the St. Mary River, 1,018 were released and 8 fish were harvested (99.2% release rate) (Table 60).

Table 60. Total number of fish released and harvested by species on the St. Mary River.

Species	Total Catch	% of Catch	Catch & Release	Harvest	% Release Rate
BT	9	0.9%	9	0	100%
EB	1	0.1%	1	0	100%
KO	2	0.2%	0	2	0%
MW	39	3.8%	36	3	92%
RB	11	1.1%	11	0	100%
WCT	964	94%	961	3	100%
Total	1,026		1,018	8	99.2%

Westslope cutthroat trout composed 94% of the catch during the St. Mary summer/fall fishery, with mountain whitefish, rainbow trout, bull trout, kokanee and eastern brook trout comprising 3.8%, 1.1%, 0.9%, 0.2% and 0.1% of the total catch, respectively (Figure 36).

Figure 36. Catch composition for the 2006 summer/fall St. Mary River fishery.



Potential post-hooking mortality numbers for all fish caught and released on the St. Mary River range from 5 to 51 fish (Table 61).

Table 61. Total number of fish released, harvested and post-hooking mortalities on the St. Mary River.

Catch and Release	Post-Hooking Mortality		Harvest
	0.5%	5%	
1,018	5	51	8

12.2.2 Guided vs. non-guided anglers

Of the 198 anglers interviewed on the St. Mary River, 55 were guided (28%) and 143 were non-guided (72%) (Table 62).

Table 62. Total angler days for guided and non-guided anglers on the St. Mary River.

Guided Angler Days		Non-Guided Angler Days		Total Angler Days
Shore	Boat	Shore	Boat	
5	50	119	24	198

Guided anglers fished for 305 hours (46% of total hours fished), while non-guided anglers fished for 361 hours (54% of total hours fished) (Table 63).

Table 63. Total angler effort in hours for guided and non-guided anglers on the St. Mary River.

Guided Angler Hours		Non-Guided Angler Hours		Total Angler Hours
Shore	Boat	Shore	Boat	
33	272	245	116	666

Guided anglers caught 505 fish, while non-guided anglers caught 521 (49% and 51% of the total catch, respectively). Catch per unit effort for guided anglers (CPUE) was 1.66 fish per rod hour, while the CPUE for non-guided anglers was 1.44 fish per rod hour (Table 64).

Table 64. Effort, catch and CPUE for guided vs. non-guided anglers on the St. Mary River.

Status	Angler Days	Angler Hours	Total Fish Caught	CPUE
Guided	55	305	505	1.66
Non-Guided	143	361	521	1.44
Total	198	666	1,026	1.54

12.2.3 Boat vs. shore anglers

Boat angler days comprised 74 of the 198 angler days on the St. Mary River (37%), while shore angler days accounted for 124 of the total angler days (63%). Anglers fished from a boat for 388 hours (58%) and caught 638 fish, while shore anglers fished for 278 hours (42%) and caught 388 fish. CPUE for boat anglers was 1.64 fish per rod hour, while the CPUE for shore anglers was 1.39 (Table 65).

Table 65. Overall effort, catch and CPUE for boat vs. shore anglers on the St. Mary River.

Angler Class	Angler Days	Angler Hours	Total Fish Caught	CPUE
Boat Anglers	74	388	638	1.64
Shore Anglers	124	278	388	1.39
Total	198	666	1,026	1.54

12.2.4 Trip length

Overall, anglers interviewed on the St. Mary River spent an average of 5.48 hours fishing per day through the course of the survey. Boat anglers spent an average of 7.18 hours fishing per day, while shore anglers averaged 3.61 hours per day. Guided boat anglers fished for an average of 7.43 hours per day, while non-guided boat anglers averaged 6.85 hours per trip. Guided shore anglers averaged 8.25 hours per trip (limited sample size, n=4), while non-guided shore anglers averaged 2.92 hours per day (Table 66).

Table 66. Average trip length by various angler classed on the St. Mary River (complete trip data only).

All Anglers (n=65)	Boat Anglers (n=34)	Shore Anglers (n=31)	Guided Anglers		Non-Guided Anglers	
			Boat (n=21)	Shore (n=4)	Boat (n=13)	Shore (n=27)
5.48	7.18	3.61	7.43	8.25	6.85	2.92

12.2.5 Angling methods

Of the 198 anglers interviewed on the St. Mary River, 180 were fly anglers (91%), while 16 used gear (8%) and 2 anglers used both fly and gear (1%) (Table 67).

Table 67. Fishing methods by place of residence on the St. Mary River.

Place of Residence	Fly	Gear	Both
British Columbia	87	15	2
United States	52	0	0
Alberta	35	1	0
Other Canadians	5	0	0
Other Countries	1	0	0
Total	180	16	2

12.2.6 Angler residency

Of the 198 anglers interviewed on the St. Mary River, 145 were Canadian (73%), 52 were American (26%), and 1 angler were from Europe (1%). Canadian anglers were from British Columbia, Alberta, Ontario and Saskatchewan, while American anglers represented 10 different states and the European angler was from Germany (Table 68).

Table 68. Place of residence for anglers fishing the St. Mary River.

Country of Residence	Total Anglers	%	Province/State	Number of Anglers	%
Canada	145	73%	British Columbia	104	53%
			Alberta	36	18%
			Ontario	3	2%
			Saskatchewan	2	1%
United States	52	26%	Washington	16	8%
			Montana	11	6%
			California	9	5%
			Arizona	4	2%
			Idaho	3	2%
			Virginia	3	2%
			Florida	2	1%
			Nevada	2	1%
			Oregon	1	1%
			Texas	1	1%
Europe	1	1%	Germany	1	1%

12.2.7 Angling experience

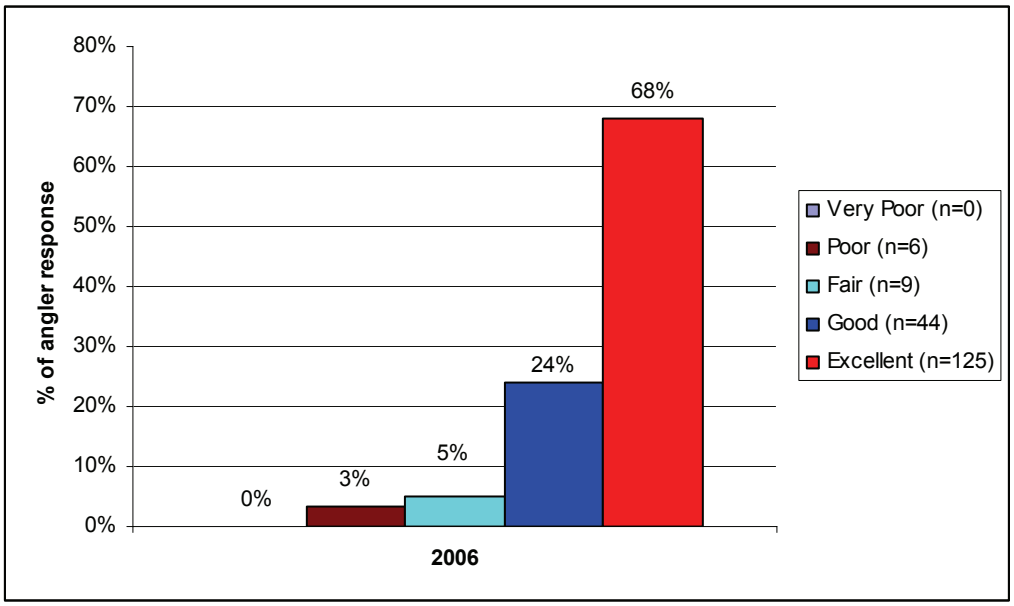
12.2.7.1 Quality of the angling experience

Of 198 anglers who were asked to rate their angling experience, 184 responded. A total of 6 anglers rated their experience as poor, 9 as fair, 44 as good and 125 as excellent (3%, 5%, 24% and 68%, respectively) (Table 69 & Figure 37).

Table 69. Quality of angling experience on the St. Mary River by residence.

Residence	Very Poor	Poor	Fair	Good	Excellent
B.C.	0	4	5	30	53
U.S.	0	0	4	8	40
Alberta	0	2	0	5	27
Other CDN.	0	0	0	1	4
Other	0	0	0	0	1
Total	0	6	9	44	125

Figure 37. Quality of angling experience response from anglers on the St. Mary River.



Anglers were also asked to list the top three factors which led to their quality of angling experience rating. There were a total of 504 responses categorized into this list. There were 149 responses pertaining to the surrounding scenery, 90 to the quality of fish caught, 83 related to water conditions, 77 responses relating to the quantity of fish caught, 54 which listed the number of other anglers as a factor (positive and negative), 24 responses were listed under "other", 17 pertained to the quality of water access and 10 responses were related to the number of boats on the water (Table 70).

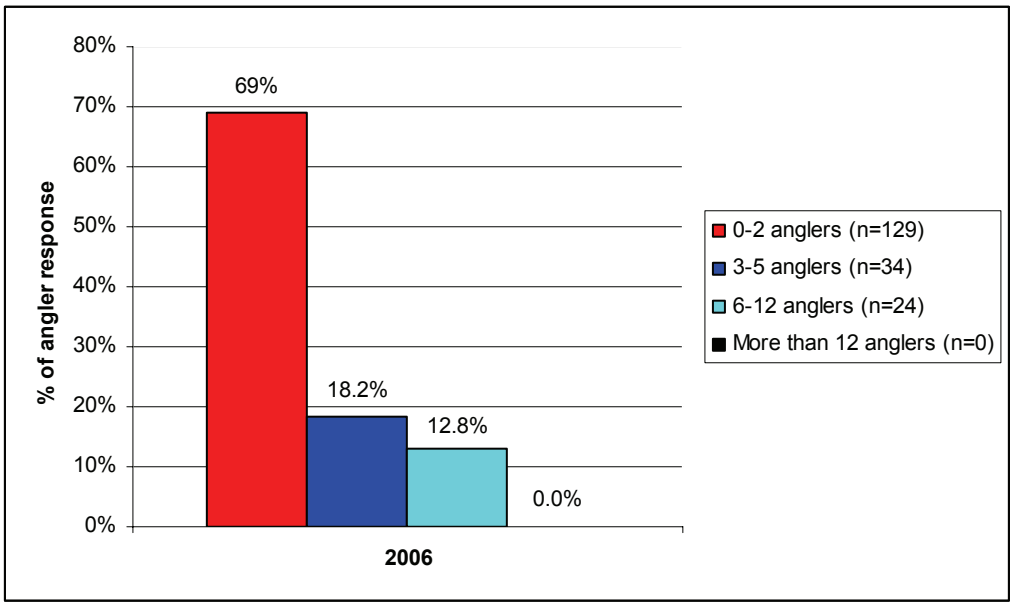
Table 70. Summary of factors contributing to the quality of angling experience for the St. Mary River.

Factor 1		Factor 2		Factor 3		Sum of Factors	
A	77	B	56	D	66	D (Surrounding scenery)	149
C	37	D	54	F	37	B (Quality of fish caught)	90
B	32	C	36	E	15	C (Water conditions)	83
D	29	F	13	H	12	A (Quantity of fish caught)	77
F	4	H	10	C	10	F (Number of other anglers)	54
H	2	E	2	G	10	H (Other)	24
				B	2	E (Quality of access to water)	17
						G (Number of boats on water)	10

12.2.7.2 Other anglers seen

Of the 198 anglers interviewed on the St. Mary River, 187 anglers responded to the question of how many other anglers they saw on their trip. Of these anglers, 129 saw 0-2 other anglers, 34 saw 3-5 anglers, 24 saw 6-12 anglers and no anglers saw more than 12 other anglers on their trip (Figure 38).

Figure 38. Other anglers seen by anglers interviewed on the St. Mary River.



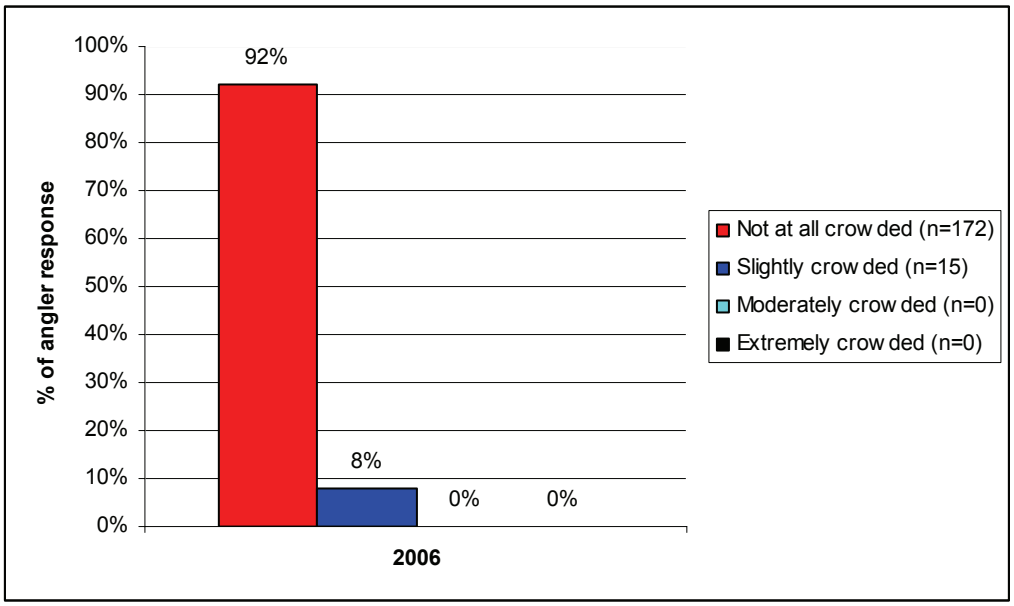
12.2.7.3 Crowding response

Of the 198 anglers interviewed on the St. Mary River, 187 anglers responded to the crowding questions. Overall, anglers did not feel that crowding was an issue on the river (Figure 39). Of the 187 anglers, 172 rated the crowding level "not at all crowded" and 15 anglers rated it as "slightly crowded" (Table 71).

Table 71. Summary of angler response related to crowding on the St. Mary River

Crowding Description	Number of Anglers	Percent of Angler Response
Not at all Crowded	172	92%
Slightly Crowded	15	8%
Moderately Crowded	0	0%
Extremely Crowded	0	0%

Figure 39. Angler crowding rating on the St. Mary River.



13.0 WHITE RIVER

13.1 Study area

The White River originates from glacier-fed lakes in the Height of the Rockies Wilderness Area (HOTR), between the Park and Front Ranges of the southern Rocky Mountains in southeastern British Columbia. The upper basin of the White River is divided into three large forks. The North Fork White River and the Middle Fork White River flow south approximately 40 km until they join the East Fork of the White River, which flows directly west from its headwaters. From the East Fork confluence, the White River flows west/southwest for approximately 10 km. At Whiteswan Provincial Park the river turns north/northwest for its final 34 km until it empties into the upper Kootenay River, approximately 30 km northeast of the village of Canal Flats (Figure 40).

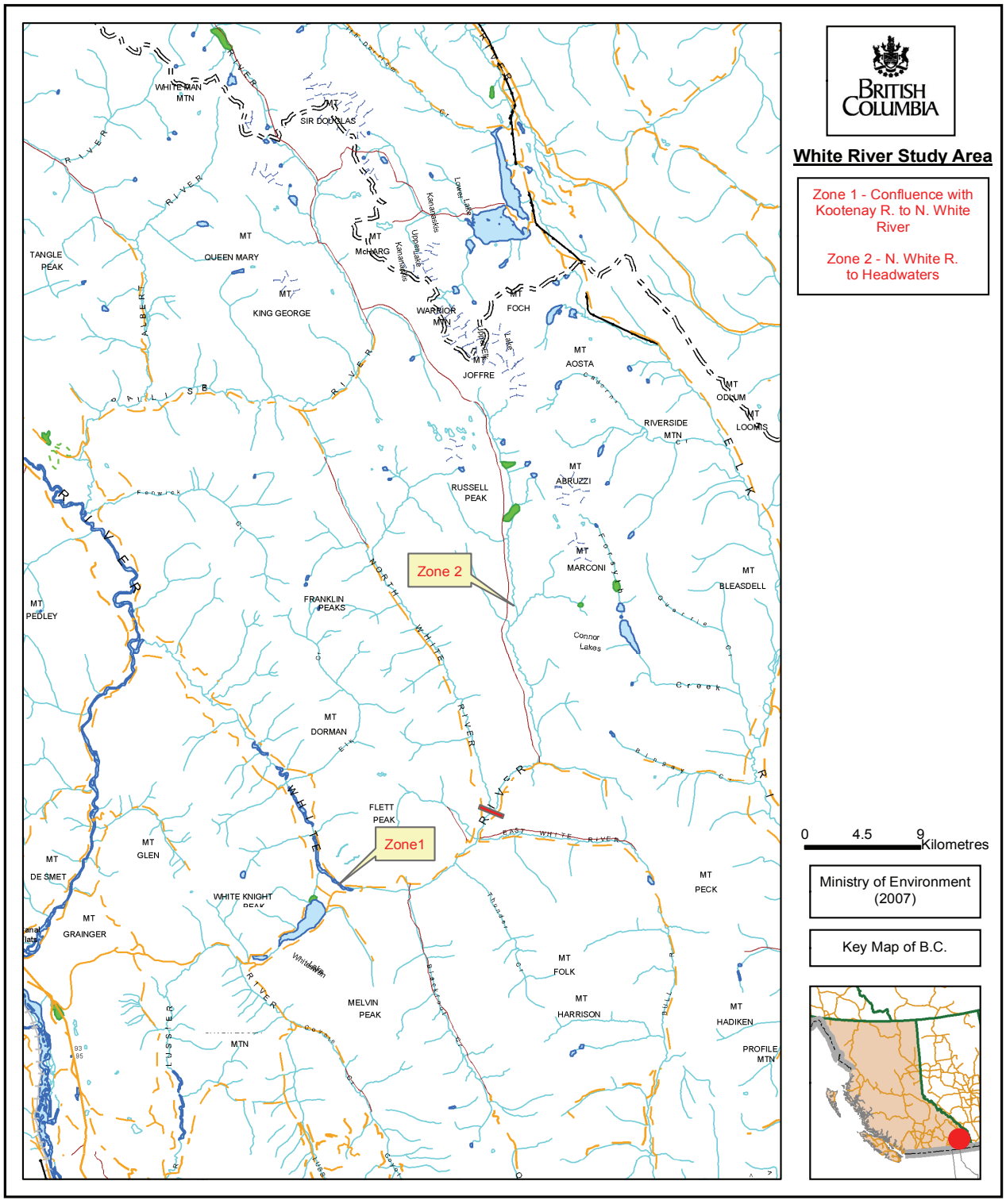
The White River has a total watershed area of 987 km^2 with a mean annual discharge of 23.3 m^3/s (Water Survey of Canada). Significant tributaries to the North and Middle Forks include Schofield Creek, Nilksuka Creek, Nipakoo Creek, Colin Creek, Maiyuk Creek, Kotsats Creek, Klookuh Creek and Rock Canyon Creek. Significant tributaries to the White River below the East Fork confluence include Grave Creek, Thunder Creek, Blackfoot Creek, Outlet Creek, Ptarmigan Creek, Elk Creek and Moscow Creek.

The portion of the White River included in this survey is approximately 65 river kms and extends from its confluence with the Kootenay River to the confluence of Mayuik Creek and the Middle Fork White River. The study area was divided into two zones which correspond with special restrictions established in the freshwater fishing regulations for Region 4 (BC Regulations Synopsis). Zone 1 (harvest) extends from the Kootenay River to the North Fork confluence. Zone 2 (catch and release/fly fishing only) extends from the North Fork confluence to the headwaters of the Middle Fork.

Several forest service roads (FSRs) provide access into portions of the White River, although much of the lower river is limited to hike-in access only and a significant canyon limits access through a good portion of the river below the Elk Creek confluence. Below Whiteswan Lake Provincial Park, the east side of the river is accessed in several places by the White Rock FSR

and the Moscow Creek FSR provides limited access to the west of the lower White. Above Whiteswan Lake Provincial Park, the White River is accessed by the White River FSR, although the river is confined to steep canyon areas with high gradients making access difficult up to the Thunder Creek confluence. Above Thunder Creek, all 3 forks of the White River are accessible by the North Fork FSR, Middle Fork FSR and East Fork FSR.

Figure 40. Map of the White River study area.



13.2 Results

Due to the logistical constraints of covering such a vast study area as included in this survey, only four days were spent on the White River. Because the corresponding data is limited and the angler sample size is very small (n=10), only a brief text summary of the data will be given.

A total of 10 anglers were interviewed on the White River during the survey. They fished 18 hours and caught a total of 2 bull trout (BT) and 13 westslope cutthroat trout (WCT) for a CPUE of 0.83 fish per rod hour. Of the 15 fish caught, all were released (100% release rate). Of the 10 anglers, 9 were BC residents and 1 angler was from Alberta. All anglers were non-guided shore anglers (the White River is designated as a non-guided water), 8 used gear while 2 were fly anglers. Of the 10 anglers, 2 rated the quality of their angling experience as fair, 7 as good and 1 as excellent. The anglers listed surrounding scenery, number of other anglers seen, quality of fish caught, water conditions, and quantity of fish caught as the main factors for their responses. Angler crowding was not considered a significant issue by the 10 anglers interviewed, as 6 of the anglers rated the crowd level at (1) “not at all crowded” and 4 anglers rated the crowding at (2) “slightly crowded”.

14.0 WIGWAM RIVER

14.1 Study area

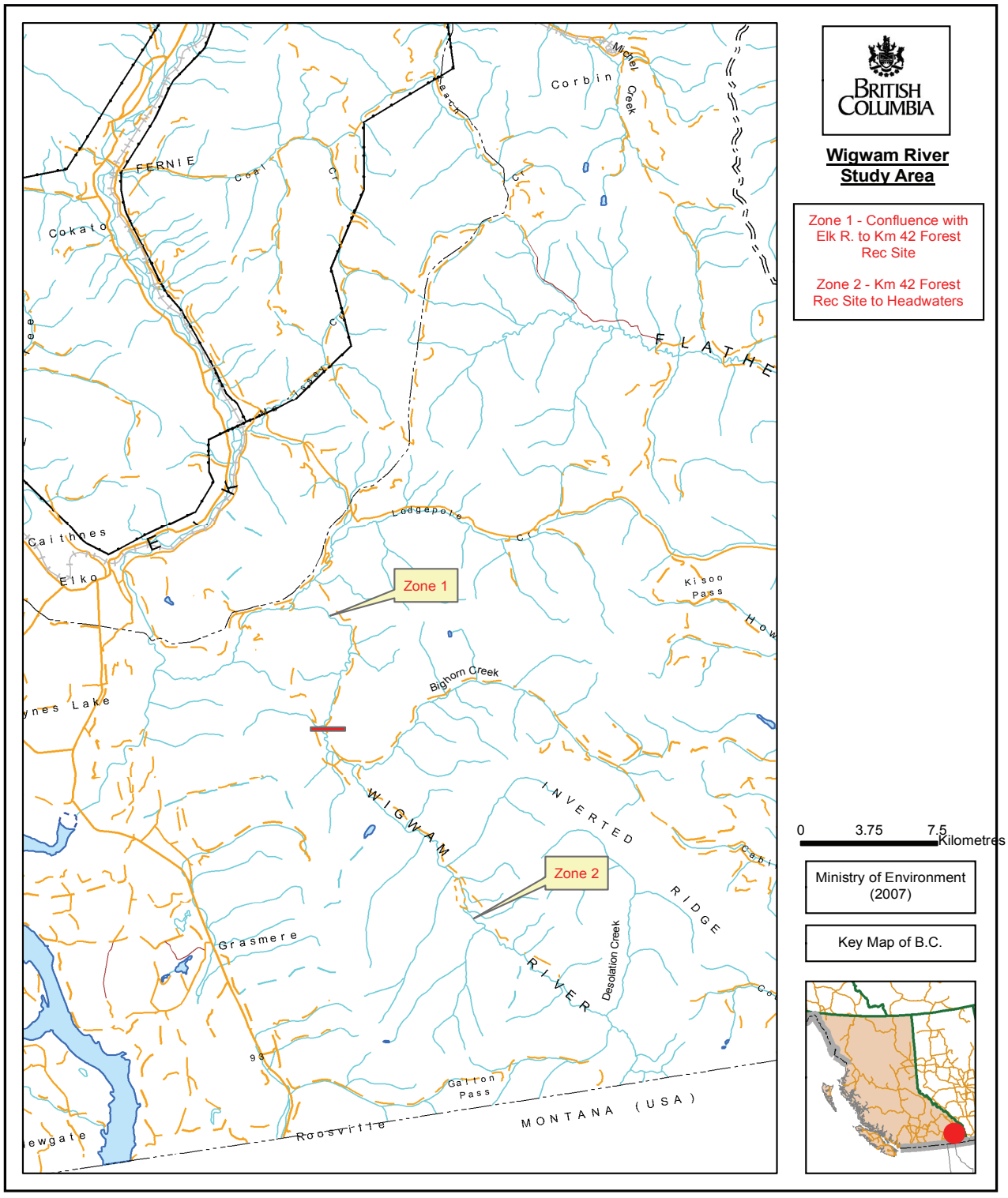
The Wigwam River originates in the Rocky Mountains within the state of Montana and flows approximately 57 km north/northwest between the Galton and Macdonald ranges in British Columbia to its confluence with the Elk River, approximately 10 km south of the town of Elko (Figure 41).

The drainage area of the Wigwam River is 835 km^2, with a mean annual discharge of 9.5m^3/s (Tembec Water Monitoring Station). It should be noted that the Wigwam hydrometric data station was positioned near the confluence of Bighorn Creek, well above Lodgepole Creek, its largest tributary, and that the mean annual discharge of the Wigwam River at or near its confluence would be significantly greater. Major tributaries to the Wigwam River include Weasel Creek, Rabbit Creek, Desolation Creek, Fenster Creek, Bighorn Creek and Lodgepole Creek.

The portion of the Wigwam river included in this survey is approximately 48 river kms and extends from its confluence with the Elk River to Desolation Creek. The study area was divided into two zones which correspond with special restrictions established in the freshwater fishing regulations for Region 4 (BC Regulations Synopsis). Zone 1 (catch and release/fly fishing only) extends from the Elk River to the forest recreation site at approximately 42 km on the Ram Creek FSR. Zone 2 (catch and release/fly fishing only/Sept 1-Oct 31 closure) extends from the forest recreation site at 42 km on the Ram Creek FSR to the headwaters of the Wigwam River.

Most of the Wigwam River is accessed only by hiking. Portions of the river below Lodgepole Creek, including its confluence, can be accessed by following several seasonal road closures. The Ram Creek FSR parallels the river above the Lodgepole Creek confluence, but the road is located far above the actual river and requires hiking down steep canyon terrain to reach the river. From 42 km on the Ram Creek FSR to the confluence of Bighorn Creek there are three vehicle access points. A rough secondary forest service road parallels the upper river from the Bighorn Creek confluence to Desolation Creek, but access off this road is primarily limited to hiking.

Figure 41. Map of the Wigwam River study area.



14.2 Results

14.2.1 Effort and Catch

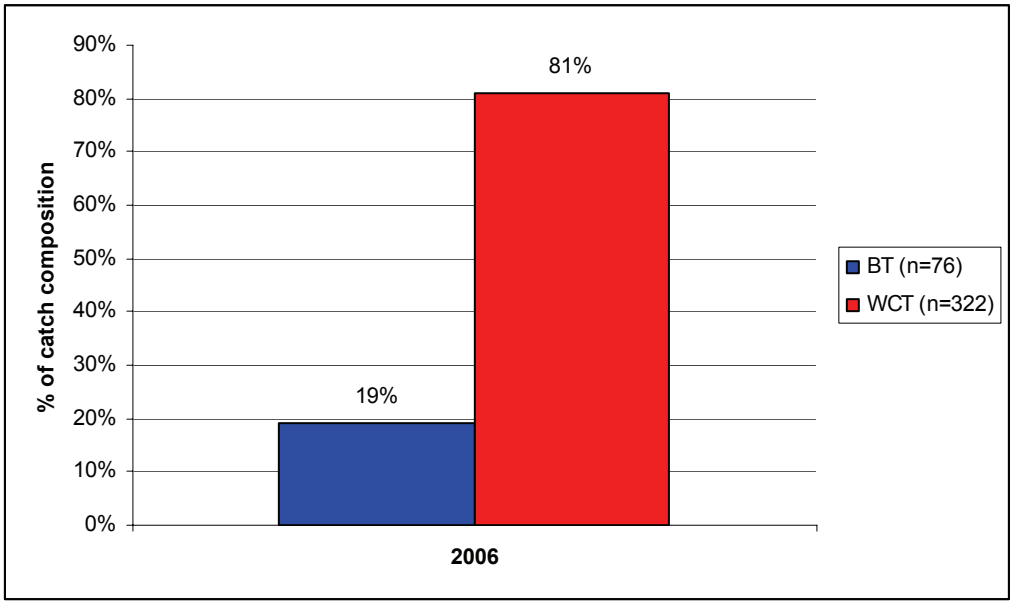
A total of 94 anglers were interviewed over 19 days on the Wigwam River during the survey. They fished for 350 hours and caught 322 westslope cutthroat trout (WCT) and 76 bull trout (BT), for an overall catch per unit effort (CPUE) of 1.14 fish per rod hour (Table 72).

Table 72. Total angler effort and catch success on the Wigwam River.

Angler Days	Hours Fished	BT	WCT	CPUE
94	350	76	322	1.14

Westslope cutthroat trout composed 81% of the catch during the Wigwam summer/fall fishery, with bull trout comprising 19% of the total catch, respectively (Figure 42).

Figure 42. Catch composition for the 2006 summer/fall Wigwam fishery.



The entire Wigwam River is designated "catch and release" in the BC freshwater fishing regulations. Of the 398 fish caught by anglers interviewed on the Wigwam River, all fish were released (100% release rate). Potential post-hooking mortality numbers for fish caught and released on the Wigwam River range from 1 to 15 fish (Table 73).

Table 73. Total number of fish released, harvested and post-hooking mortalities on the Wigwam River.

Catch and Release	Post-Hooking Mortality		Harvest
	0.5%	5%	
297	1	15	0

14.2.2 Guided vs. non-guided anglers

Of the 94 anglers interviewed on the Wigwam River, 8 were guided (9%) and 86 were non-guided (91%) (Table 74).

Table 74. Total angler days for guided and non-guided anglers on the Wigwam River.

Guided Angler Days	Non-Guided Angler Days	Total Angler Days
8	86	94

Guided anglers fished for 52 hours (15% of total hours fished), while non-guided anglers fished for 298 hours (85% of total hours fished) (Table 75).

Table 75. Total angler effort in hours for guided and non-guided anglers on the Wigwam River.

Guided Angler Hours	Non-Guided Angler Hours	Total Angler Hours
52	298	350

Guided anglers caught 52 fish, while non-guided anglers caught 346 (13% and 87% of the total catch, respectively). Catch per unit effort for guided anglers (CPUE) was 1.0 fish per rod hour, while the CPUE for non-guided anglers was 1.16 fish per rod hour (Table 76).

Table 76. Catch, effort and CPUE for guided vs. non-guided anglers on the Wigwam River.

Status	Angler Days	Angler Hours	Total Fish Caught	CPUE
Guided	8	52	52	1.0
Non-Guided	86	298	346	1.16
Total	94	350	398	1.14

14.2.3 Trip length

Overall, anglers interviewed on the Wigwam River spent an average of 6.1 hours fishing per day on the Wigwam River through the course of the survey (complete trip data only, n=27). Due to

the limitation in sample size for complete trip guided angler data (n=2), comparative trip length data between different angler classes is not summarized.

14.2.4 Angling methods

Of the 94 anglers interviewed on the Wigwam River, 91 were fly anglers (97%), while 3 used gear (3%) (Table 77). It should be noted that the Wigwam River is designated "fly fishing only" in the BC freshwater fishing regulations.

Table 77. Fishing methods by place of residence on the Wigwam River.

Place of Residence	Fly	Gear	Both
United States	42	0	0
British Columbia	29	3	0
Alberta	16	0	0
Other Canadians	4	0	0
Other Countries	0	0	0
Total	91	3	0

14.2.5 Angler residency

Of the 94 anglers interviewed on the Wigwam River, 52 were Canadian (55%) and 42 were American (45%). Canadian anglers were from British Columbia, Alberta, Ontario and Manitoba, while American anglers represented thirteen different states (Table 78).

Table 78. Place of residence for anglers fishing the Wigwam River.

Country of Residence	Total Anglers	%	Province/State	Number of Anglers	%
Canada	52	55%	British Columbia	32	34%
			Alberta	16	17%
			Ontario	3	3%
			Manitoba	1	1%
United States	42	45%	Montana	17	18%
			Arizona	3	3%
			Arkansas	3	3%
			California	3	3%
			Georgia	3	3%
			Massachusetts	3	3%
			Michigan	3	3%
			Texas	3	3%
			Washington	2	2%
			Maine	1	1%
			N. Carolina	1	1%
			Oklahoma	1	1%
			Pennsylvania	1	1%

14.2.6 Angling experience

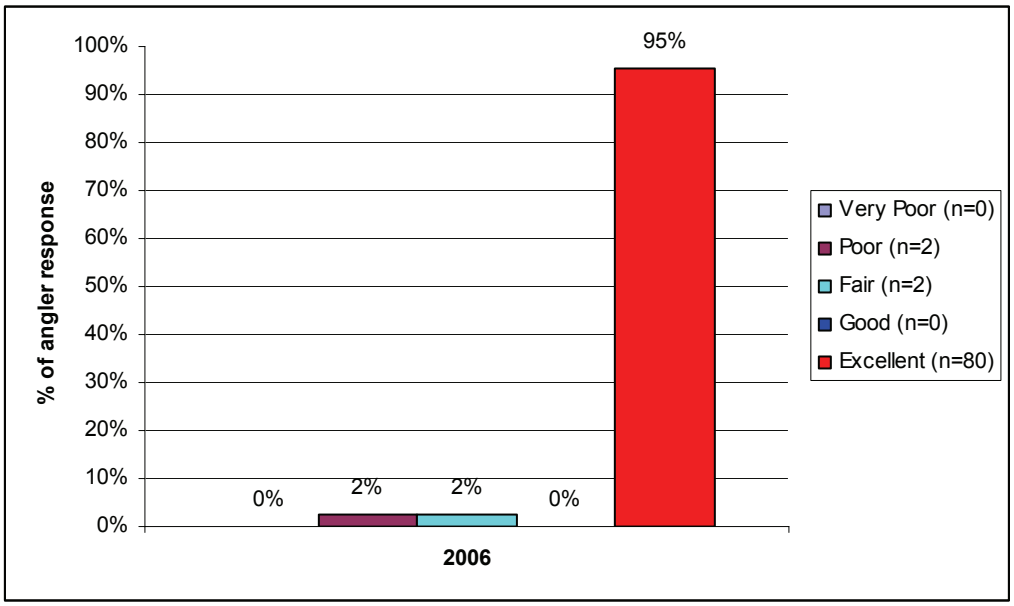
14.2.6.1 Quality of the angling experience

Of 94 anglers who were asked to rate their angling experience, 84 responded. A total of 2 anglers rated their experience as poor, 2 as fair and 80 as excellent (2.5%, 2.5% and 95%, respectively) (Table 79 & Figure 43).

Table 79. Quality of angling experience on the Wigwam River by residence.

Residence	Very Poor	Poor	Fair	Good	Excellent
B.C.	0	0	0	0	28
U.S.	0	0	2	0	37
Alberta	0	1	0	0	12
Other CDN.	0	1	0	0	3
Other	0	0	0	0	0
Total	0	2	2	0	80

Figure 43. Quality of angling experience response from anglers on the Wigwam River.



Anglers were also asked to list the top three factors which led to their quality of angling experience rating. There were a total of 248 responses categorized into this list. There were 71 responses pertaining to the surrounding scenery, 58 to the quality of fish caught, 46 related to water conditions, 33 to the quantity of fish caught, 19 which listed the number of other anglers as a factor (positive and negative), 11 pertained to the quality of water access, 7 responses were listed under "other" and 3 responses pertained to the number of boats on the water (Table 80).

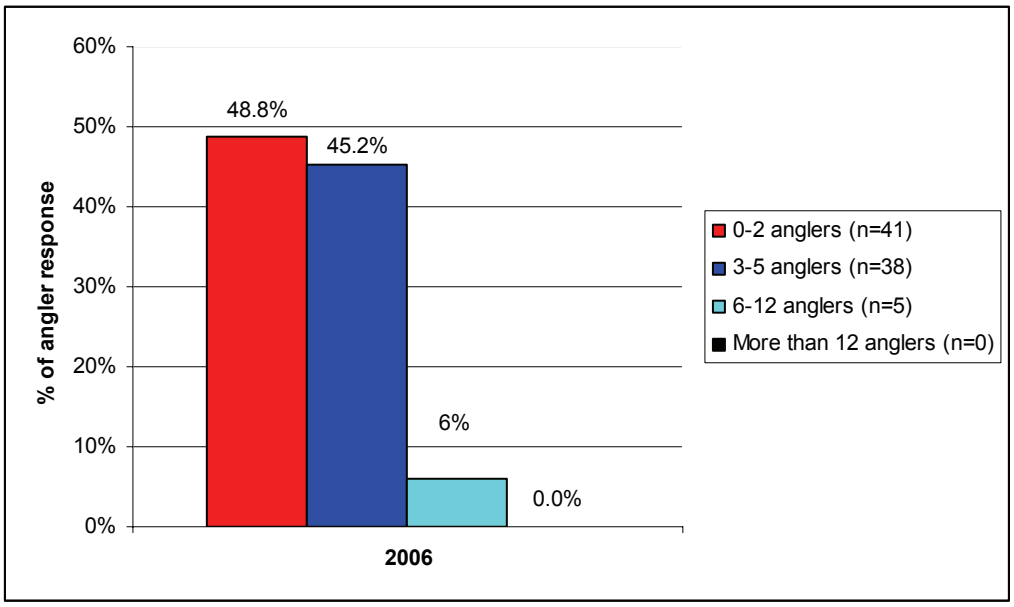
Table 80. Summary of factors contributing to the quality of angling experience for the Wigwam River.

Factor 1		Factor 2		Factor 3		Sum of Factors	
A	33	D	33	D	34	D (Surrounding scenery)	71
B	30	B	28	F	18	B (Quality of fish caught)	58
C	17	C	21	E	11	C (Water conditions)	46
D	4	F	1	C	8	A (Quantity of fish caught)	33
		H	1	H	6	F (Number of other anglers)	19
				G	3	E (Quality of access to water)	11
						H (Other)	7
						G (Number of boats on the water)	3

14.2.6.2 Other anglers seen

Of the 94 anglers interviewed on the Wigwam River, 84 anglers responded to the question of how many other anglers they saw on their trip. Of these anglers, 41 saw 0-2 other anglers, 38 saw 3-5 anglers, 5 saw 6-12 anglers and no anglers saw more than 12 other anglers on their trip (Figure 44).

Figure 44. Other anglers seen by anglers interviewed on the Wigwam River.



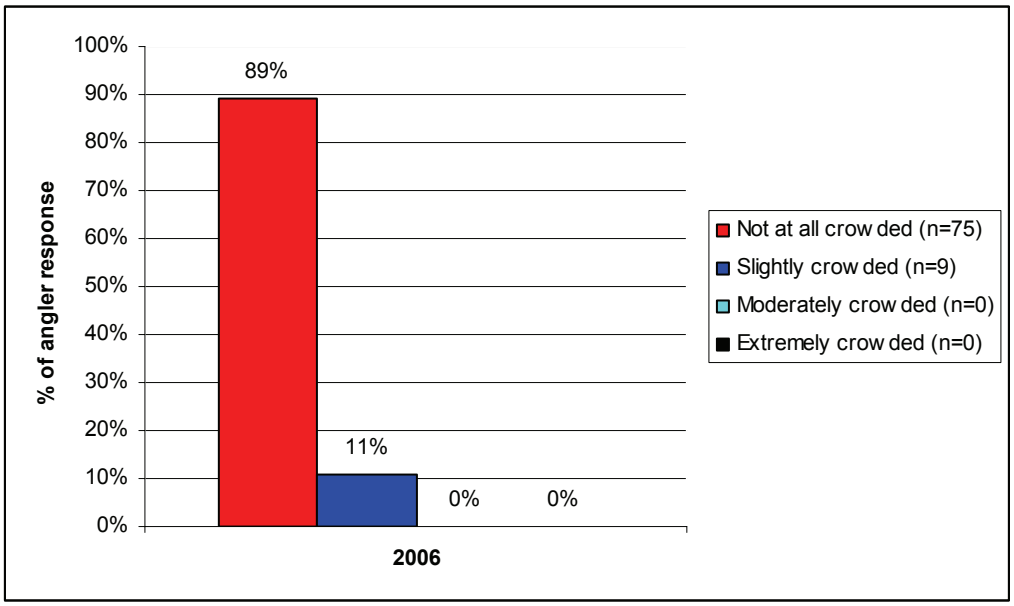
14.2.6.3 Crowding response

Of the 94 anglers interviewed on the Wigwam River, 84 anglers responded to the crowding questions. Overall, anglers did not feel that crowding was a significant issue (Figure 45). Of the 84 anglers, 75 rated the crowding level "not at all crowded" and 9 rated it as "slightly crowded" (Table 81).

Table 81. Summary of angler response related to crowding on the Wigwam River.

Crowding Description	Number of Anglers	Percent of Angler Response
Not at all Crowded	75	89%
Slightly Crowded	9	11%
Moderately Crowded	0	0%
Extremely Crowded	0	0%

Figure 45. Angler crowding rating on the Wigwam River.



15.0 DISCUSSION & RECOMMENDATIONS

In the past decade angler effort has dramatically increased on several major East Kootenay streams and has spread to include smaller, remote stream fisheries in the region. Guided and non-guided angler days and catch rates have increased, and there have been many documented concerns pertaining to overcrowding and the diminishing quality of the angling experience, particularly on the Elk, Wigwam and St. Mary Rivers. The implementation of the classified waters system in Region 4 and the preliminary and ongoing consultation process with many concerned stakeholders regarding this system is in response to these concerns.

From a fisheries conservation standpoint, there are concerns related to the sustainability and health of our sport fish populations over time, given increasing pressure. In addition, it is important to maintain the pristine qualities of EK streams, including the lack of crowding, which is documented to be a large part of the unique attractiveness of our stream fisheries. Regulatory regimes over the past decade have been increasingly restrictive and are largely responsible for the current health of sport fish populations. However, effects on fish populations associated with angling, including stress and post-hooking mortalities, are very roughly estimated and accurate population assessments have not been recently carried out on most regional streams.

While the introduction of the classified waters system and established rod days for various angler classes is a positive step in proactive management, it remains vital to establish indicator sections, where possible, on all quality streams in the East Kootenay Region, and to undertake population assessments as quickly as possible, with replicate counts carried out annually or semi-annually. These census swims are critical for fisheries managers to recognize and measure impacts that effort and catch trends may have on population sustainability. Due to the severe limitation of resources to undertake such a vast project, funding and staff allocation is needed. Several funding requests pertaining to assessments over the past two seasons have been denied. As such, there remains a need to secure funding in order to carry out this recommendation.

The presence of River Guardians has proven a significant benefit to fisheries management both in enforcement and public relations capacities in the East Kootenay Region. Compliance results from the 2006 River Guardian season demonstrate a need for increased vigilance in monitoring

classified waters. River Guardians provide a visible fisheries presence for compliance monitoring and assist in enforcement in cooperation with the Conservation Officer Service. In addition, with the implementation of the classified system, and increasing angler use trends, River Guardians provide a public relations liaison for Fisheries, and provide an educational source for anglers in the field. River Guardians also provide a fisheries management tool by conducting angler surveys. These surveys are a very effective method of collecting trend data for effort and catch, as well as many additional data which are helpful to monitoring regional fisheries. The continued presence of River Guardians is vitally important for proactive fisheries management of EK classified waters. Commitment to increase and secure annual funding allocations for the River Guardian Program provincially, and for this specific region, is needed.

The implementation of the classified waters system in Region 4 is still in its infancy and, as such, there are several concerns and inadequacies that can be found in the dissection of the system and its first season in this Region. It is critical that all stakeholders in this process remain committed to the long term plan of creating an effective angler management strategy and constructively contribute to this system in order to increase its effectiveness to the benefit of EK fisheries. Interestingly, a majority of B.C. residents contributed positive feedback and are happy with the system. Primarily, they feel it has begun to address crowding issues and should generate revenue for the region, which could increase stream management. There were significantly more B.C. resident anglers interviewed on the Classified systems and they responded more positively overall during the 2006 survey than in previous years.

As angler effort continues to increase in the region, it is paramount that fisheries managers are enabled to maintain accurate assessments of fish populations, accurate data pertaining to angler classes, effort and catch statistics and to maintain a River Guardian presence to assist in enforcement and compliance capacities. It is important that future funding allocations allow responsible fisheries management to occur, so that the legacy of EK streams will continue for future generations.

16.0 REFERENCES

B.C. Ministry of Environment. Quality Waters Strategy, Resource Document, 2005.

British Columbia Freshwater Fishing Regulations Synopsis, 2004/2005 and 2005/2006.

East Kootenay Angling Management Plan Committee. East Kootenay Angling Management Plan, B.C. Ministry of Environment, 2003.

Heidt, K.D. Elk River Creel Survey 2002, Quality Waters Strategy (River Guardian Program).

Heidt, K.D. St. Mary River Creel Survey 2003. Quality Waters Strategy (River Guardian Program).

Heidt, K.D. Survey on 7 East Kootenay Streams 2004. Quality Waters Strategy (River Guardian Program).

Mongillo, P.E. A Survey of Hooking Mortality. Washington Department of Game, Fish Man. Div., Seattle. 1984.

Personal Communication. Conservation Officer Service, Cranbrook, B.C. 2005.

Schill, D.J., and R.L. Scarpella. Barbed Hook Restrictions in Catch and Release Trout Fisheries: A Social Issue. North American Journal of Fisheries Management 17:873-881. 1997.

Taylor, J.T., and K.R. White. A Meta-Analysis of Hooking Mortality of Nonanadromous Trout. North American Journal of Fisheries Management 12:760-767. 1992.

Tembec Forest Industries Inc. Wigwam River Hydrometric Station (1999-2001).

Water Survey of Canada. Hydrometric Station Data: Bull River, Elk River, Michel Creek, Skookumchuck Creek, St. Mary River and White River.

Westover, W.T. Summer 1991 Creel Survey on the Elk River from Lladner Creek to Elko, Fisheries Project Report KO 49 (1993).

Wydoski, R.S. Relation of Hooking Mortality and Sublethal Hooking Stress to Quality Fishery Management. Pages 43-87 in R.A. Barnhart and T.D. Roelofs, editors. Catch and Release fishing as a Management Tool. 1977.

Appendix I. River Guardian Infraction Sheet – 2006

RIVER GUARDIAN INFRACTION SHEET

River Guardian:

Date: _____

Time: _____

Location **(Physical Description & Zone):** _____

Guardian Logbook Notes: _____

Infraction: NONE NONE

Infraction: NONE NONE

Infraction: NONE NONE

Subject Name: _____

Subject Address: _____

Freshwater Licence #: _____

Class II Licence #: _____

Drivers Licence #: _____

DOB: _____

Angler Form #: _____

Subject Phone #: _____

Additional Information: _____

Appendix II. Classified Waters Angler Survey Form – 2006

IF # _____

Interviewer _____ **Check Type** AM _____ PM _____

Date _____ (mm/dd) **Time** _____ (24 hr. clock) **Day Type** WEND _____ WDAY _____

System _____ **Location** _____ (See Location list for numbers)

Response _____ (**Y** – Yes **R** – Refused **NE** – Does not speak enough english)

Have you already been interviewed today?		(**Y** – Yes **N** – No)	(If Yes move on to catch data)

Guided _____ (**Y** – Yes **N** – No) **If yes by WHOM?** Name _____ Co. Name _____

Residency BC City CDN Province _____

US State Other Country _____

License Class 1 Day _____ 8 Day _____ Annual _____ Under 16 _____ Native _____

BC Disabled _____ Senior _____ No License _____

Classified License Annual _____ Multiple Days _____ Number _____ No License (*see above) _____

Did you use a fly or gear today? Fly ___ Gear ___ Both ___

How did you access the river today? Boat _____ Foot _____

When did you start fishing today? _____ **When did you finish fishing today?** _____

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

(Repeat Check) **How many hours have you fished since I last checked you?** _____

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

Angler #	**Species (eg. wct/bt/mw)**	**#Released**	**# Harvested**	**Comments**
Angler 1				
Angler 2				

In terms of the quality of the angling experience (1 being very poor and 5 being excellent), how would you rate this System, and what were the key factors that influenced your answer? (circle one – list top 3 factors – see field book for **environment and setting features**)

1 Very Poor 2 Poor 3 Fair 4 Good 5 Excellent 6 (Don't Read) Not Sure

1. _____ 2. _____

3. _____

About how many other anglers do you remember seeing on your fishing trip? (circle one #)

1.	0-2 Anglers	2.	3-5 Anglers	3.	6-12 Anglers	4.	More than 12 Anglers	5.	Not Sure/Can't Recall

Based on the total number of other anglers seen today, on a scale of 1 to 4 how crowded did you feel? (circle one # on the scale)

1 Not at all crowded 2 Slightly Crowded 3 Moderately Crowded 4 Extremely Crowded

---