River Guardian Compliance Monitoring and Angler Survey on East Kootenay Classified Waters - 2007 (River Guardian Program)

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EXECUTIVE SUMMARY

A compliance monitoring project and angler survey were conducted over a 102 day period by 2 River Guardians (RGs) on classified streams in the East Kootenay Region from July 3 to October 12, 2007. River Guardians were mandated to provide a fisheries presence for compliance monitoring, public relations and educational purposes. River Guardians worked in a limited enforcement capacity, issuing violation tickets and warnings for licence infractions and working with the Conservation Officer Service (COS) to deal with 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 670 anglers were checked by RGs during the 2007 summer/fall angling season. Of the total anglers checked, there were 92 anglers in non-compliance (14% of all interviews) and 132 angler infractions documented by RGs for an overall non-compliance rate of 20%. The percentage of infraction occurrence varied significantly by classified stream from a high of 49% on one system to 0% on another. River Guardians issued 27 tickets and 25 warnings to anglers for licence infractions.

Overall, anglers fished for a total of 2,370 hours, 84 were guided and 586 were non-guided. They caught 2,454 fish over the survey, including 2,297 westslope cutthroat trout (WCT), 112 bull trout (BT), 40 mountain whitefish (MW), 4 rainbow trout (RB) and 1 kokanee (KO) for a catch per unit effort (CPUE) of 1.04 overall. Only 16 fish were harvested among anglers interviewed during this survey for a release rate of 99.3%.

Of the 670 anglers, 414 were Canadian (61.8%), 241 were from the United States (36%), 13 anglers were from Europe (1.9%) and 2 anglers were from Asia (0.3%). British Columbian anglers account for 42.7% of all anglers, while anglers from Alberta, Washington, California and Texas round out the top five provinces/states with 15.4%, 5.2%, 4.5% and 3.3% of all anglers, respectively.

The 670 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 615 anglers responded to the question of angling experience, with 274 anglers rating the experience as excellent (45%), 272 as good (44%), 58 as fair (9.5%), 8 as poor (1%) and 3 as very poor (0.5%). A total of 613 anglers responded when asked the number of other anglers they had seen: 342 saw 0-2 other anglers, 156 saw 3-5 anglers, 107 saw 6-12 anglers and 8 saw more than 12 anglers on their trip. A total of 613 anglers responded to the crowding question, with 495 rating the level of crowding not at all crowded (80.7%), 84 as slightly crowded (13.7%), 25 as moderately crowded (4.1%) and 9 as extremely crowded (1.5%).

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 technical and logistical support and assistance with 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.

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1.0 INTRODUCTION

Seven streams systems were monitored during the 2007 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 3 to October 13, 2007 on six of the seven East Kootenay classified systems (no days were spent on the Upper Kootenay River). This survey was conducted by 2 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 2007 survey is the fourth year that all or most of the classified waters in the East Kootenay have been monitored.

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. However, after significant consultation, policy evaluation and amendments and provincial and regional review, 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 2007 summer angling season was the third angling season to see this system implemented in the East Kootenay 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 were 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.

One of the significant recent changes to the system is the implementation of electronic angling licences. Established on a trial basis in September, 2007, electronic licensing will be fully functional by the 2008 angling season and is expected to be the only venue for licence purchases by the 2009 angling season.

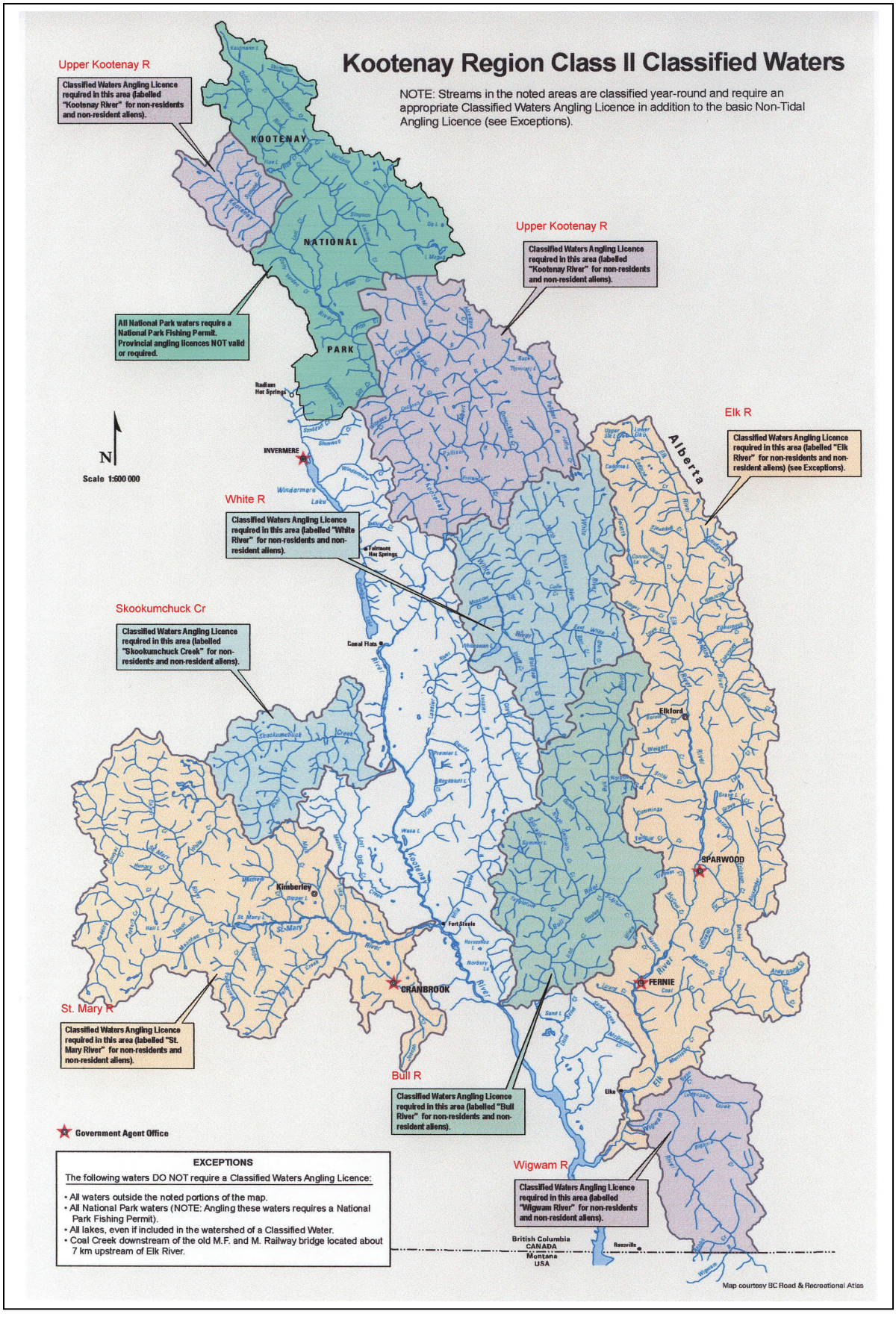
3.0 STUDY AREA

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 were conducted over a 102 day period from July 3 to October 13, 2007. There were a total of 115 man days sampled during this period. The project included six of the seven classified stream systems (0 days were spent on the Upper Kootenay River). A significant portion of the River Guardian effort was focused on the Elk and St. Mary Rivers (24.4% and 20.9% of interview days, respectively) due to these systems high angler use as shown in previous angler surveys (Heidt 2002, 2003); however, compared to previous surveys (Heidt 2005, 2006) this percentage was reduced from 68% and 55% of the total River Guardian effort in 2005 and 2006, to 45.3% in 2007, enabling RGs to spend more time on the other classified systems. The Bull River, Wigwam River, Michel Creek, White River and Skookumchuck Creek were patrolled at approximately 13%, 12.2%, 10.4%, 10.4% and 8.7%, 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 two 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 8 days to float sections of the St. Mary, Elk, Bull, 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 2 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 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 flowing 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 85% 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 vs. non-guided angler data in this survey are taken primarily from Elk River interviews (56 guided angler days). There were four other streams (Michel Creek, St. Mary River, Wigwam River and Bull River) which accounted for an additional 28 guided angler days (13, 8, 5 and 2 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 Elk River interviews (107 boat angler days). Only two other streams (St. Mary and Bull Rivers) accounted for any boat angler effort (23 and 6 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.

4.5 Data analysis

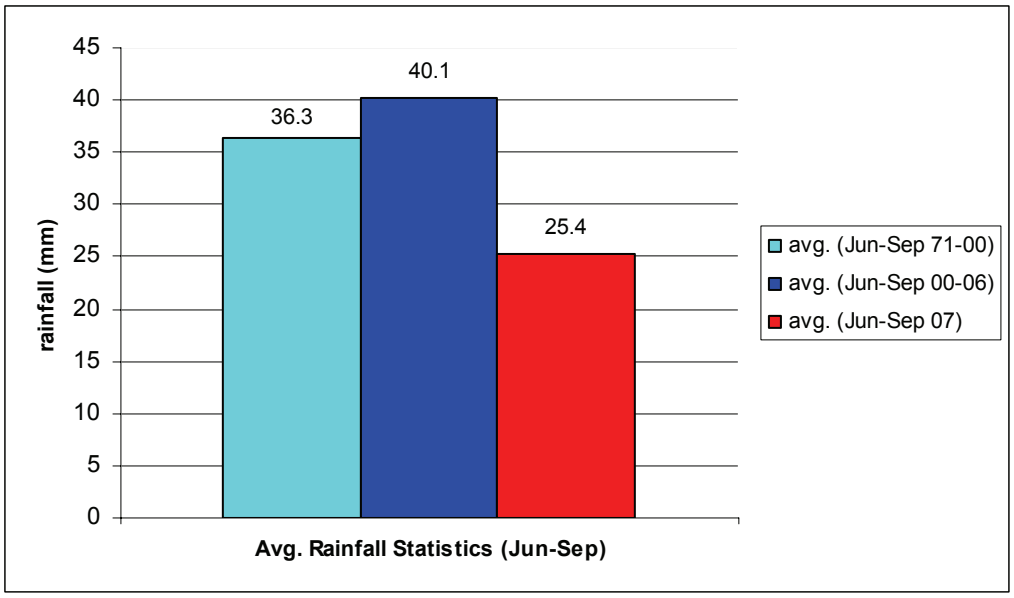
Non-compliance data and angler survey data were entered into a database created using Microsoft Access 2002 and several queries were subsequently generated to produce the survey results presented in this report. Regional rainfall statistics were imported from Environment Canada's climate data website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

5.0 ELEMENTS INFLUENCING RESULTS

5.1 Weather

The period of this study (July-Oct) in the East Kootenay Region was extremely dry and hot. While warm, arid periods are typical for summer and early fall in the region, conditions during the 2007 season were beyond average documented norms (Environment Canada) (Figure 2). Extreme daytime temperatures and extremely dry conditions may have contributed to a decline in angler pressure on some systems during mid-day periods, and potentially shifted angler pressure to later time periods (River Guardians, pers. comm.). While this may not have been a significant factor influencing overall angler effort results, it may be a factor when analyzing average trip lengths and other specific angler data analyzed in this report (ie. anglers contacted during am time periods).

Figure 2. Rainfall statistics comparison for the East Kootenay Region (1971-2007)



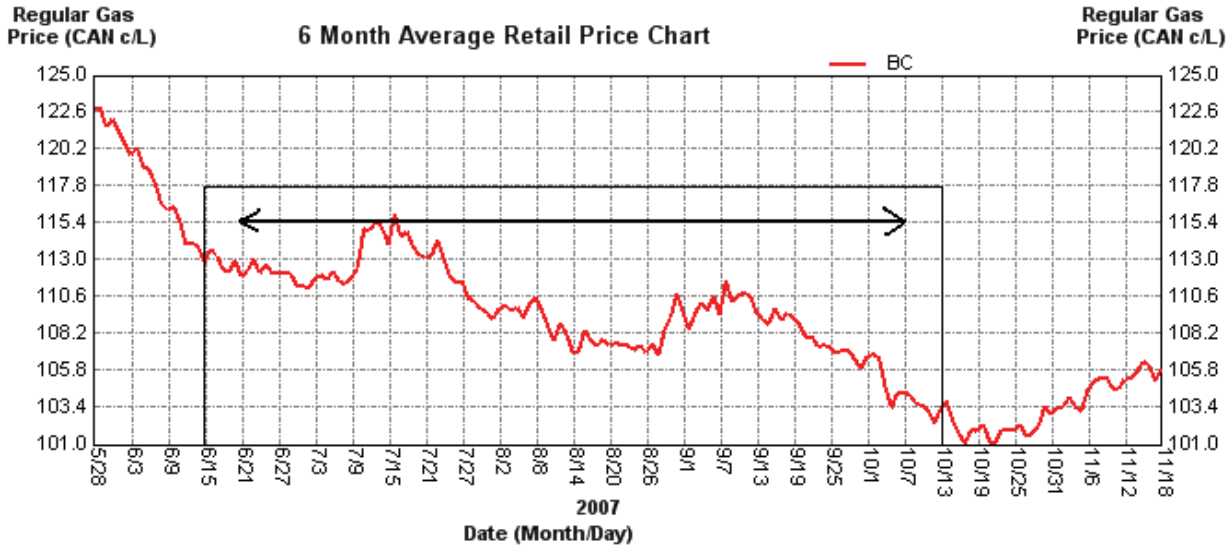
Another weather related factor that should be considered occurred in the province of Alberta, Montana, Idaho and several additional states. Sustained hot and dry weather resulted in extreme backcountry fire conditions and several serious wildfires. These factors eventually led to the complete closure of wilderness areas during most of August and part of September. Anglers were not permitted to fish most of the major stream systems in these areas. Given the proximity of these states and province to the East Kootenay Region and the angling opportunities available

in the EK, these factors may have contributed to an increase in non-resident anglers during late summer-early fall.

5.2 Gas prices

Several elements have influenced global oil prices over the past two years, resulting in escalating gas prices for consumers at the pump. Consumer gas prices at the pump averaged well over a dollar per litre during the 2007 study period and made travel extremely expensive (BCGasPrices.com) (Figure 3). This factor may have been a 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 3. Consumer gas prices at the pump in British Columbia (Jun - Oct, 2007).

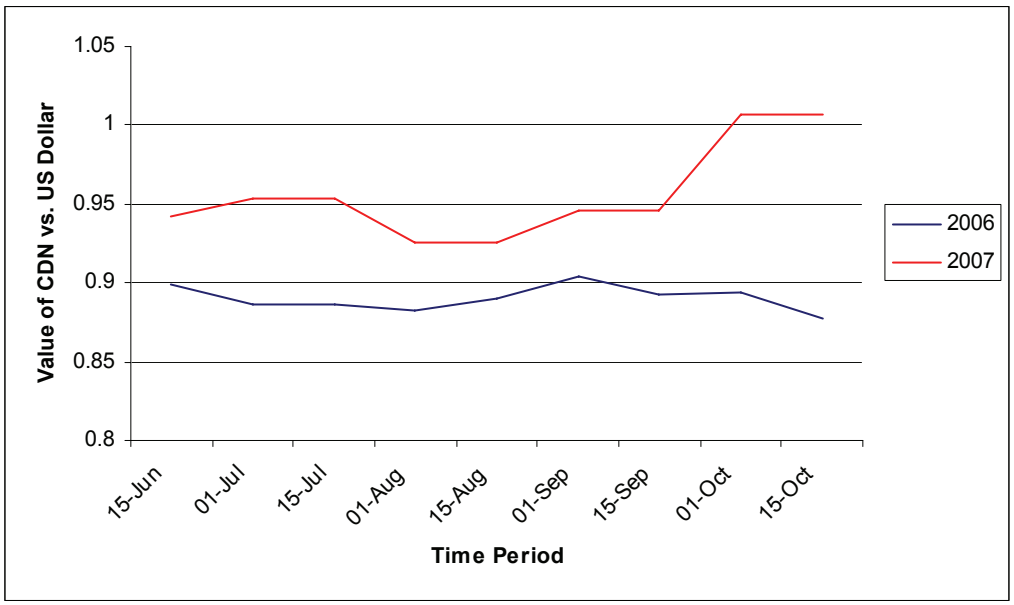


5.3 Value of Canadian currency

Another situation to be considered during the 2007 survey was the increase of the Canadian Dollar compared to U.S. currency. Although the Canadian dollar did not see dramatic increases until the end of the survey, there was a significant comparative increase for the same study period (June - Oct) between 2006 and 2007. Over the course of the 2006 study period (June 15-Oct 15) the Canadian dollar averaged approximately 0.89 cents to the U.S. dollar. During the same period in 2007, the Canadian dollar averaged approximately 0.96 cents to the U.S. dollar, an increase of 7 cents per dollar (Bank of Canada) (Figure 4). This increase is significant when

considering average consumer prices in Canada are significantly higher than in the United States. The increase in Canadian currency may have been a limiting factor to anglers from the United States (a demographic which contributes significantly to overall angler effort in the region) considering travelling to the region.

Figure 4. Comparison of Canadian vs. U.S. Dollar over 2006 and 2007 survey periods.



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, some non-resident anglers remain frusterated 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 non-resident Canadian 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 2007 angler survey show Albertan angler numbers remain consistent with 2006 results, slightly reduced when compared to previous reports (Heidt 2004, 2005). While trend data alone 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) 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 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 2007 summer/fall fishery on Region 4 classified waters, there were 2 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 and 2007 surveys, indicates 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.

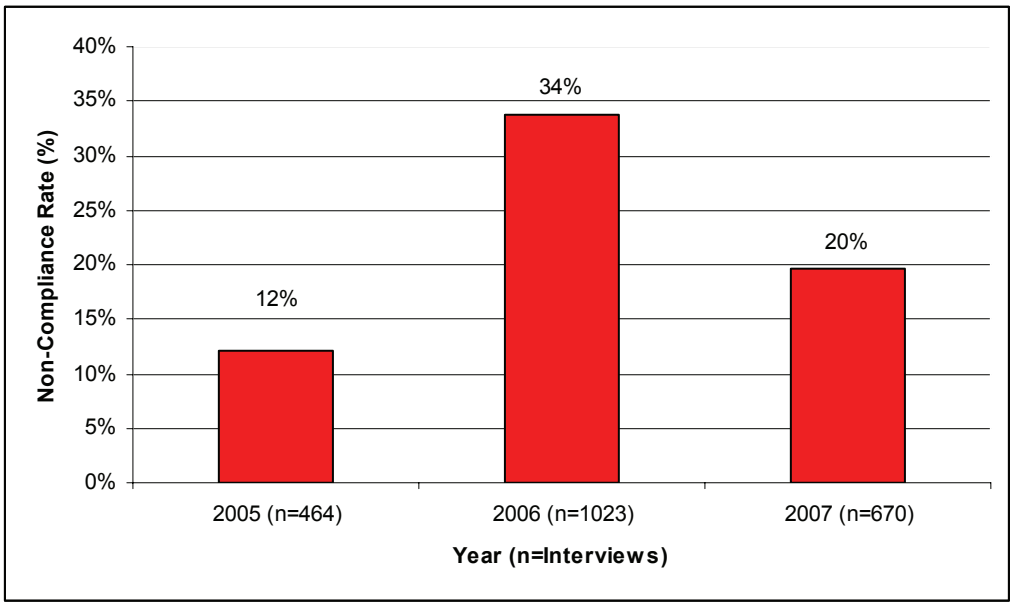
Among other concerning statistics, non-compliance results from 2006 indicated an extremely high level of angling licence related infractions. In reaction to this problem, a decision was reached by the fisheries program in the East Kootenay Region to request further delegation of authority for River Guardians to deal with licence infractions in the field. As a result, the River Guardian Program in the region created a new compliance and procedures policy and amended its mandate to include a more direct enforcement role. By the end of July 2007, River Guardians had received the appropriate delegation of authority and began issuing tickets for angling licence infractions in the field.

6.2 Results

During the 2007 angler survey, River Guardians encountered 92 anglers in non-compliance (14% of all anglers interviewed) and 132 infractions (infraction occurrence/non-compliance rate of 20%) among 670 anglers checked on seven classified streams in Region 4 (Figure 5). 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 remains a concern (COS. pers. comm.). While non-compliance results were lower than in 2006, it should be noted that the lower non-compliance rate may have been a result of the reduction from 3 RGs in 2006 to 2 RGs in 2007, thus reducing the frequency per area RGs could patrol and the anglers interviewed from 1,023 to 670.

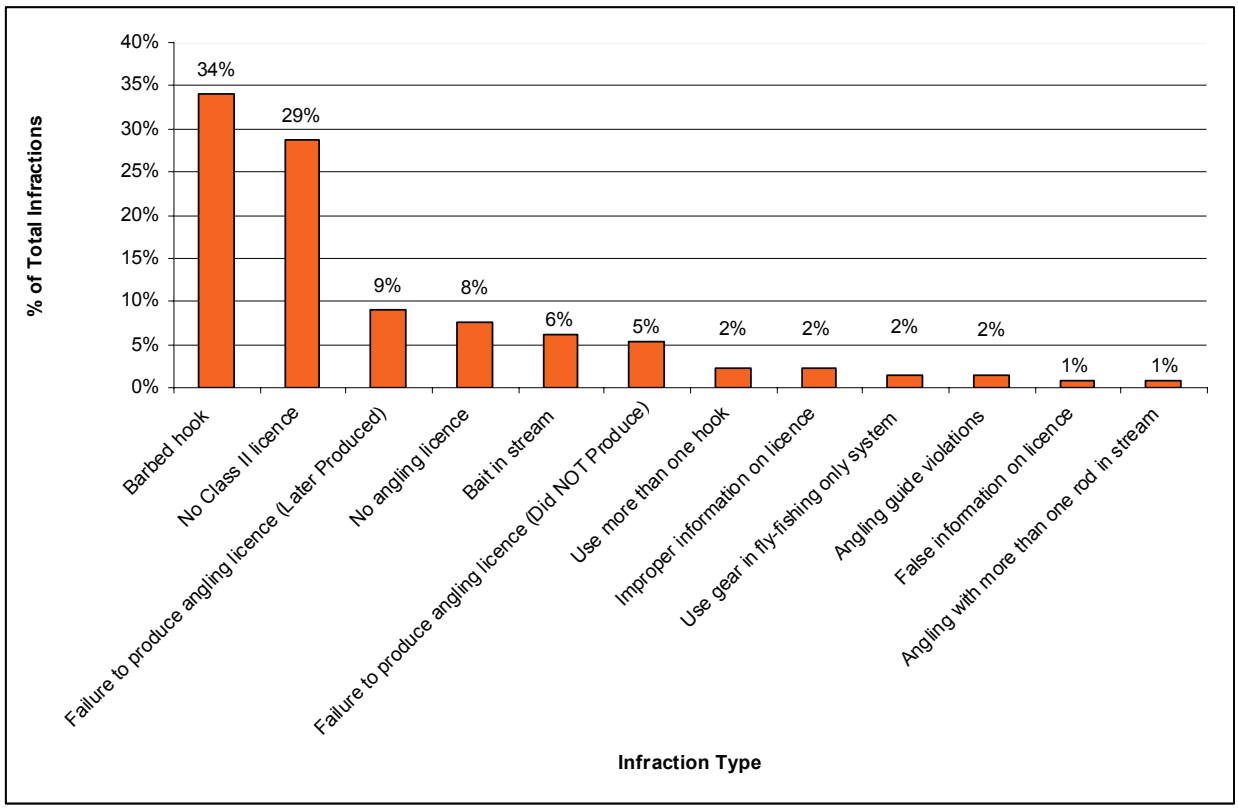
Figure 5. River Guardian non-compliance results (%) (2005 - 2007)



While primary concerns raised by high non-compliance rates obviously pertain to fish stock sustainability and resource protection, 2007 non-compliance results also reflect dramatically on the potential loss of revenue to the province through licence sales and a disregard for licence requirements among anglers fishing in this region. Analysis of the non-compliance data shows licence infractions composed 45% of all infractions in 2007 (Figure 6). Total licence infractions are a combination of "No Class II licence", "No angling licence", "Failure to produce angling licence (did not produce)", "Improper information on licence" and "False information of licence". Anglers who "Failed to produce", but later produced a valid licence for inspection composed 9% of all infractions, but are not included in the 45% licence non-compliance percentage.

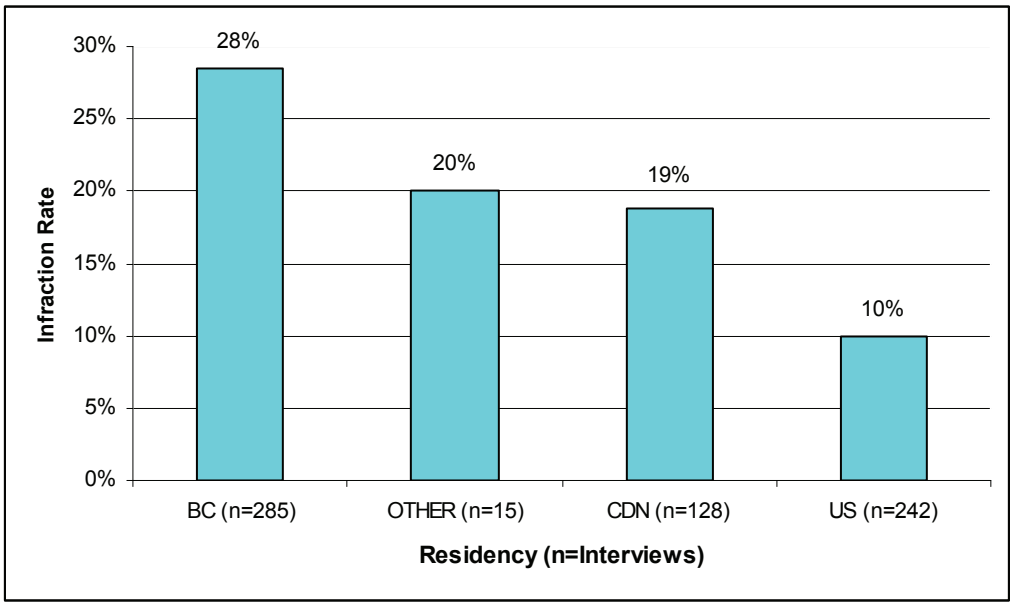
From the end of July to Oct 13, 2007, River Guardians issue 27 violation tickets and 25 warnings to anglers for licence infractions. It should be noted that some of the tickets issued were for both a "No Class II licence" infraction and a "No angling licence" infraction.

Figure 6. Angler infractions by type on East Kootenay Class II waters in 2007



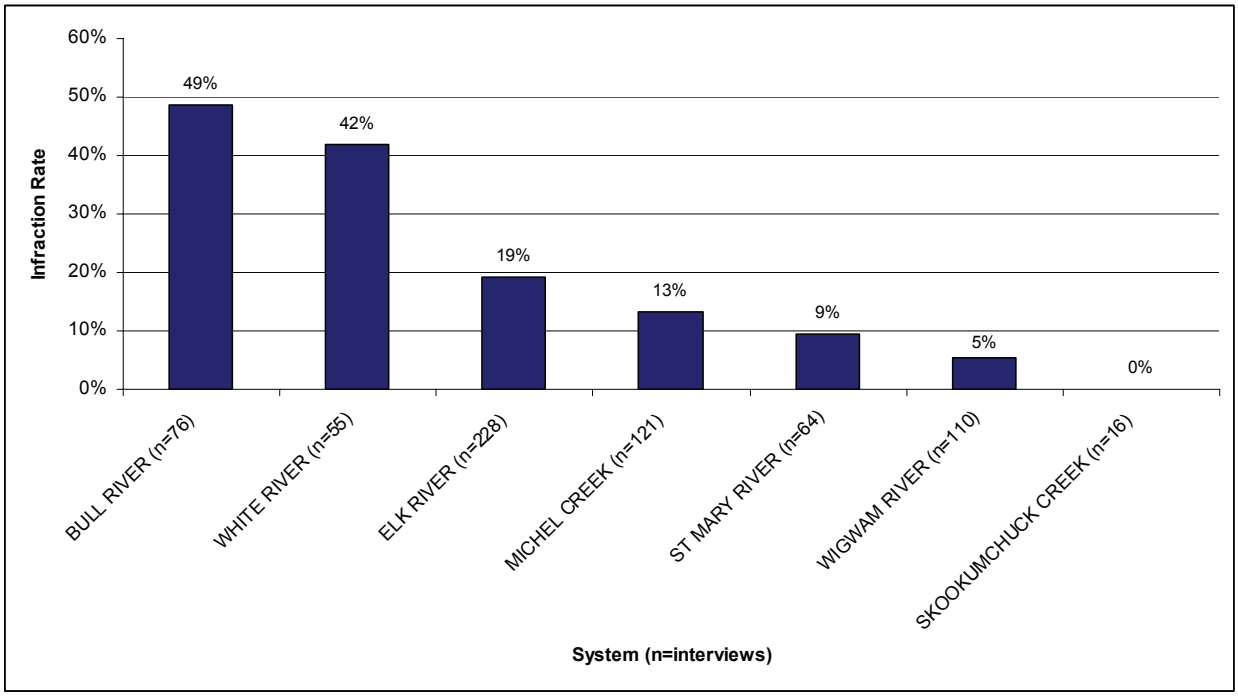
Of the 132 infractions documented by RGs during the 2007 season, BC resident anglers had the highest infraction rate (28%), while anglers from the United States had the lowest infraction rate (10%) on East Kootenay Classified waters (Figure 7).

Figure 7. Angler infraction rate by residency on East Kootenay Class II waters (2007)



Non-compliance rates varied significantly between EK classified waters (Figure 8). Of the seven classified systems patrolled in 2007, the Bull River had the highest infraction rate (49%), while Skookumchuck Creek had the lowest (0%). It should be noted that total angler interviews on the Skookumchuck were very low (n=16) and likely influence infraction totals. Another issue to be considered in water specific infraction rates applies to the Bull River. The Bull River is divided by a BC hydro dam which creates upper and lower sections with two distinct fisheries. 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 (RG compliance statistics, 2005-2007). As such, infraction results from the Bull River should be interpreted accordingly.

Figure 8. Angler infraction rate by system on the EK Classified waters in 2007



7.0 ANGLER SURVEY RESULTS SUMMARY (non-extrapolated)

7.1 Effort and catch

A total of 670 anglers were interviewed during the survey from July 3 to October 12, 2007. They angled for 2,370 hours on seven streams and caught 2,454 fish: 112 bull trout (BT), 1 kokanee (KO), 40 mountain whitefish (MW), 4 rainbow trout (RB) and 2,297 westslope cutthroat trout (WCT), for an overall catch per unit effort (CPUE) of 1.04 fish per rod hour (Table 2).

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

Angler Days	Hours Fished	BT	KO	MW	RB	WCT	CPUE
670	2,370	112	1	40	4	2,297	1.04

Of the 2,454 fish caught on all seven streams during this survey, 16 fish were harvested while 2,438 fish were released (99.3% 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	112	4.6%	110	2	98.2%
KO	1	0.04%	0	1	100%
MW	40	1.6%	31	9	77.5%
RB	4	0.16%	3	1	75%
WCT	2,297	93.6%	2,294	3	99.8%
Total	2,454	n/a	2,438	16	99.3%

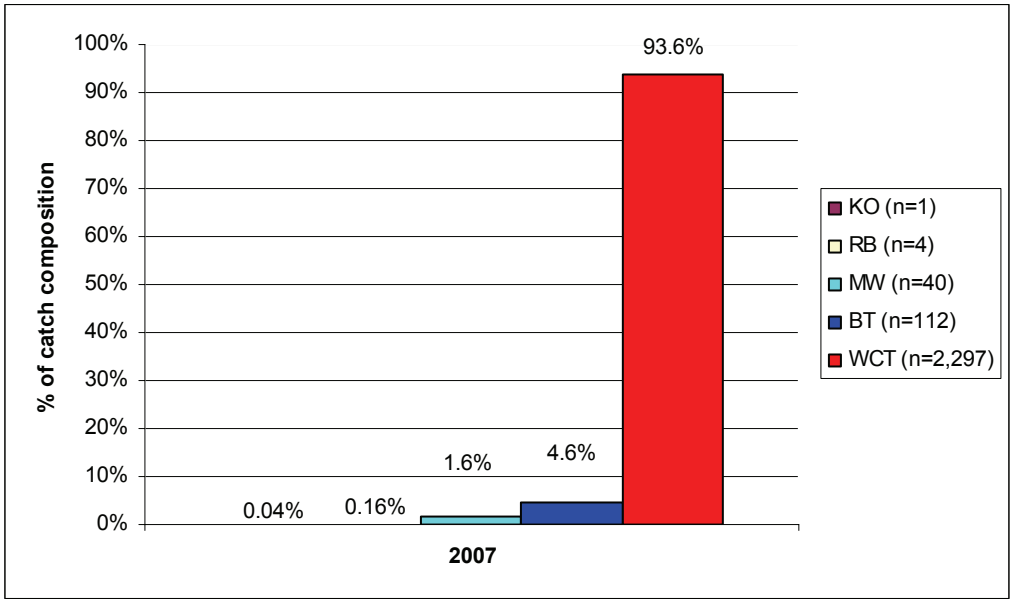
Potential post-hooking mortality numbers for all fish caught and released on the seven classified systems range from 18 to 182 fish (Table 4).

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%	
2,438	12	122	16

Westslope cutthroat trout composed 93.6% of the catch in the summer/fall fishery, with bull trout, mountain whitefish, rainbow trout and kokanee comprising 4.6%, 1.6%, 0.16% and 0.04% of the total catch, respectively (Figure 9).

Figure 9. Catch composition for the 2007 Class II summer/fall fisheries.



7.2 Guided vs. non-guided anglers

Of the 670 anglers interviewed during this survey, 84 were guided (13%) and 586 were non-guided (87%). 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	
23	61	513	73	670

Guided anglers fished for 300 hours (13% of total hours fished), while non-guided anglers fished for 2,070 hours (87% of total hours fished). More guided anglers fished from a boat than from shore (59% of all guided hours), while a majority of non-guided anglers fished from shore (83% 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	
123	177	1,709	361	2,370

Guided anglers caught 340 fish, while non-guided anglers caught 2,114 (14% and 86% of the total catch, respectively). Catch per unit effort (CPUE) was slightly higher overall for guided anglers at 1.13 fish per rod hour, while the CPUE for non-guided anglers was 1.02 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	84	300	340	1.13
Non-Guided	586	2,070	2,114	1.02
Total	670	2,370	2,454	1.04

Of the 84 guided anglers interviewed, 67 were from the United States, 15 were from Canada (10 from Alberta, 2 from B.C. and 3 from Ontario) and 2 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	241	67	28%	10%
Alberta	112	10	89%	1.5%
British Columbia	286	2	1%	0.3%
Other Cdns.	16	3	19%	0.4%
Europe	13	2	15%	0.3%
Asia	2	0	0%	0%
Total	670	84		13%

7.3 Boat vs. shore anglers

Boat angler days comprised 134 of the 670 angler days (20%), while shore angler days accounted for 536 of the total angler days (80%). Anglers fished from a boat for 538 hours (23%), while shore anglers fished for 1,832 hours (77%). The CPUE for boat and shore anglers was comparible at 1.04 and 1.03 fish per rod hour, respectively (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	134	538	558	1.04
Shore Anglers	536	1,832	1,896	1.03
Total	670	2,370	2,454	1.04

7.4 Trip length

Overall, anglers spent an average of 5.85 hours fishing per day through the course of the survey. Boat anglers spent an average of 7.81 hours fishing per day, while shore anglers averaged 5.27 hours per day. Guided boat anglers fished for an average of 7.26 hours per day, while non-guided boat anglers averaged 8.14 hours per trip. Guided shore anglers fished for an average of 7.42 hours per trip, while non-guided shore anglers averaged 5.19 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 = 223)	Boat Anglers (n = 51)	Shore Anglers (n = 172)	Guided Anglers		Non-Guided Anglers	
			Boat (n = 19)	Shore (n = 6)	Boat (n = 32)	Shore (n = 166)
5.85	7.81	5.27	7.26	7.42	8.14	5.19

7.5 Angling methods

There were significantly more fly anglers than gear anglers interviewed during the period of this study. Of the 670 total angler interviews, 568 were fly anglers (85%), 91 were gear anglers (13%) and 11 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	200	79	7
United States	238	1	2
Alberta	103	7	2
Other Canadians	14	2	0
Other Countries	13	2	0
Total	568	91	11

Of the guided anglers interviewed during this study, 99% were fly anglers and 1% used gear, while 83% of the non-guided anglers interviewed were fly anglers, 15% 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 81% of shore anglers were fly anglers, 17% 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	83	1	0
Non-Guided Angler	485	90	11
Boat Angler	131	1	2
Shore Angler	437	90	9

7.6 Angler residency

Of the 670 total anglers interviewed, 62% were Canadian, 36% were American and 2% were from Europe, Asia and Australia/Oceania. Canadian anglers were from British Columbia, Alberta, Ontario, Saskatchewan, Quebec and Manitoba (42%, 17%, 1.5%, <1%, <1% and <1% of all anglers, respectively). The U.S. states most heavily represented by American anglers were Washington, California, Texas, Montana, Idaho, Oregon, Utah and Pennsylvania (5%, 4%, 3%, 3%, 3%, 2%, 2% and 2% of all anglers, respectively), with 23 additional states represented (Table 13). There were 5 European countries, 1 Asian country and 1 country in Australia/Oceania represented by anglers during the 2007 survey.

Table 13. Place of residence for anglers fishing all streams included in the 2007 survey.

Country of Residence	Total Anglers	%	Province/State	Number of Anglers	%
Canada	414	62%	British Columbia	286	42%
			Alberta	112	17%
			Ontario	10	1.5%
			Manitoba	1	<1%
			Saskatchewan	3	<1%
			Quebec	2	<1%
United States	241	36%	Washington	35	5%
			California	30	4%
			Texas	22	3%
			Montana	21	3%
			Idaho	18	3%
			Oregon	14	2%
			Utah	12	2%
			Pennsylvania	11	2%
			New York	8	1%
			Massachusetts	7	1%
			Minnesota	6	1%
			South Dakota	6	1%
			Virginia	6	1%
			Hawaii	3	<1%
			Illinois	3	<1%
			Maine	3	<1%
			Michigan	3	<1%
			Ohio	3	<1%
			Connecticut	2	<1%
			Florida	2	<1%
			Iowa	2	<1%
			New Hampshire	2	<1%
			New Jersey	2	<1%
			North Carolina	2	<1%
			North Dakota	2	<1%
			Alabama	1	<1%
			Georgia	1	<1%
			Maryland	1	<1%
			Nevada	1	<1%
			South Carolina	1	<1%
			Wisconsin	1	<1%
Europe	13	2%	Germany	3	<1%
			Italy	3	<1%
			Netherlands	3	<1%
			England	2	<1%
			France	2	<1%
Asia	2	<1%	Japan	1	<1%
Australia/Oceania	1	<1%	New Zealand	1	<1%

7.7 Angling experience

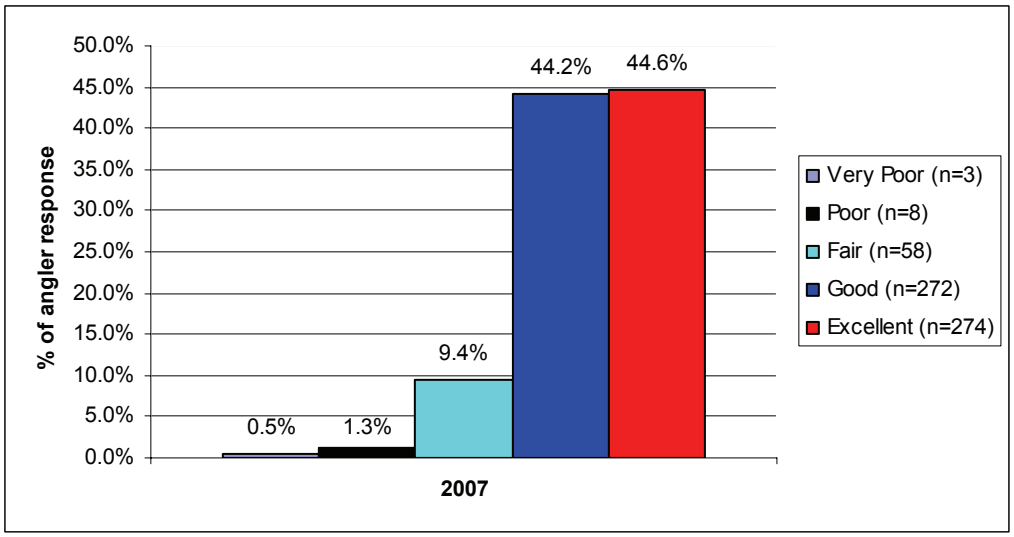
7.7.1 Quality of the angling experience

Of the 670 anglers who were asked to rate their quality of angling experience, 615 responded. A total of 3 anglers rated their experience as very poor, 8 as poor, 58 as fair, 272 as good and 274 as excellent. (0.5%, 1.3%, 9.4%, 44.2% and 44.6%, 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.	2	6	33	123	97
U.S.	1	0	13	91	118
Alberta	0	2	9	50	41
Other CDN.	0	0	3	7	6
Other	0	0	0	1	12
Total	3	8	58	272	274

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 1,677 responses categorized into this list. There were 441 responses relating to scenery and the pristine qualities of the area, 402 responses pertaining to the quality of fish caught, 351 listed water conditions, 182 listed the number of other anglers as a factor (positive and negative), 182 pertained to the quantity of fish caught, 96 responses pertained to the quality of access to the water, 14 responses were "other", which often included comments on

the classification system, and 6 responses pertained to the number of boats seen (many anglers included this comment under "other anglers seen") (Table 15).

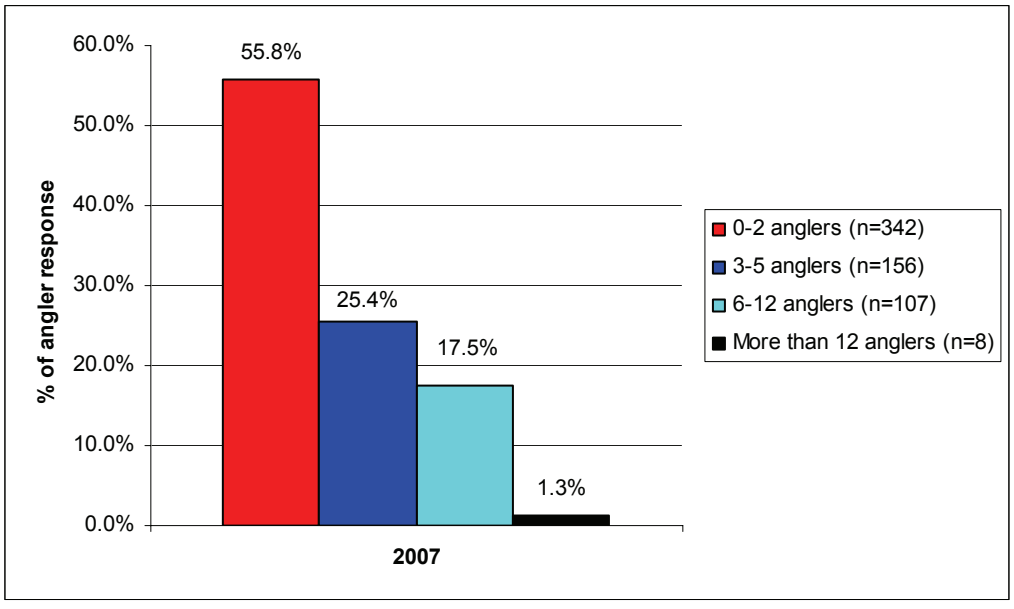
Table 15. Summary of factors contributing to the quality of angling experience.

Factor 1		Factor 2		Factor 3		Sum of Factors	
B	257	C	201	D	236	D (Surrounding scenery)	441
A	178	D	175	F	171	B (Quality of fish caught)	402
C	95	B	143	E	72	C (Water conditions)	351
D	30	E	24	C	55	F (Number of other anglers)	185
H	1	F	14	H	13	A (Quantity of fish caught)	182
		G	2	A	4	E (Quality of access to water)	96
				G	4	H (Other)	14
				B	2	G (Number of boats on water)	6

7.7.2 Other anglers seen

Of the 670 anglers interviewed in this survey, 613 anglers responded to the question of how many other anglers they saw on their trip. Of these anglers, 342 saw 0-2 other anglers, 156 saw 3-5 anglers, 107 saw 6-12 anglers and 8 saw more than 12 anglers on their trip (Figure 11).

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



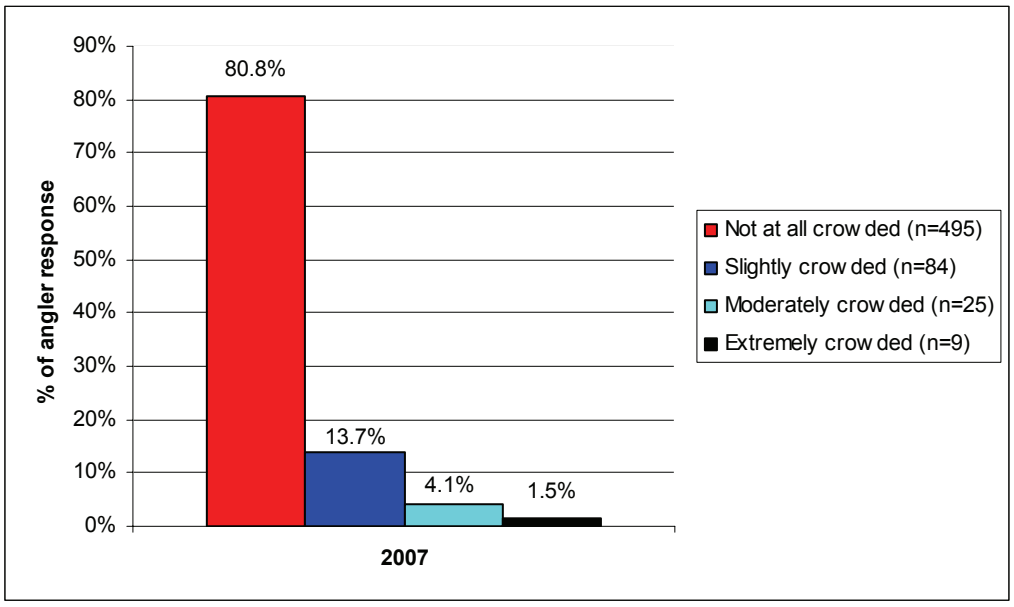
7.7.3 Crowding response

Of the 670 anglers, 613 anglers responded to the crowding questions. Overall, anglers did not feel that crowding was a significant issue (Figure 12). Of the 670 anglers, 495 rated the crowding level "not at all crowded", 84 rated it as "slightly crowded", 25 rated it as "moderately crowded", and 9 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	495	80.8%
Slightly Crowded	84	13.7%
Moderately Crowded	25	4.1%
Extremely Crowded	9	1.5%

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



8.0 BULL RIVER

8.1 Study area

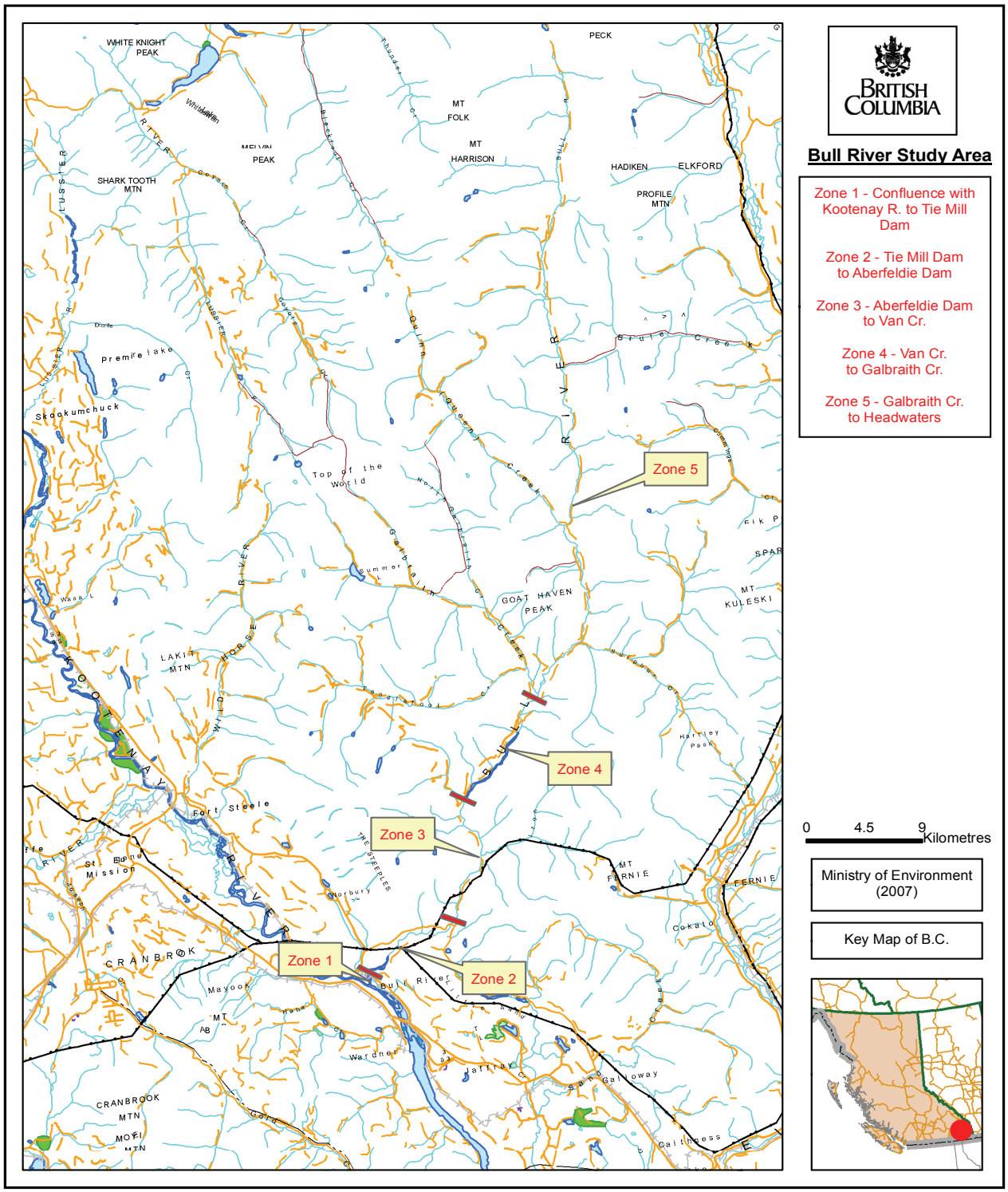
The Bull River originates within the Park and Front Ranges of the Southern Rocky Mountains, northwest of Fernie, B.C. From its headwaters, the stream flows east for approximately 8.5 km, at which point it flows south/southwest, continuing for approximately 81 km to its confluence with the Kootenay River (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 76 anglers were interviewed over 15 days on the Bull River during the survey. They fished for 163 hours and caught 16 bull trout, 1 kokanee, 6 mountain whitefish and 132 westslope cutthroat trout, for an overall catch per unit effort of 1.0 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	WCT	CPUE
76	163	16	1	6	132	1.0

Of the 155 fish caught by anglers interviewed on the Bull River, 2 fish were harvested while 153 fish were released (98.7% release rate) (Table 18).

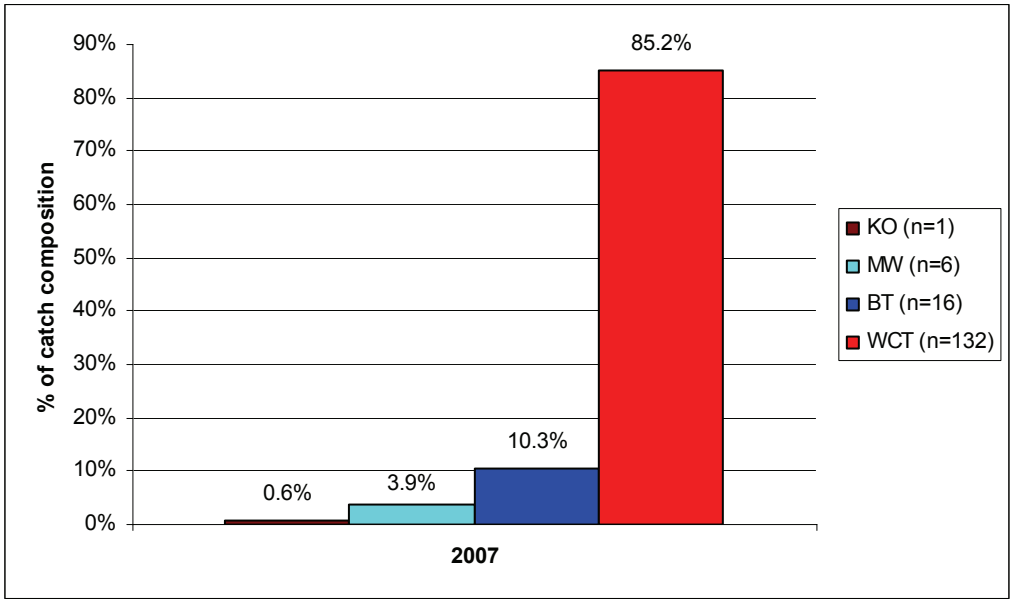
Table 18. Total number of fish released and harvested by species on the Bull River.

Species	Total Catch	% of Catch	Catch & Release	Harvest	% Release Rate
BT	16	10.3%	16	0	100%
KO	1	0.6%	0	1	0.0%
MW	6	3.9%	6	0	100%
WCT	132	85.2%	131	1	99.2%
Total	155		153	2	98.7%

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).

Westslope cutthroat trout composed 85.2% of the catch during the Bull River summer/fall fishery, with bull trout, mountain whitefish and kokanee comprising 10.3%, 3.9%, and 0.6% of the total catch, respectively (Figure 14).

Figure 14. Catch composition for the 2007 summer/fall Bull River fishery.



Potential post-hooking mortality numbers for all fish caught and released on the Bull River range from 1 to 8 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%	
153	1	8	2

8.2.2 Guided vs. non-guided anglers

Of the 76 anglers interviewed on the Bull River, 2 were guided (3%) and 74 were non-guided (97%) (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	
0	2	70	4	76

Guided anglers fished for 15 hours (9% of total hours fished), while non-guided anglers fished for 148 hours (91% 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	
0	15	129	19	163

Guided anglers caught 30 fish, while non-guided anglers caught 125 (19% and 81% of the total catch, respectively). Catch per unit effort for guided anglers (CPUE) was 2.0 fish per rod hour, while the CPUE for non-guided anglers was 0.8 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	2	15	30	2.0
Non-Guided	74	148	125	0.8
Total	76	163	155	1.0

8.2.3 Boat vs. shore anglers

Boat angler days comprised 6 of the 76 angler days on the Bull River (8%), while shore angler days accounted for 70 of the total angler days (92%). Anglers fished from a boat for 34 hours (21%) and caught 75 fish, while shore anglers fished for 129 hours (79%) and caught 80 fish. CPUE for boat anglers was 2.2 fish per rod hour, while the CPUE for shore anglers was 0.6 (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	6	34	75	2.2
Shore Anglers	70	129	80	0.6
Total	76	163	155	1.0

8.2.4 Trip length

Overall, anglers interviewed on the Bull River spent an average of 3.60 hours fishing per day through the course of the survey. Boat anglers spent an average of 8.50 hours fishing per day, while shore anglers averaged 2.67 hours per day. Guided boat anglers fished for an average of 7.50 hours per day (limited sample size, n=2), while non-guided boat anglers averaged 9.50 hours per trip (limited sample size, n=2). There were no guided shore anglers interviewed on the Bull River during the 2007 survey. Non-guided shore anglers averaged 2.67 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=25)	Boat Anglers (n=4)	Shore Anglers (n=21)	Guided Anglers		Non-Guided Anglers	
			Boat (n=2)	Shore (n=0)	Boat (n=2)	Shore (n=21)
3.60	8.50	2.67	7.50	n/a	9.50	2.67

8.2.5 Angling methods

Of the 76 anglers interviewed on the Bull River, 38 were fly anglers (50%) and 38 used gear (50%) (Table 25).

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

Place of Residence	Fly	Gear
British Columbia	27	36
United States	6	0
Alberta	5	2
Total	38	38

8.2.6 Angler residency

Of the 76 anglers interviewed on the Bull River, 70 were Canadian (92%) and 6 were American (8%). Canadian anglers were from British Columbia and Alberta, while American anglers were from California, Texas and Washington (Table 26).

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

Country of Residence	Total Anglers	%	Province/State	Number of Anglers	%
Canada	70	92%	British Columbia	63	83%
			Alberta	7	9.2%
United States	6	8%	California	2	2.6%
			Texas	2	2.6%
			Washington	2	2.6%

8.2.7 Angling experience

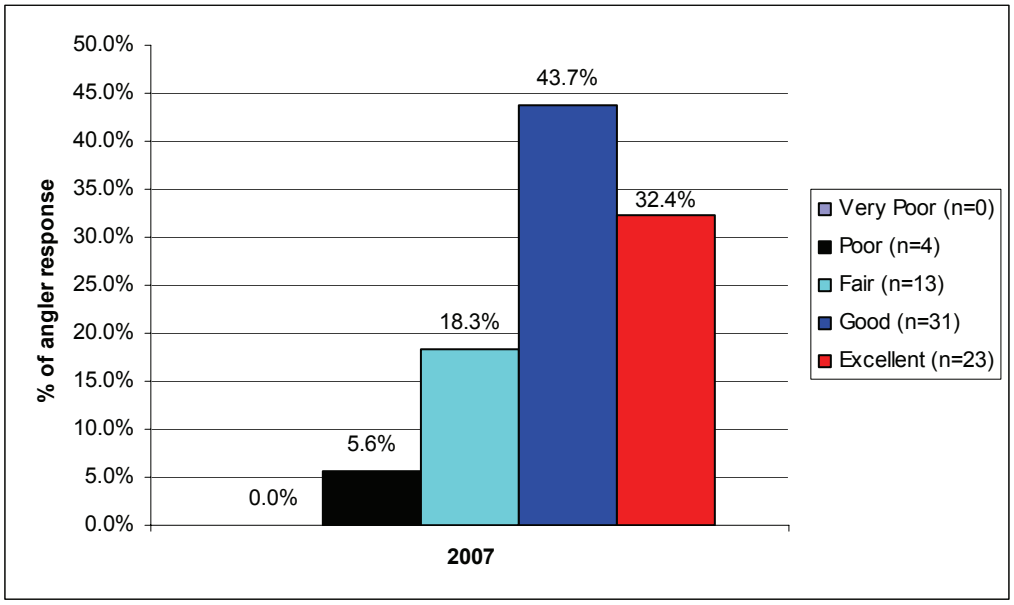
8.2.7.1 Quality of the angling experience

Of 76 anglers who were asked to rate their angling experience, 71 responded. A total of 4 anglers rated their experience as poor, 13 as fair, 31 as good and 23 as excellent (6%, 18%, 44% and 32%, 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	4	12	28	14
U.S.	0	0	0	0	6
Alberta	0	0	1	3	3
Total	0	4	13	31	23

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 174 responses categorized into this list. There were 53 responses pertaining to water conditions, 52 related to surrounding scenery, 25 which listed the number of other anglers as a factor (positive and negative), 20 to the quality of fish caught, 11 responses relating to the quantity of fish caught, 12 pertaining to the quality of water access and 1 response was listed under "other" (Table 28).

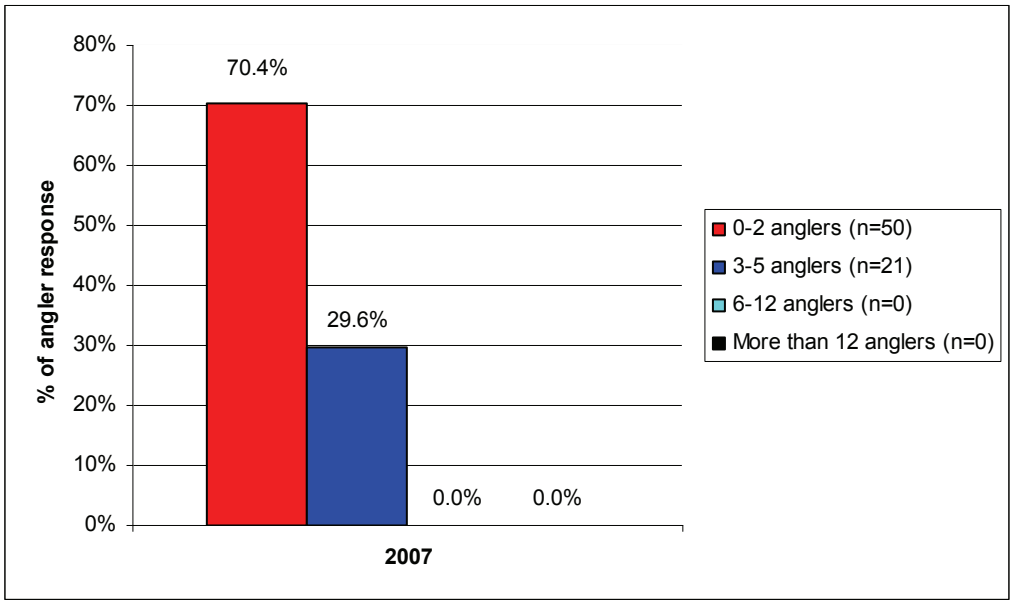
Table 28. Summary of factors contributing to the quality of angling experience for the Bull River.

Factor 1		Factor 2		Factor 3		Sum of Factors	
C	26	D	27	F	22	C (Water conditions)	53
B	15	C	21	D	19	D (Surrounding scenery)	52
A	11	B	5	E	10	F (Number of other anglers)	25
D	6	F	3	C	6	B (Quality of fish caught)	20
		E	2	H	1	E (Quality of access to water)	12
						A (Quantity of fish caught)	11
						H (Other)	1

8.2.7.2 Other anglers seen

Of the 76 anglers interviewed on the Bull River, 71 anglers responded to the question of how many other anglers they saw on their trip. Of these anglers, 50 saw 0-2 other anglers and 21 saw 3-5 anglers on their trip (Figure 16).

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



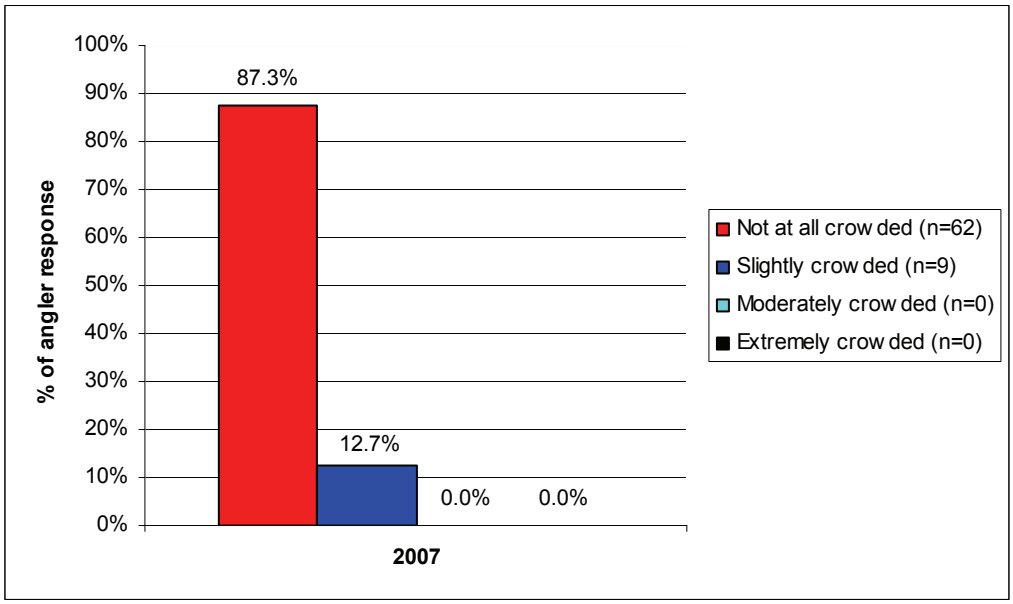
8.2.7.3 Crowding response

Of the 76 anglers interviewed on the Bull River, 71 anglers responded to the crowding questions. Overall, anglers did not feel that crowding was a significant issue (Figure 17). Of the 71 anglers, 62 rated the crowding level "not at all crowded" and 9 rated it as "slightly 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	62	87.3%
Slightly Crowded	9	12.7%
Moderately Crowded	0	0.0%
Extremely Crowded	0	0.0%

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 highway parallels sections of the river to Elkford and a gravel forest service road roughly 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).

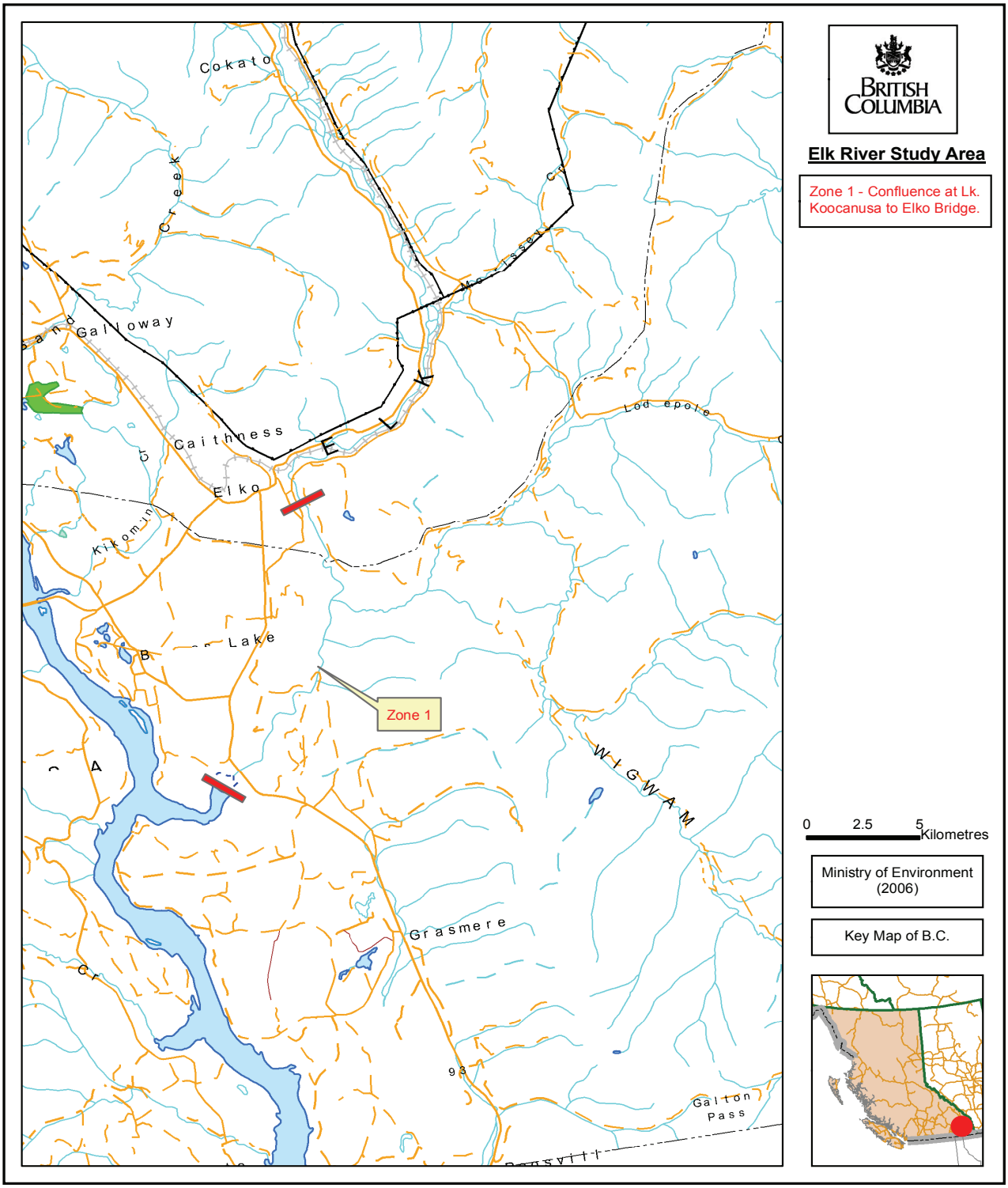


Figure 19. Map of the Elk River study area (Zones 2-5).

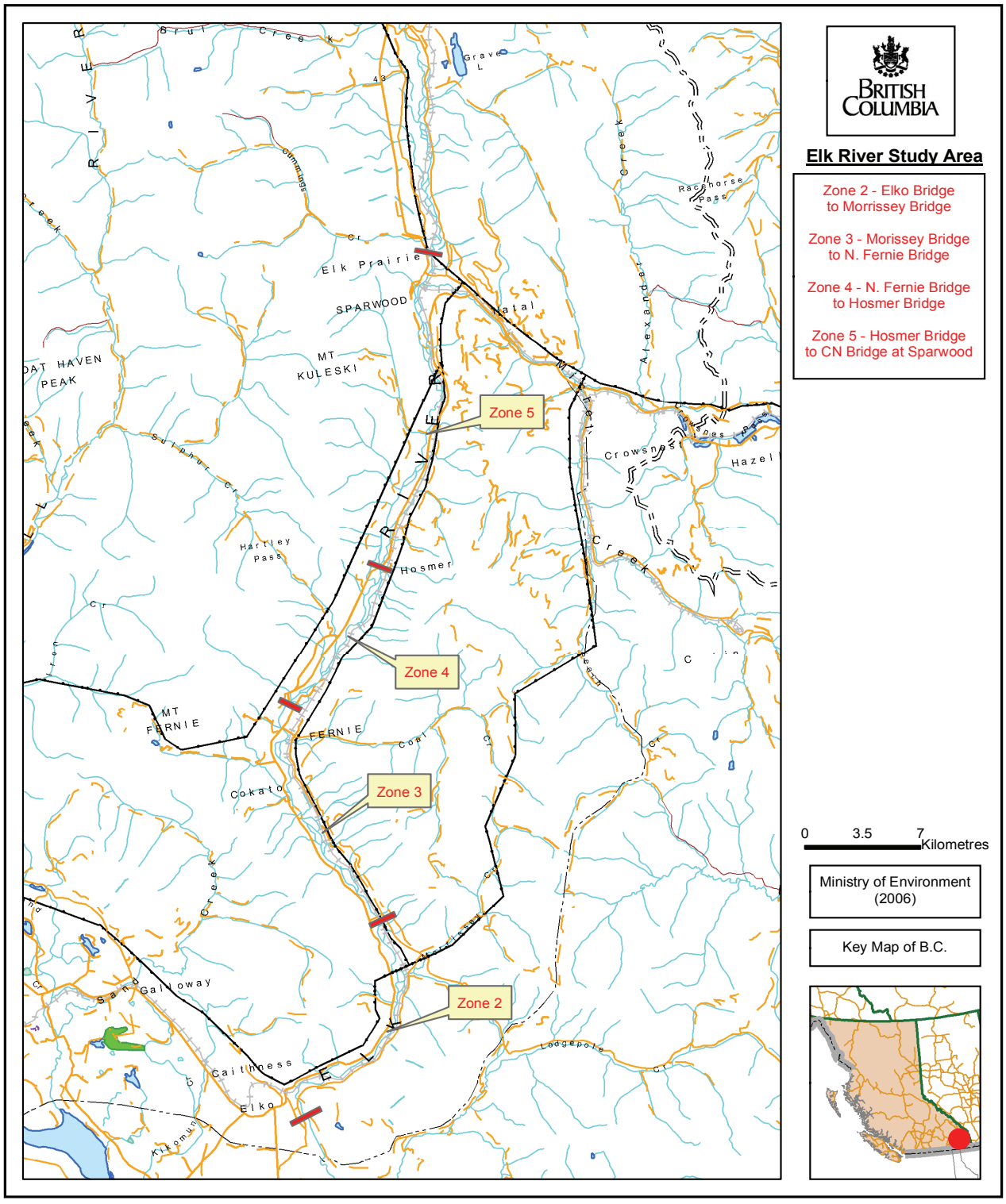
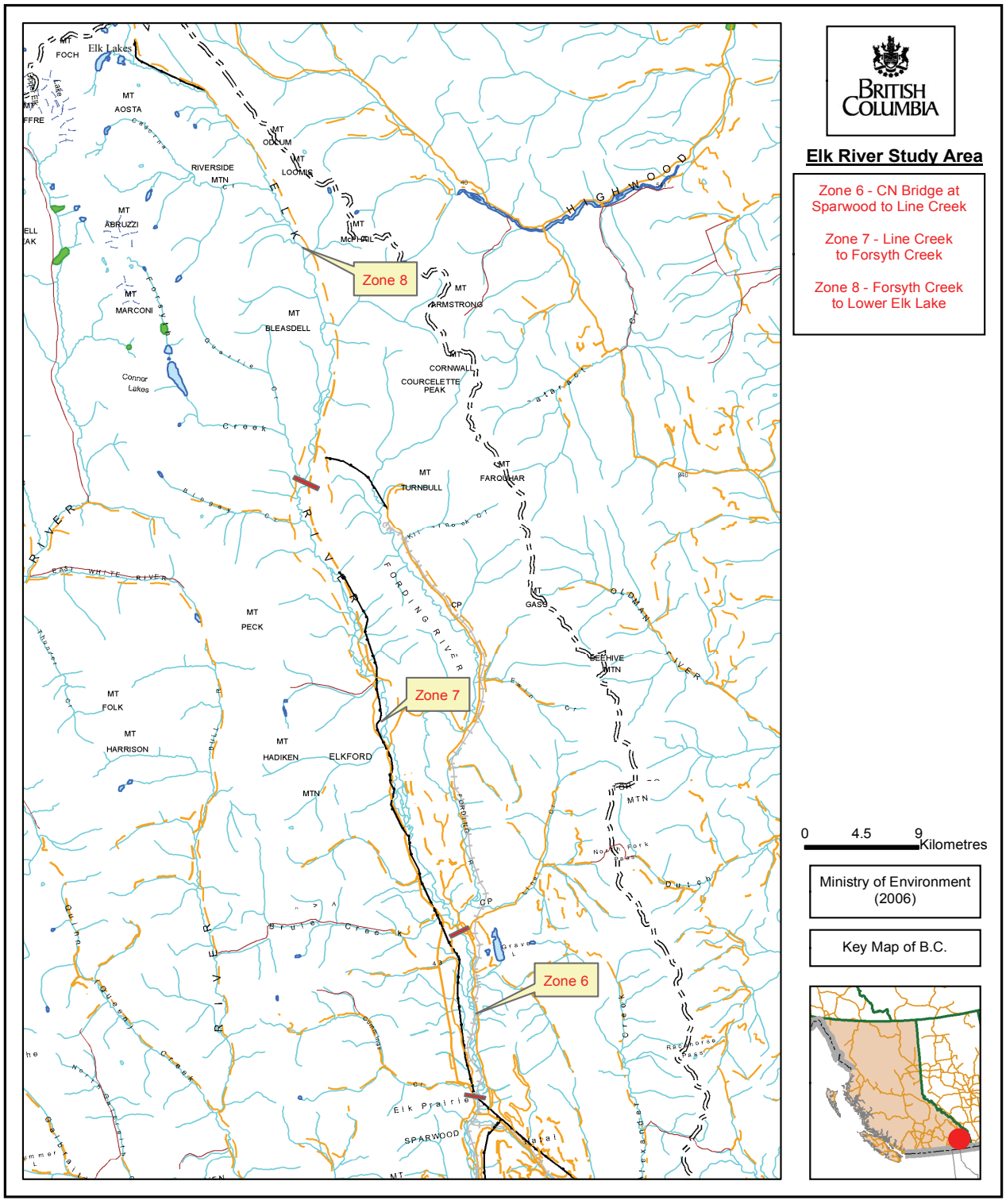


Figure 20. Map of the Elk River study area (Zones 6-8).



9.2 Results

9.2.1 Effort and Catch

A total of 228 anglers were interviewed over 28 days on the Elk River during the survey. They fished for 773 hours and caught 10 bull trout, 24 mountain whitefish and 721 westslope cutthroat trout, for an overall catch per unit effort of 1.0 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
228	773	10	24	721	1.0

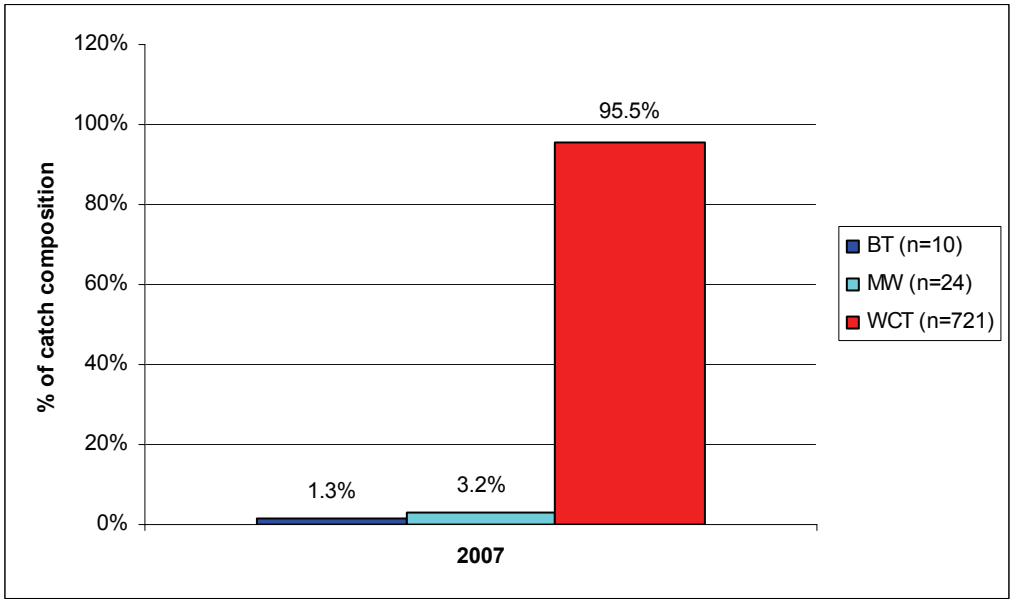
Of the 755 fish caught by anglers interviewed on the Elk River, 10 were harvested while 745 were released (98.7% release rate) (Table 31).

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	10	1.3%	10	0	100%
MW	24	3.2%	15	9	62%
WCT	721	95.5%	720	1	99.8%
Total	755		745	10	98.7%

Westslope cutthroat trout composed 95.5% of the catch during the Elk River summer/fall fishery, with mountain whitefish and bull trout comprising 3.2% and 1.3% of the total catch, respectively (Figure 21).

Figure 21. Catch composition for the 2007 summer/fall Elk River fishery.



Potential post-hooking mortality numbers for all fish caught and released on the Elk River range from 4 to 37 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%	
745	4	37	10

9.2.2 Guided vs. non-guided anglers

Of the 228 anglers interviewed on the Elk River, 56 were guided (25%) and 172 were non-guided (75%) (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	
3	53	118	54	228

Guided anglers fished for 183 hours (24% of total hours fished), while non-guided anglers fished for 590 hours (76% 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	
9.5	173.5	321	269	773

Guided anglers caught 204 fish, while non-guided anglers caught 551 (27% and 73% of the total catch, respectively). Catch per unit effort for guided anglers (CPUE) was 1.11 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	56	183	204	1.11
Non-Guided	172	590	551	0.93
Total	228	773	755	1.0

9.2.3 Boat vs. shore anglers

Boat angler days comprised 107 of the 228 angler days on the Elk River (47%), while shore angler days accounted for 121 of the total angler days (53%). Anglers fished from a boat for 443 hours (57%) and caught 455 fish, while shore anglers fished for 330 hours (43%) and caught 300 fish. CPUE for boat anglers was 1.02 fish per rod hour, while the CPUE for shore anglers was 0.91 (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	107	443	455	1.02
Shore Anglers	121	330	300	0.91
Total	228	773	755	1.0

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 7.6 hours fishing per day, while shore anglers averaged 3.2 hours per day. Guided boat anglers fished for an average of 7.3 hours per day, while non-guided boat anglers averaged 7.8 hours per trip. Non-guided shore anglers averaged 3.2 hours per day (there were 0 guided shore angler complete trip interviews) (Table 37).

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

All Anglers (n=69)	Boat Anglers (n=43)	Shore Anglers (n=26)	Guided Anglers		Non-Guided Anglers	
			Boat (n=19)	Shore (n=0)	Boat (n=24)	Shore (n=26)
5.9	7.6	3.2	7.3	n/a	7.8	3.2

9.2.5 Angling methods

Of the 228 anglers interviewed on the Elk River, 197 were fly anglers (86.4%), while 28 used gear (12.3%) and 3 anglers used both fly and gear (1.3%) (Table 38).

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

Place of Residence	Fly	Gear	Both
British Columbia	50	23	1
United States	101	1	2
Alberta	34	3	0
Other Canadians	4	1	0
Other Countries	8	0	0
Total	197	28	3

9.2.6 Angler residency

Of the 228 anglers interviewed on the Elk River, 116 were Canadian (51%), 104 were American (46%), and 8 anglers were from Europe (3%). Canadian anglers were primarily from British Columbia and Alberta, with 2 other provinces represented, while American anglers represented 25 different states and the European anglers were from Italy, Netherlands, England and Germany (Table 39).

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

Country of Residence	Total Anglers	%	Province/State	Number of Anglers	%
Canada	116	51%	British Columbia	74	32%
			Alberta	37	16%
			Ontario	4	2%
			Saskatchewan	1	<1%
United States	104	46%	Washington	17	7%
			California	11	5%
			Utah	11	5%
			Idaho	9	4%
			Montana	9	4%
			Texas	9	4%
			Colorado	3	1%
			Minnesota	3	1%
			Oregon	3	1%
			Virginia	3	1%
			Connecticut	2	<1%
			Florida	2	<1%
			Iowa	2	<1%
			Maine	2	<1%
			Michigan	2	<1%
			New Hampshire	2	<1%
			New York	2	<1%
			North Dakota	2	<1%
			Ohio	2	<1%
			Pennsylvania	2	<1%
			South Dakota	2	<1%
			Alabama	1	<1%
			Hawaii	1	<1%
			Massachusetts	1	<1%
			New Jersey	1	<1%
Europe	8	3%	Italy	3	1%
			Netherlands	3	1%
			England	1	<1%
			Germany	1	<1%

9.2.7 Angling experience

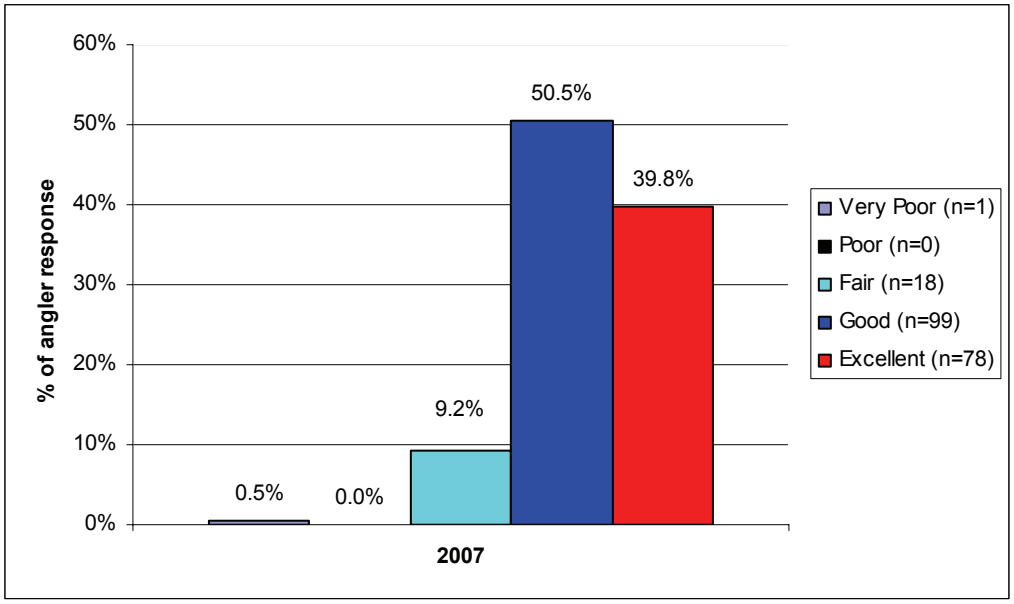
9.2.7.1 Quality of the angling experience

Of the 228 anglers who were asked to rate their angling experience, 196 responded. Only 1 angler rated their experience as very poor, no anglers rated it as poor, 20 anglers rated the experience as fair, 99 as good and 78 as excellent (0.5%, 0.0%, 9.2%, 50.5% and 39.8%, 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	0	5	38	22
U.S.	1	0	9	38	40
Alberta	0	0	3	19	8
Other CDN.	0	0	1	3	1
Other	0	0	0	1	7
Total	1	0	18	99	78

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 524 responses categorized into this list. There were 137 responses pertaining to the surrounding scenery, 126 to the quality of fish caught, 104 relating to water conditions, 63 responses relating to the quantity of fish caught, 50 which listed the number of other anglers as a factor (positive and negative), 29 pertaining to the quality of water access, 9 responses were listed under "other" and 6 responses were related to the number of boats on the water (Table 41).

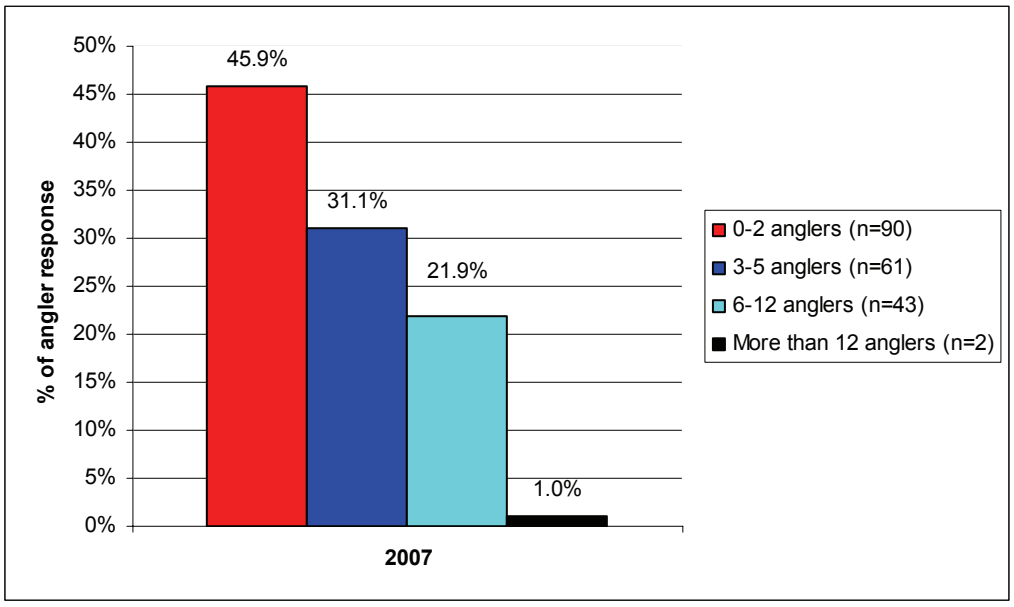
Table 41. Summary of factors contributing to the quality of angling experience for the Elk River.

Factor 1		Factor 2		Factor 3		Sum of Factors	
B	79	C	61	D	73	D (Surrounding scenery)	137
A	60	D	50	F	46	B (Quality of fish caught)	126
C	22	B	47	C	21	C (Water conditions)	104
D	14	E	11	E	18	A (Quantity of fish caught)	63
H	1	F	4	H	8	F (Number of other anglers)	50
		G	2	G	4	E (Quality of access to water)	29
				A	3	H (Other)	9
						G (Number of boats on water)	6

9.2.7.2 Other anglers seen

Of the 228 anglers interviewed on the Elk River, 196 anglers responded to the question of how many other anglers they saw on their trip. Of these anglers, 90 saw 0-2 other anglers, 61 saw 3-5 anglers, 43 saw 6-12 anglers and 2 anglers saw more than 12 anglers on their trip (Figure 23).

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



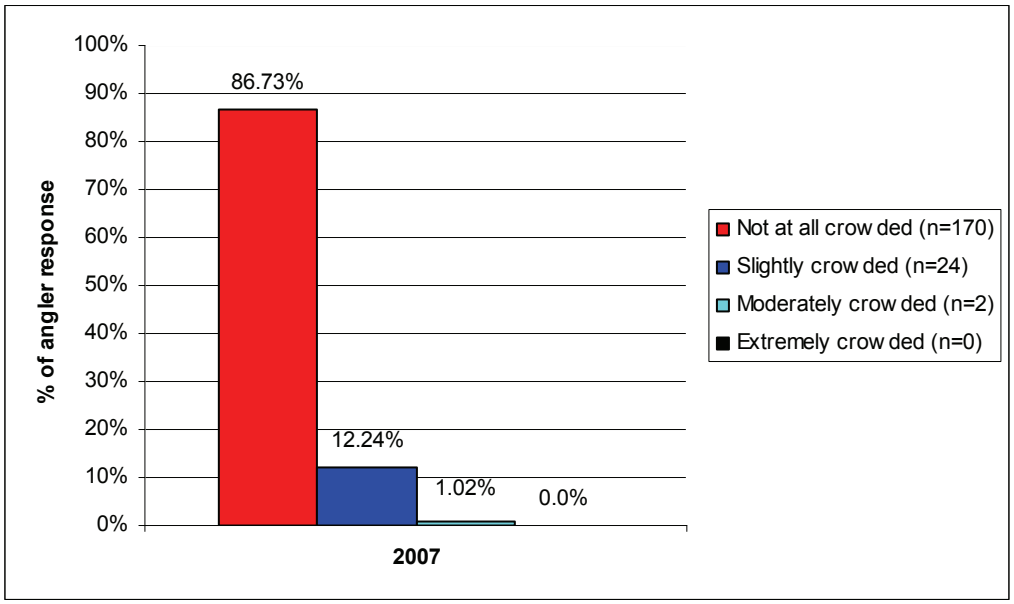
9.2.7.3 Crowding response

Of the 228 anglers interviewed on the Elk River, 196 anglers responded to the crowding questions. Overall, anglers did not feel that crowding was a significant issue (Figure 24). Of the 196 anglers, 170 rated the crowding level "not at all crowded", 24 rated it as "slightly crowded", 2 rated it as "moderately crowded", and 0 anglers 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	170	86.7%
Slightly Crowded	24	12.3%
Moderately Crowded	2	1.0%
Extremely Crowded	0	0.0%

Figure 24. Angler crowding rating on the Elk River.



10.0 MICHEL CREEK

10.1 Study area

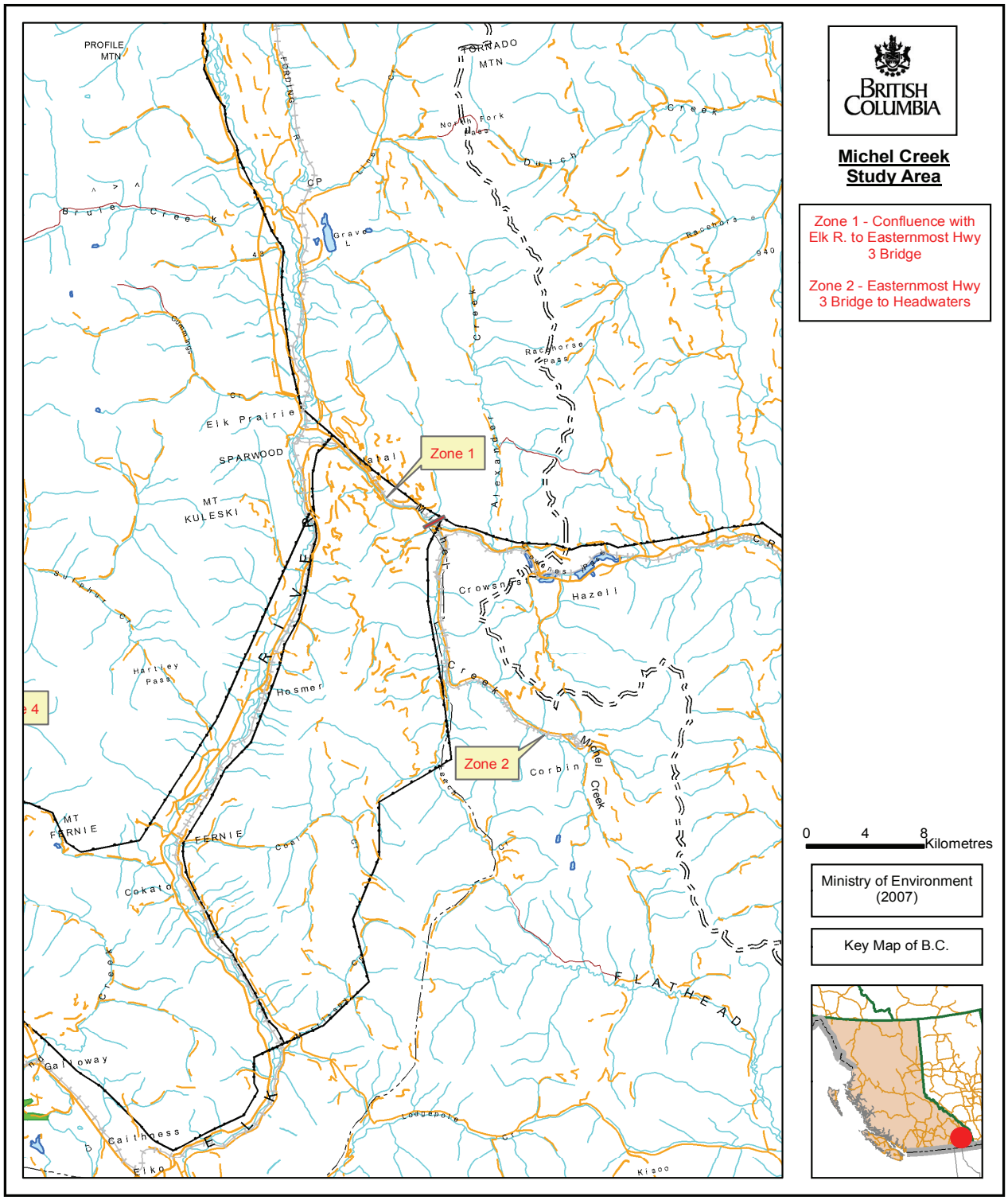
Michel Creek originates in the Taylor Range of the Southern Rocky Mountains. From its headwaters, Michel Creek flows approximately 46.5 km north/northwest to its confluence with the Elk River at Sparwood (Figure 25).

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 121 anglers were interviewed over 12 days on Michel Creek during the survey. They fished for 424 hours and caught 1 bull trout, 1 mountain whitefish and 656 westslope cutthroat trout, for an overall catch per unit effort of 1.55 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
121	424	1	1	656	1.55

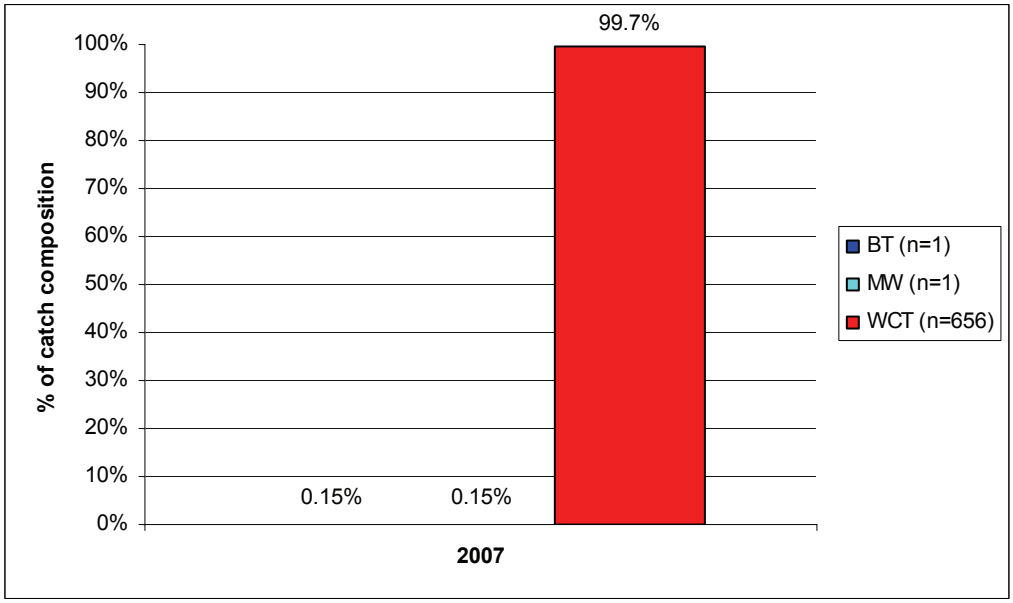
Of the 658 fish caught by anglers interviewed on Michel Creek, 1 fish was harvested while 657 fish were released (99.8% release rate) (Table 44).

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	1	0.15%	1	0	100%
MW	1	0.15%	1	0	100%
WCT	656	99.7%	655	1	99.8%
Total	658		657	1	99.8%

Westslope cutthroat trout composed 99.7% of the catch during summer/fall fishery on Michel Creek, with bull trout and mountain whitefish comprising 0.15% and 0.15% of the total catch, respectively (Figure 26).

Figure 26. Catch composition for the 2007 summer/fall Michel Creek fishery.



Potential post-hooking mortality numbers for all fish caught and released on Michel Creek range from 3 to 33 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%	
657	3	33	1

10.2.2 Trip length

Overall, anglers interviewed on Michel Creek spent an average of 6.3 hours fishing per day through the course of the survey (Complete trip data only n=18).

10.2.3 Angling methods

Of the 121 anglers interviewed on Michel Creek, 120 were fly anglers (99%) and 1 angler used both fly and gear (1%) (Table 46).

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

Place of Residence	Fly	Gear	Both
British Columbia	35	0	0
United States	57	0	0
Alberta	24	0	1
Other Canadians	1	0	0
Other Countries	3	0	0
Total	120	0	1

10.2.4 Angler residency

Of the 121 anglers interviewed on Michel Creek, 61 were Canadian (50.4%), 57 were American (47.1%), and 3 anglers were from Europe (2.5%). Canadian anglers were from British Columbia, Alberta and Ontario, American anglers represented 16 different states and the European anglers were from France and England (Table 47).

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

Country of Residence	Total Anglers	%	Province/State	Number of Anglers	%
Canada	61	50.4%	British Columbia	35	28.9%
			Alberta	25	20.6%
			Ontario	1	0.8%
United States	57	47.1%	California	10	8.2%
			Texas	9	7.4%
			Pennsylvania	7	5.8%
			Oregon	5	4.1%
			Washington	5	4.1%
			Illinois	3	2.5%
			Montana	3	2.5%
			Virginia	3	2.5%
			Colorado	2	1.6%
			Idaho	2	1.6%
			New York	2	1.6%
			South Dakota	2	1.6%
			Georgia	1	0.8%
			Maine	1	0.8%
			South Carolina	1	0.8%
			Utah	1	0.8%
Europe	3	2.5%	France	2	1.6%
			England	1	0.8%

10.2.5 Angling experience

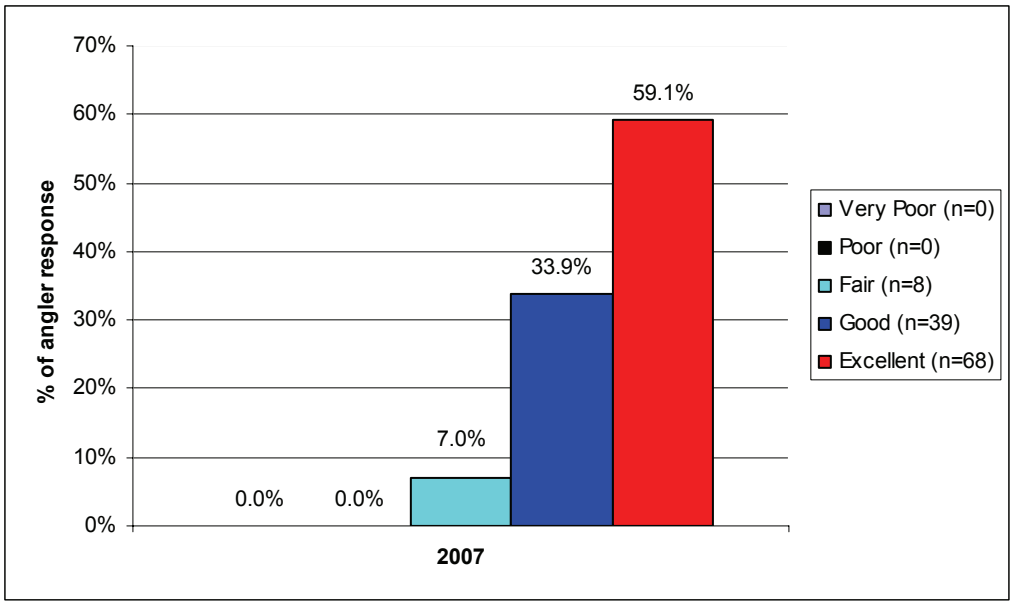
10.2.5.1 Quality of the angling experience

Of the 121 anglers who were asked to rate their angling experience, 115 responded. A total of 8 anglers rated their experience as fair, 39 as good and 68 as excellent (7%, 34% and 59%, 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	5	12	15
U.S.	0	0	2	21	32
Alberta	0	0	1	6	17
Other CDN.	0	0	0	0	1
Other	0	0	0	0	3
Total	0	0	8	39	68

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 345 responses were categorized into this list. There were 99 responses related to the quality of fish caught, 77 responses pertaining to the surrounding scenery, 57 responses relating to the quantity of fish caught, 57 related to water conditions, 28 pertaining to the quality of water access, 26 which listed the number of other anglers as a factor (positive and negative) and 1 response was listed under "other" (Table 49).

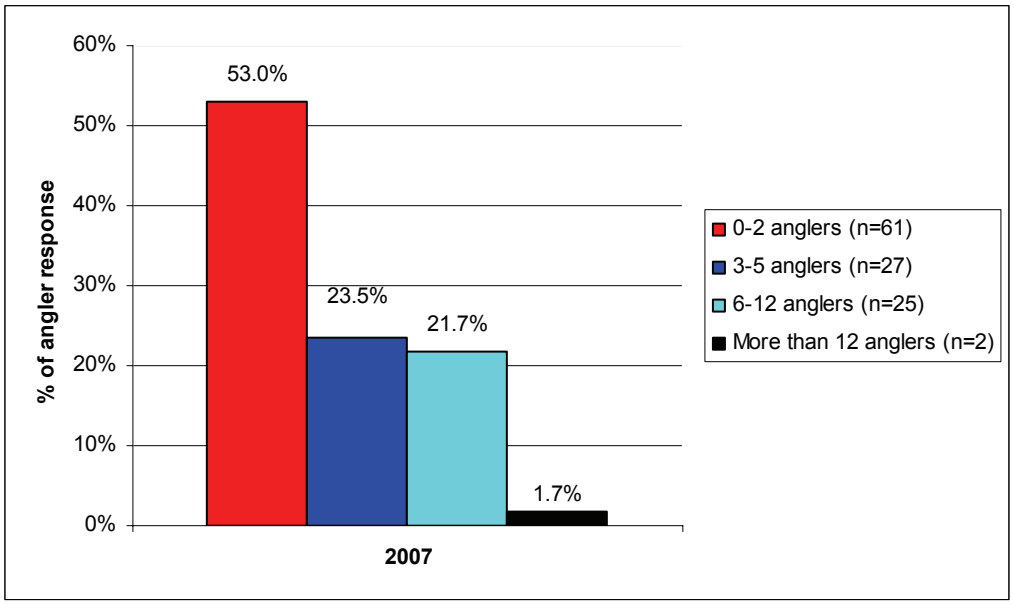
Table 49. Summary of factors contributing to the quality of angling experience on Michel Creek.

Factor 1		Factor 2		Factor 3		Sum of Factors	
B	79	C	61	D	73	B (Quality of fish caught)	99
A	60	D	50	F	46	D (Surrounding scenery)	77
C	22	B	47	C	21	A (Quantity of fish caught)	57
D	14	E	11	E	18	C (Water conditions)	57
H	1	F	4	H	8	E (Quality of access to water)	28
		G	2	G	4	F (Number of other anglers)	26
				A	3	H (Other)	1

10.2.5.2 Other anglers seen

Of the 121 anglers interviewed on Michel Creek, 115 responded to the question of how many other anglers they saw on their trip. Of these anglers, 61 saw 0-2 other anglers, 27 saw 3-5 anglers, 25 saw 6-12 other 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.



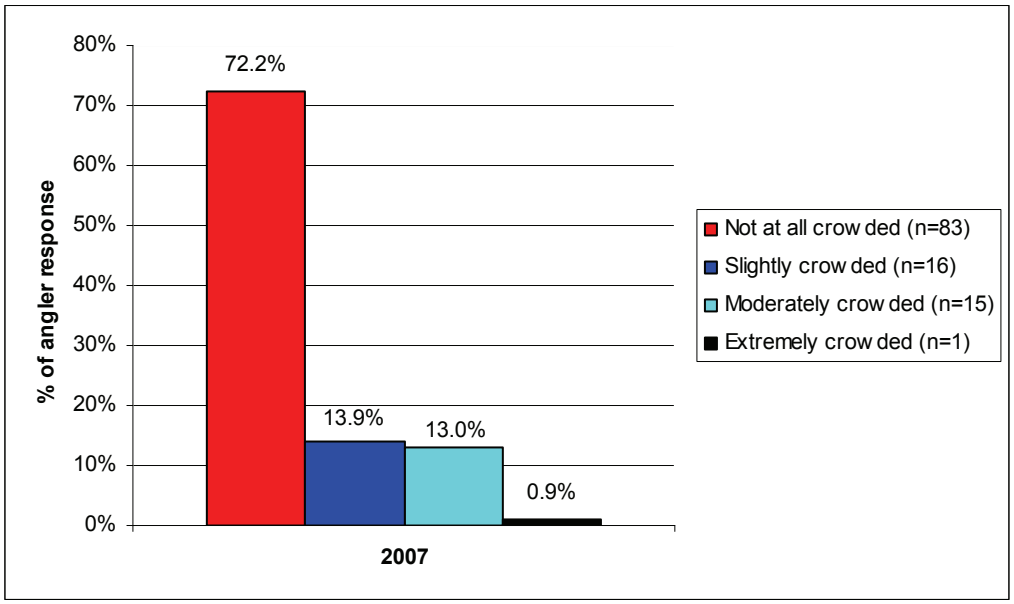
10.2.5.3 Crowding response

Of the 121 anglers interviewed on Michel Creek, 115 responded to the crowding questions. Overall, anglers did not feel that crowding was a significant issue (Figure 29). Of the 121 anglers, 83 rated the crowding level "not at all crowded", 16 rated it as "slightly crowded", 15 rated it as moderately crowded and 1 angler rated it as "extremely 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	83	72.2%
Slightly Crowded	16	13.9%
Moderately Crowded	15	13%
Extremely Crowded	1	0.9%

Figure 29. Angler crowding rating on Michel Creek.



11.0 SKOOKUMCHUCK CREEK

11.1 Study area

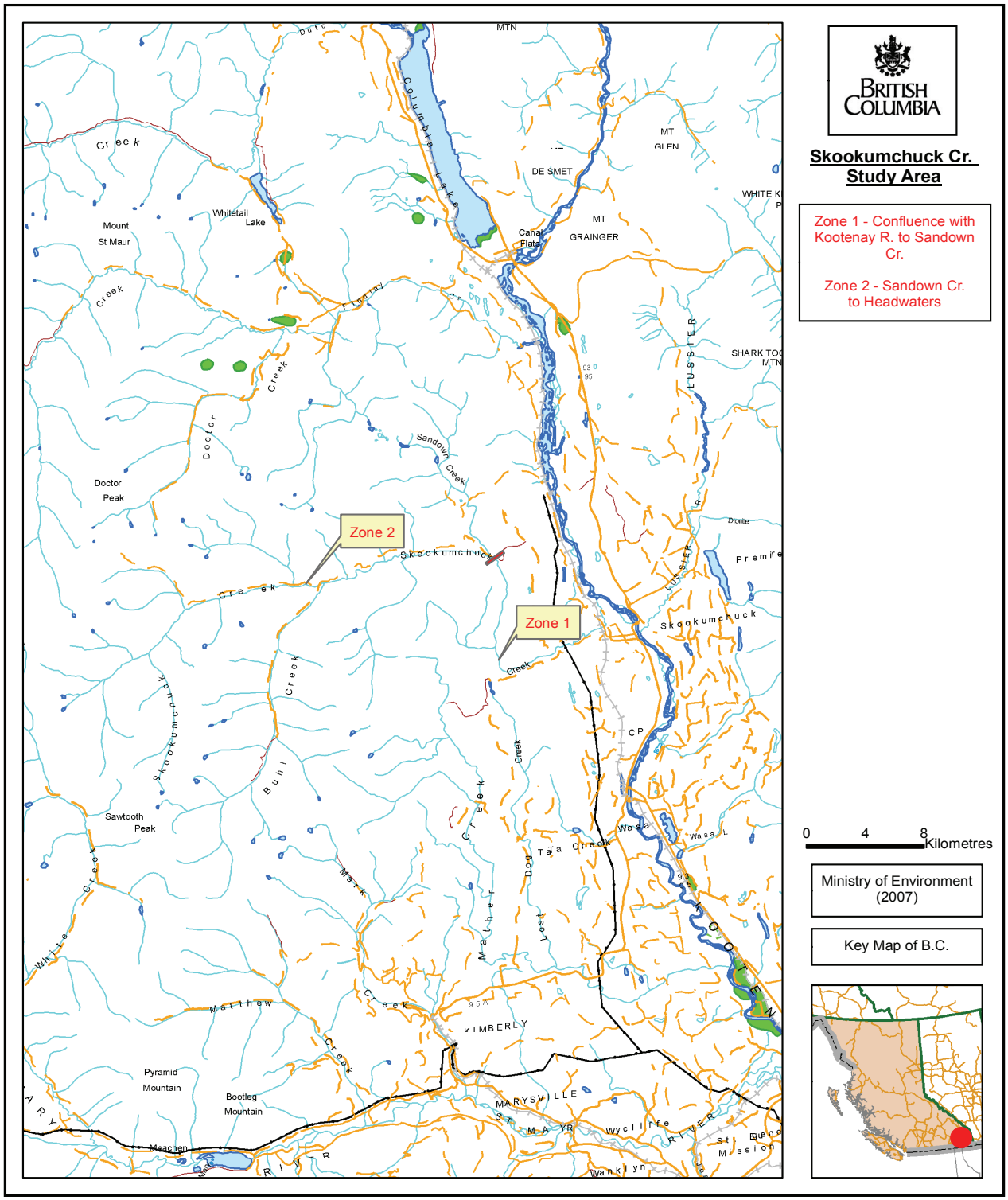
Skookumchuck Creek originates in the Purcell Mountains within the Purcell Wilderness Conservancy. From its headwaters, the stream flows east/northeast for approximately 62 km to its confluence with the upper Kootenay River (Figure 30). There is a fish barrier waterfall just above the Buhl Creek confluence,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

When interpreting angler survey statistics from Skookumchuck Creek for 2007, it should be noted that the small sample size (n=16) limits accurate data analysis. As a result, data may be biased and should be interpreted accordingly.

A total of 16 anglers were interviewed over 10 days on Skookumchuck Creek during the survey. They fished for 65 hours and caught 2 bull trout and 121 westslope cutthroat trout, for an overall catch per unit effort of 1.9 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
16	65	2	121	1.9

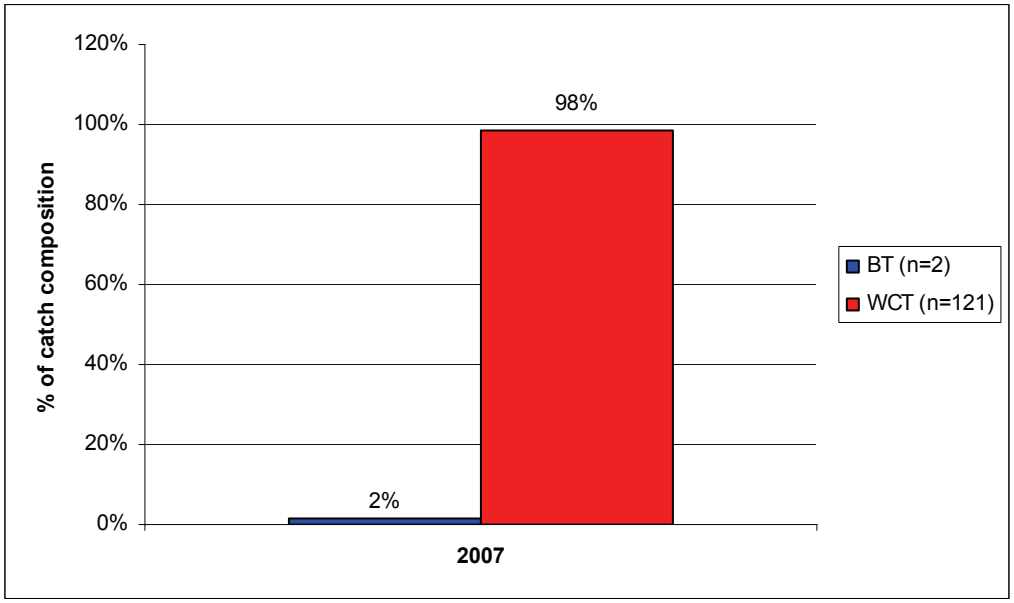
Of the 123 fish caught by anglers interviewed on Skookumchuck Creek, all were released (100% release rate) (Table 52).

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	2	2%	2	0	100%
WCT	121	98%	121	0	100%
Total	123		123	0	100%

Westslope cutthroat trout composed 98% of the catch during summer/fall fishery on Skookumchuck Creek, with bull trout comprising 2% of the total catch (Figure 31).

Figure 31. Catch composition for the 2007 summer/fall Skookumchuck fishery.



Potential post-hooking mortality numbers for all fish caught and released on Skookumchuck Creek range from <1 to 6 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%	
121	<1	6	0

11.2.2 Angling methods

Of the 16 anglers interviewed on Skookumchuck Creek, 12 were fly anglers (75%), while 2 used gear (12.5%) and 2 anglers used both fly and gear (12.5%) (Table 54).

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

Place of Residence	Fly	Gear	Both
British Columbia	7	2	2
Alberta	3	0	0
United States	2	0	0
Total	12	2	2

11.2.3 Angler residency

Of the 16 anglers interviewed on Skookumchuck Creek, 14 were Canadian (87.5%) and 2 were American (12.5%) (Table 55).

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

Country of Residence	Total Anglers	%	Province/State	Number of Anglers	%
Canada	14	87.5%	British Columbia	11	68.8%
			Alberta	3	18.7%
United States	2	12.5%	Montana	2	12.5%

11.2.4 Angling experience

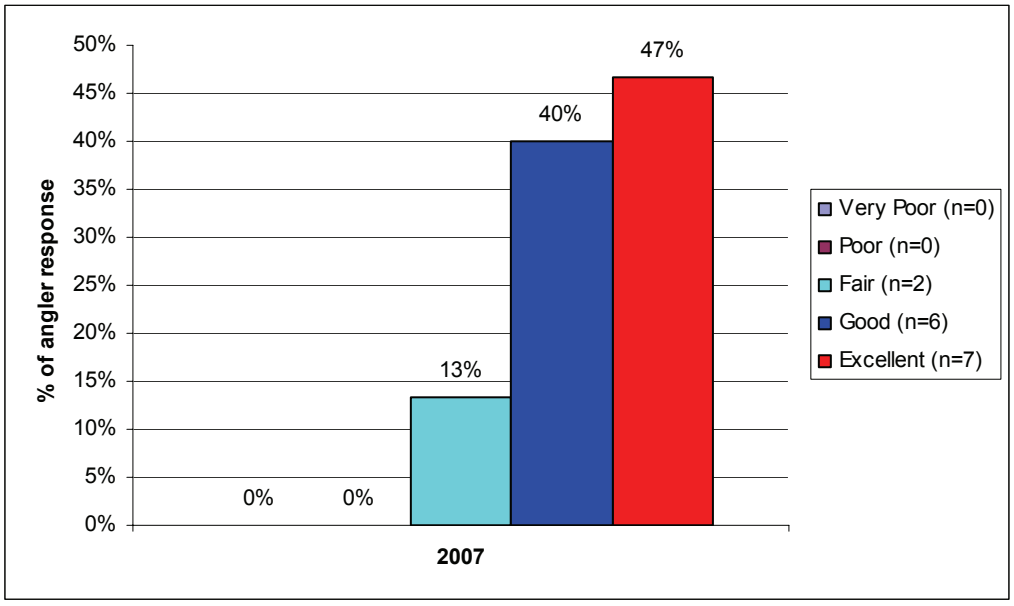
11.2.4.1 Quality of the angling experience

Of the 16 anglers who were asked to rate their angling experience, 15 responded. A total of 2 anglers rated their experience as fair, 6 as good and 7 as excellent (13%, 40% and 47%, 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	2	5	4
Alberta	0	0	0	1	1
United States	0	0	0	0	2
Total	0	0	2	6	7

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 39 responses were categorized into this list. There were 10 responses related to the quality of fish caught, 8 pertaining to water conditions, 7 responses which listed the number of other anglers as a factor, 7 related to the surrounding scenery, 6 to the quantity of fish caught and 1 response pertained to the quality of access to the water (Table 57).

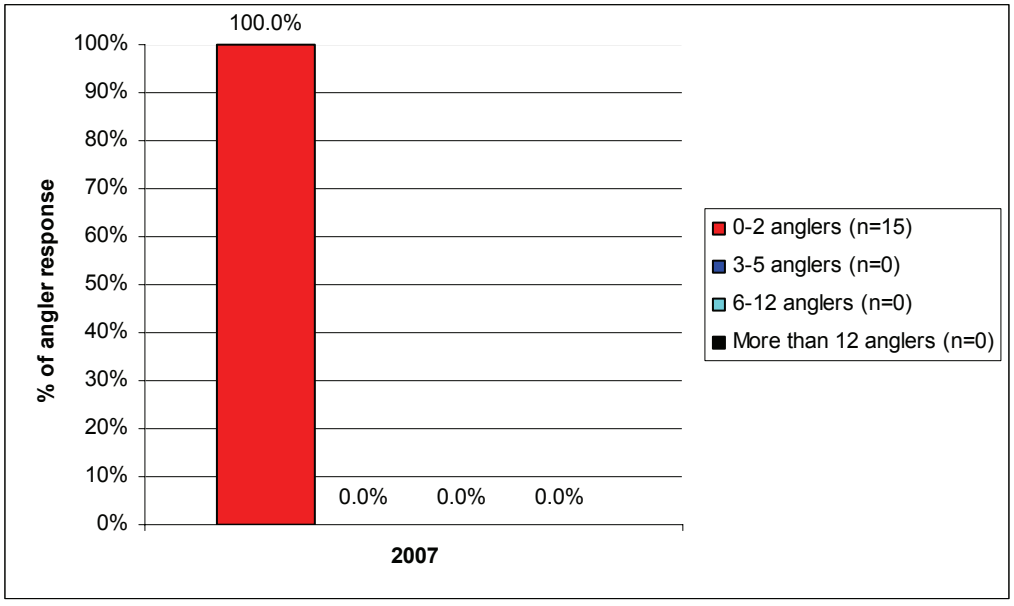
Table 57. Summary of factors contributing to the quality of angling experience on Skookumchuck Creek.

Factor 1		Factor 2		Factor 3		Sum of Factors	
B	7	D	5	F	7	B (Quality of fish caught)	10
A	6	C	5	C	3	C (Water conditions)	8
		B	3	D	2	D (Surrounding scenery)	7
				E	1	F (Number of other anglers)	7
						A (Quantity of fish caught)	6
						E (Quality of Access to the Water)	1

11.2.4.2 Other anglers seen

Of the 16 anglers interviewed on Skookumchuck Creek, 15 responded to the question of how many other anglers they saw on their trip. Of these anglers, all 15 responded that they saw 0-2 other anglers on their trip (Figure 33).

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



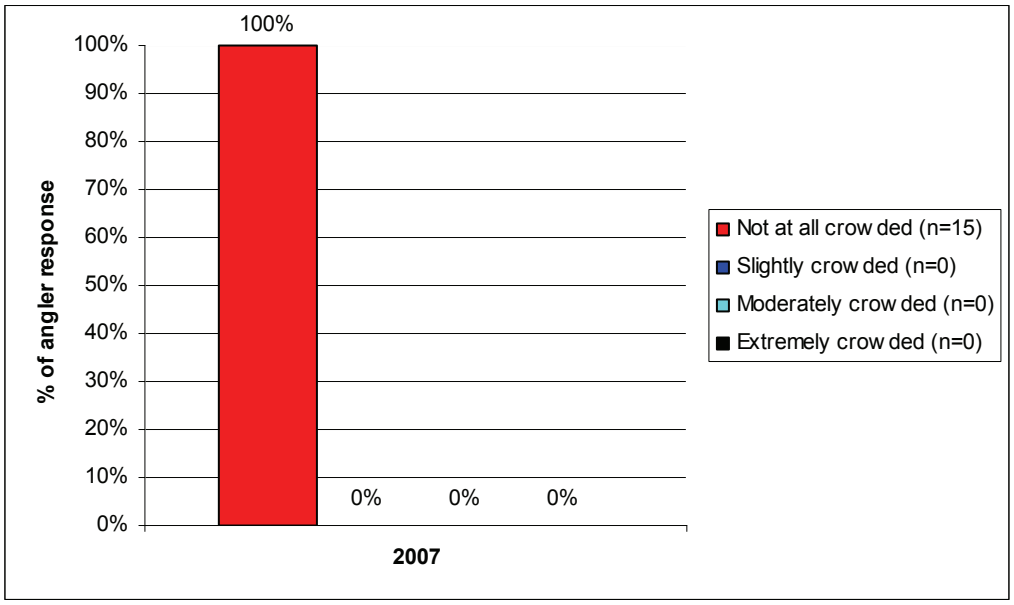
11.2.4.3 Crowding response

Of the 16 anglers interviewed on Skookumchuck Creek, 15 responded to the crowding questions. Anglers did not feel that crowding was a significant issue, with all 15 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	15	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

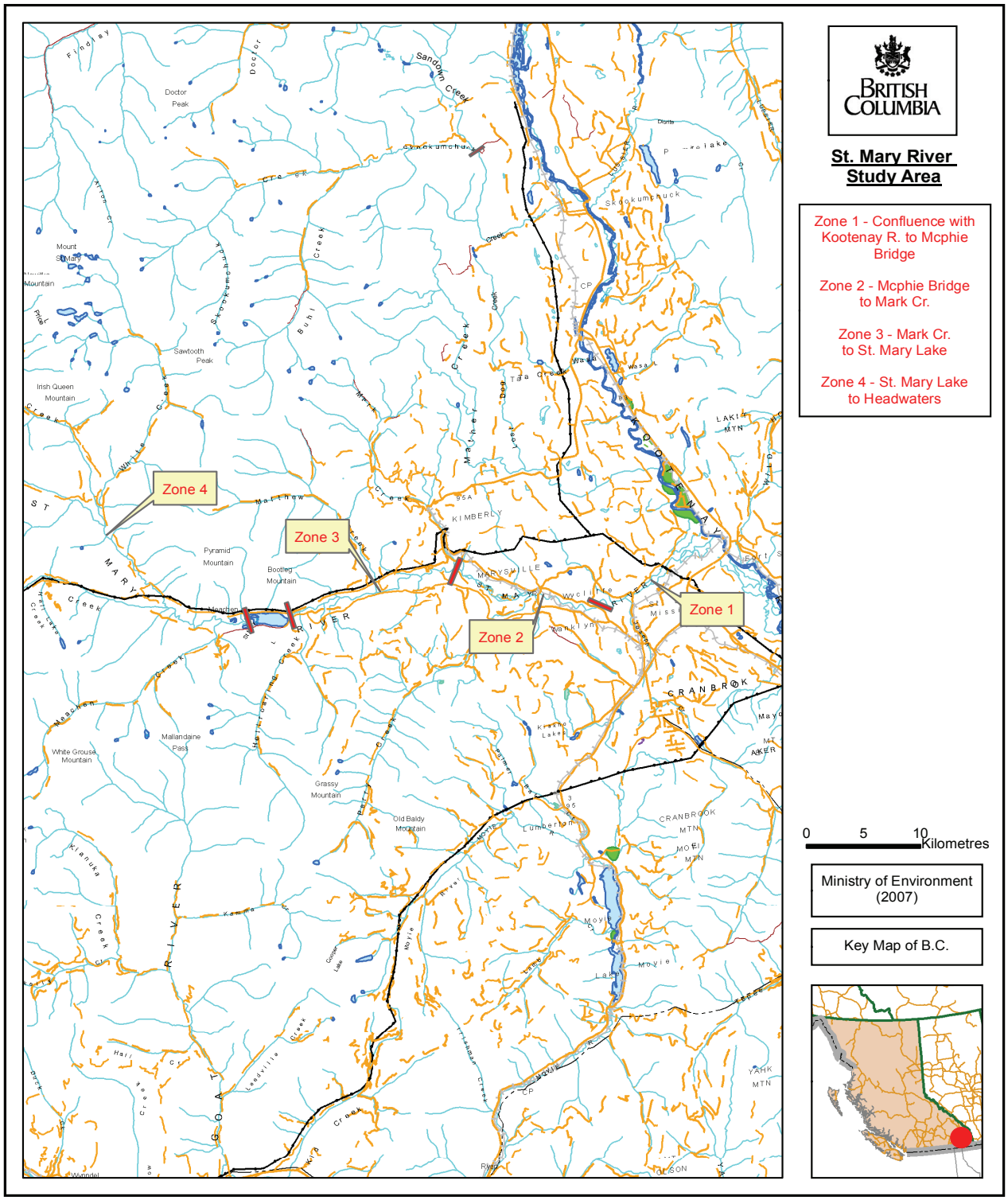
The St. Mary River originates in the Purcell Mountains of southeastern British Columbia, flowing approximately 106 km from its headwaters in a southeastern direction, joining the upper Kootenay River near Fort Steele, B.C. (Figure 35). The river is separated into two sections by St. Mary Lake: the upper 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 64 anglers were interviewed over 24 days on the St. Mary River during the survey. They fished for 150 hours and caught 3 mountain whitefish and 123 westslope cutthroat trout, for an overall catch per unit effort of 0.84 fish per rod hour (Table 59).

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

Angler Days	Hours Fished	MW	WCT	CPUE
64	150	3	123	0.84

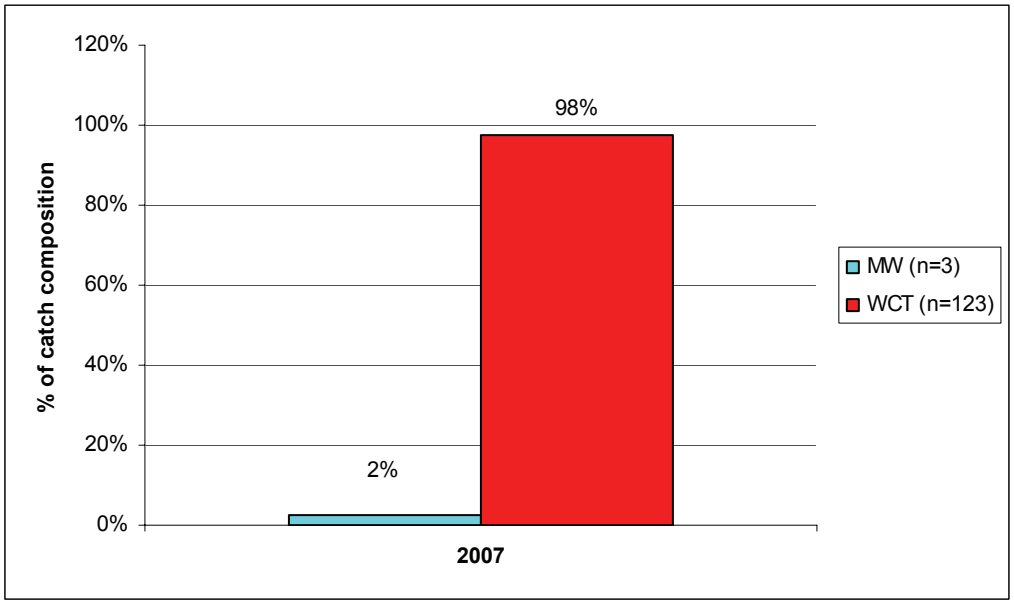
Of the 126 fish caught by anglers interviewed on the St. Mary River, all were released (100% release rate) (Table 60).

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
MW	3	2%	3	0	100%
WCT	123	98%	123	0	100%
Total	126		126	0	100%

Westslope cutthroat trout composed 98% of the catch during the St. Mary summer/fall fishery, with mountain whitefish comprising 2% of the total catch (Figure 36).

Figure 36. Catch composition for the 2007 summer/fall St. Mary River fishery.



Potential post-hooking mortality numbers for all fish caught and released on the St. Mary River range from <1 to 6 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%	
126	<1	6	0

12.2.2 Guided vs. non-guided anglers

Of the 64 anglers interviewed on the St. Mary River, 8 were guided (12.5%) and 56 were non-guided (87.5%) (Table 62). Due to the limited sample size for guided anglers (n=8), results may be biased and should be interpreted accordingly.

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	
0	8	41	15	64

Guided anglers fished for 4 hours (3% of total hours fished), while non-guided anglers fished for 146 hours (97% 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	
0	4	73	73	150

Guided anglers caught 4 fish, while non-guided anglers caught 122 (3% and 97% of the total catch, respectively). Catch per unit effort for guided anglers (CPUE) was 1.00 fish per rod hour, while the CPUE for non-guided anglers was 0.84 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	8	4	4	1.00
Non-Guided	56	146	122	0.84
Total	64	150	126	0.84

12.2.3 Boat vs. shore anglers

Boat angler days comprised 23 of the 64 angler days on the St. Mary River (36%), while shore angler days accounted for 41 of the total angler days (64%). Anglers fished from a boat for 77 hours (51%) and caught 58 fish, while shore anglers fished for 73 hours (49%) and caught 68 fish. CPUE for boat anglers was 0.75 fish per rod hour, while the CPUE for shore anglers was 0.93 (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	23	77	58	0.75
Shore Anglers	41	73	68	0.93
Total	64	150	126	0.84

12.2.4 Trip length

Overall, anglers interviewed on the St. Mary River spent an average of 7.3 hours fishing per day through the course of the survey (complete trip data only - limited sample size, n=10).

12.2.5 Angling methods

Of the 64 anglers interviewed on the St. Mary River, 61 were fly anglers (95%), while 1 used gear (2%) and 2 anglers used both fly and gear (3%) (Table 66).

Table 66. Fishing methods by place of residence on the St. Mary River.

Place of Residence	Fly	Gear	Both
British Columbia	34	0	2
United States	14	0	0
Alberta	11	0	0
Other Canadians	1	0	0
Other Countries	1	1	0
Total	61	1	2

12.2.6 Angler residency

Of the 64 anglers interviewed on the St. Mary River, 48 were Canadian (75%), 14 were American (22%), 1 angler was from Europe (1.5%) and 1 angler was from Asia (1.5%). Canadian anglers were from British Columbia, Alberta, and Quebec, while American anglers

represented 6 different states. The European and Asian anglers were from Germany and Japan (Table 67).

Table 67. Place of residence for anglers fishing the St. Mary River.

Country of Residence	Total Anglers	%	Province/State	Number of Anglers	%
Canada	48	75%	British Columbia	36	56%
			Alberta	11	17%
			Quebec	1	1.5%
United States	14	22%	Oregon	4	6%
			Washington	3	5%
			Idaho	2	3%
			Pennsylvania	2	3%
			South Dakota	2	3%
			Ohio	1	1.5%
Europe	1	1.5%	Germany	1	1.5%
Asia	1	1.5%	Japan	1	1.5%

12.2.7 Angling experience

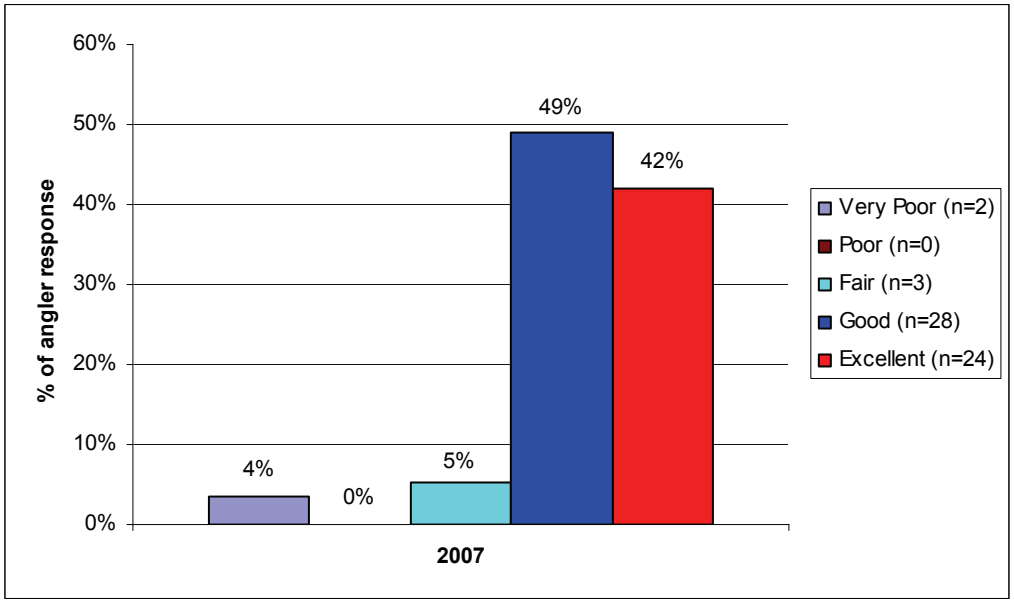
12.2.7.1 Quality of the angling experience

Of 64 anglers who were asked to rate their angling experience, 57 responded. A total of 2 anglers rated their experience as very poor, 3 as fair, 28 as good and 24 as excellent (4%, 5%, 49% and 40%, respectively) (Table 68 & Figure 37).

Table 68. Quality of angling experience on the St. Mary River by residence.

Residence	Very Poor	Poor	Fair	Good	Excellent
B.C.	2	0	3	11	15
U.S.	0	0	0	8	6
Alberta	0	0	0	8	2
Other CDN.	0	0	0	1	0
Other	0	0	0	0	1
Total	2	0	3	28	24

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 135 responses categorized into this list. There were 37 responses related to water conditions, 33 pertaining to the surrounding scenery, 25 to the quality of fish caught, 25 which listed the number of other anglers as a factor (positive and negative), 7 responses relating to the quantity of fish caught, 6 pertained to the quality of water access and 2 responses were listed under "other" (Table 69).

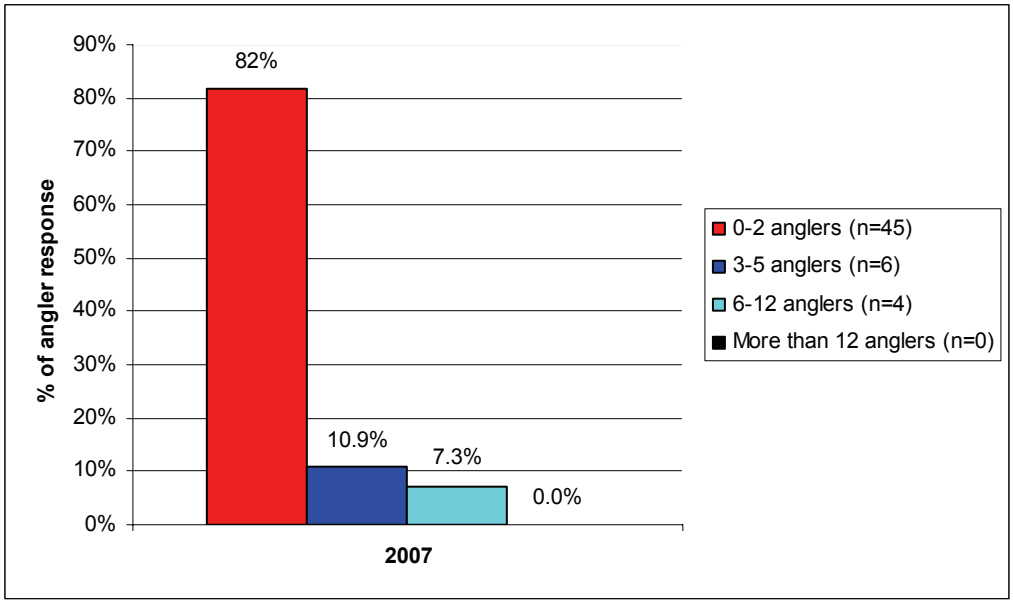
Table 69. Summary of factors contributing to the quality of angling experience for the St. Mary River.

Factor 1		Factor 2		Factor 3		Sum of Factors	
B	20	D	18	F	21	C (Water conditions)	37
C	16	C	16	D	13	D (Surrounding scenery)	33
A	7	B	5	C	5	B (Quality of fish caught)	25
D	2	F	4	E	4	F (Number of other anglers)	25
		E	2	H	2	A (Quantity of fish caught)	7
						E (Quality of access to water)	6
						H (Other)	2

12.2.7.2 Other anglers seen

Of the 64 anglers interviewed on the St. Mary River, 55 anglers responded to the question of how many other anglers they saw on their trip. Of these anglers, 45 saw 0-2 other anglers, 6 saw 3-5 anglers, 4 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.



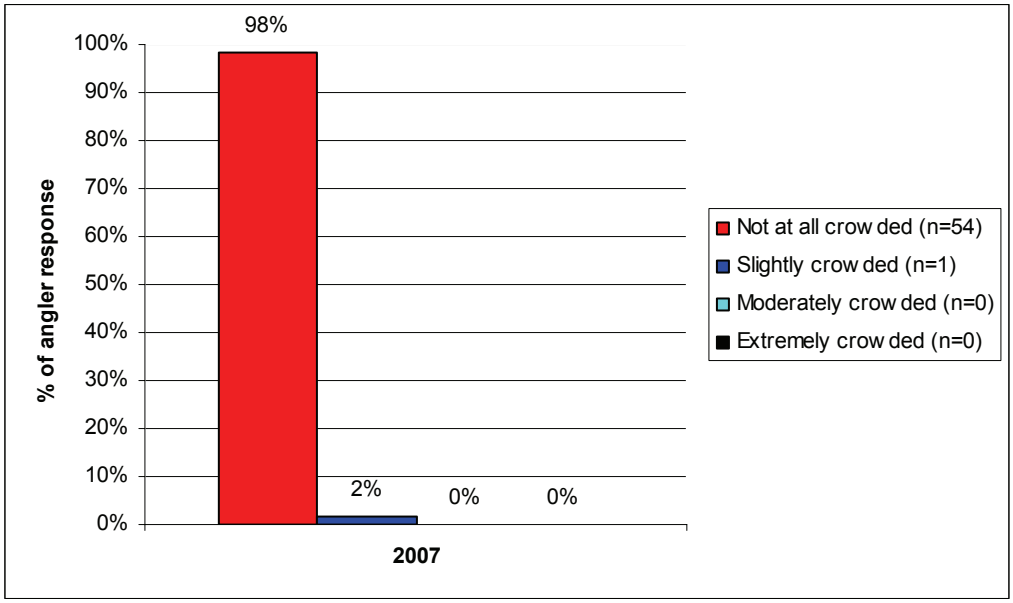
12.2.7.3 Crowding response

Of the 64 anglers interviewed on the St. Mary River, 55 anglers responded to the crowding questions. Overall, anglers did not feel that crowding was an issue on the river (Figure 39). Of the 55 anglers, 54 rated the crowding level "not at all crowded" and 1 angler rated it as "slightly crowded" (Table 70).

Table 70. 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	54	98%
Slightly Crowded	1	2%
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).

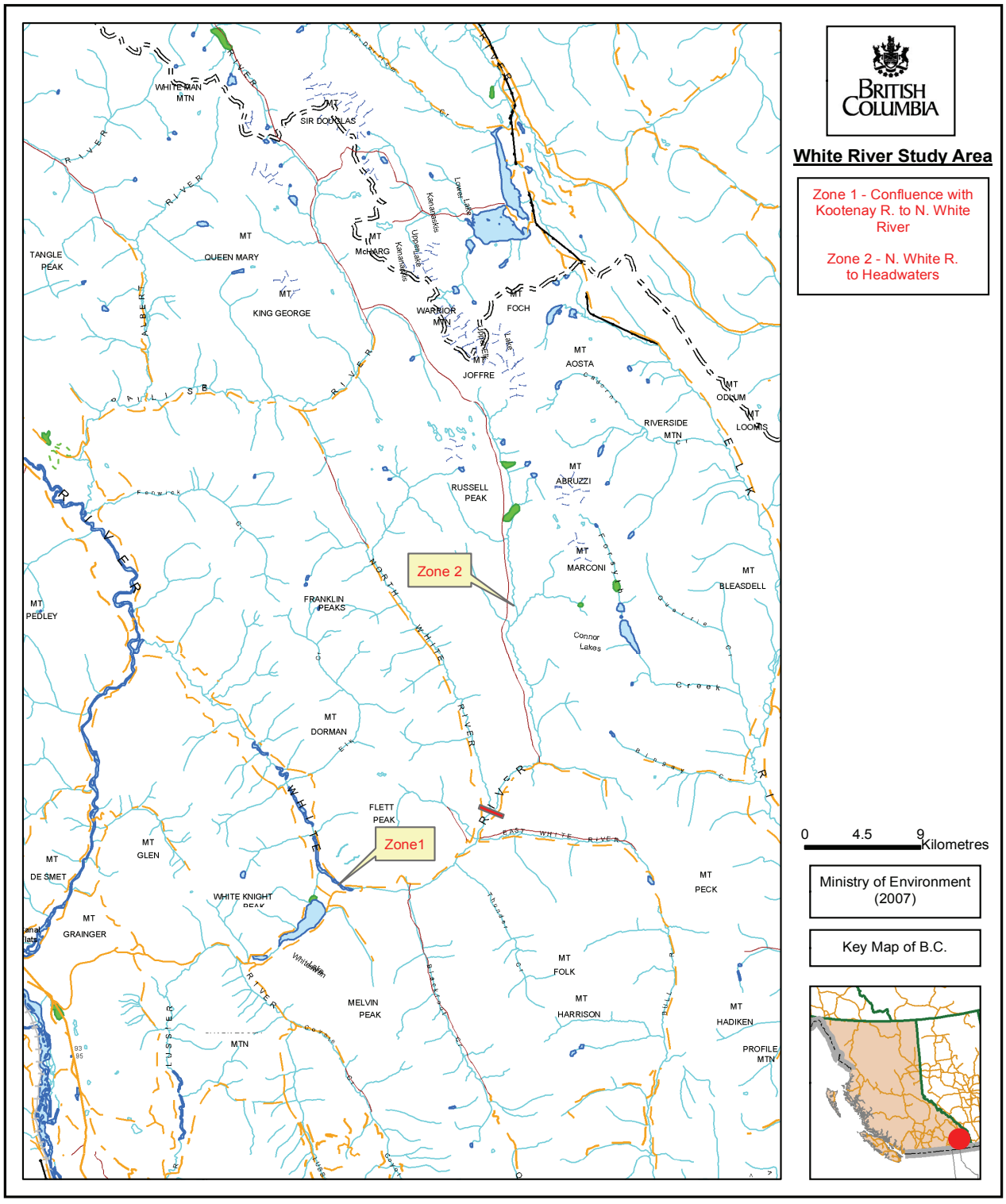
The White River has a total watershed area of 987 km^2 with a mean annual discharge of 23.3 m^3/s (Water Survey of Canada). Significant tributaries to the North and Middle Forks include Schofield Creek, Nilksuka Creek, Nipakoo Creek, Colin Creek, Maiyuk Creek, Kotsats Creek, Klookuh Creek and Rock Canyon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

13.2.1 Effort and Catch

A total of 55 anglers were interviewed over 12 days on the White River during the survey. They fished for 127 hours and caught 8 bull trout (BT), 1 mountain whitefish, 3 rainbow trout and 112 westslope cutthroat trout for an overall catch per unit effort (CPUE) of 1.0 fish per rod hour (Table 71).

Table 71. Total angler effort and catch success on the White River.

Angler Days	Hours Fished	BT	MW	RB	WCT	CPUE
55	127	8	1	3	112	1.0

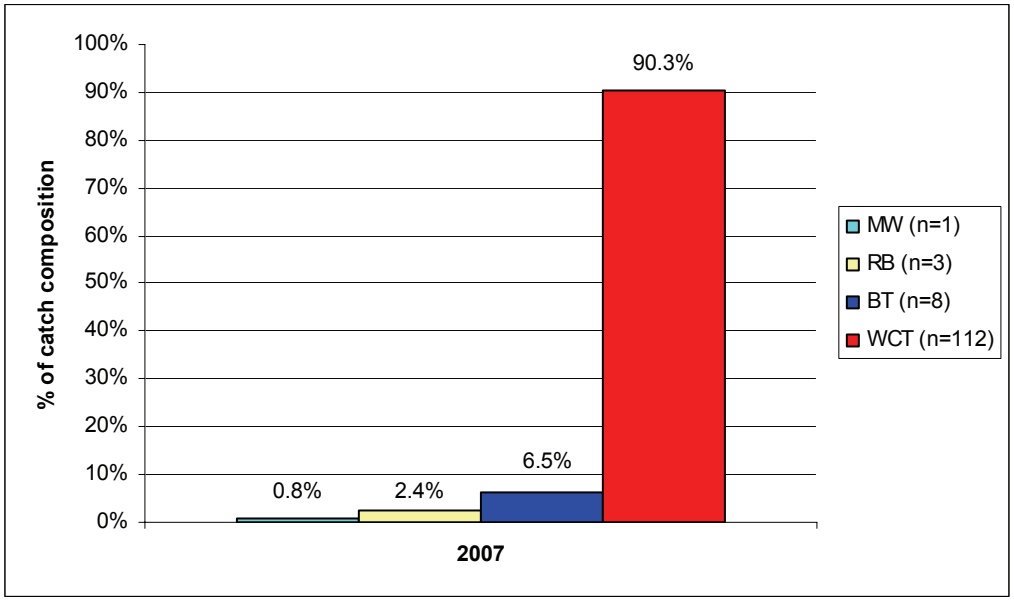
Of the 124 fish caught by anglers interviewed on the White River, 122 were released (98.4% release rate) (Table 72).

Table 72. Total number of fish released and harvested by species on the White River.

Species	Total Catch	% of Catch	Catch & Release	Harvest	% Release Rate
BT	8	6.5%	7	1	87.5%
MW	1	0.8%	1	0	100%
RB	3	2.4%	2	1	67%
WCT	112	90.3%	112	0	100%
Total	124		126	0	100%

Westslope cutthroat trout composed 90.3% of the catch during the White River summer/fall fishery, with bull trout, rainbow trout and mountain whitefish comprising 6.5%, 2.4% and 0.8%, respectively (Figure 41).

Figure 41. Catch composition for the 2007 summer/fall White River fishery.



13.2.2 Trip length

Overall, anglers interviewed on the White River spent an average of 2.7 hours fishing per day on the White River through the course of the survey (complete trip data only, n=21). It should be noted that all complete trip data were from shore anglers.

13.2.3 Angling methods

Of the 55 anglers interviewed on the White River, 30 were fly anglers (54.5%), while 22 used gear (40%) and 3 used both fly and gear (5.5%) (Table 73).

Table 73. Fishing methods by place of residence on the White River.

Place of Residence	Fly	Gear	Both
United States	4	0	0
British Columbia	20	18	2
Alberta	6	2	1
Other Canadians	0	1	0
Other Countries	0	1	0
Total	30	22	3

13.2.4 Angler residency

Of the 55 anglers interviewed on the White River, 50 were Canadian (91%), 4 were American (4%) and 1 angler was from Europe (2%). Canadian anglers were from British Columbia, Alberta and Manitoba, American anglers were from Idaho and Wisconsin and the European angler was from Germany (Table 74).

Table 74. Place of residence for anglers fishing the White River.

Country of Residence	Total Anglers	%	Province/State	Number of Anglers	%
Canada	50	91%	British Columbia	40	73%
			Alberta	9	16%
			Manitoba	1	2%
United States	4	7%	Idaho	3	5%
			Wisconsin	1	2%
Europe	1	2%	Germany	1	2%

13.2.5 Angling experience

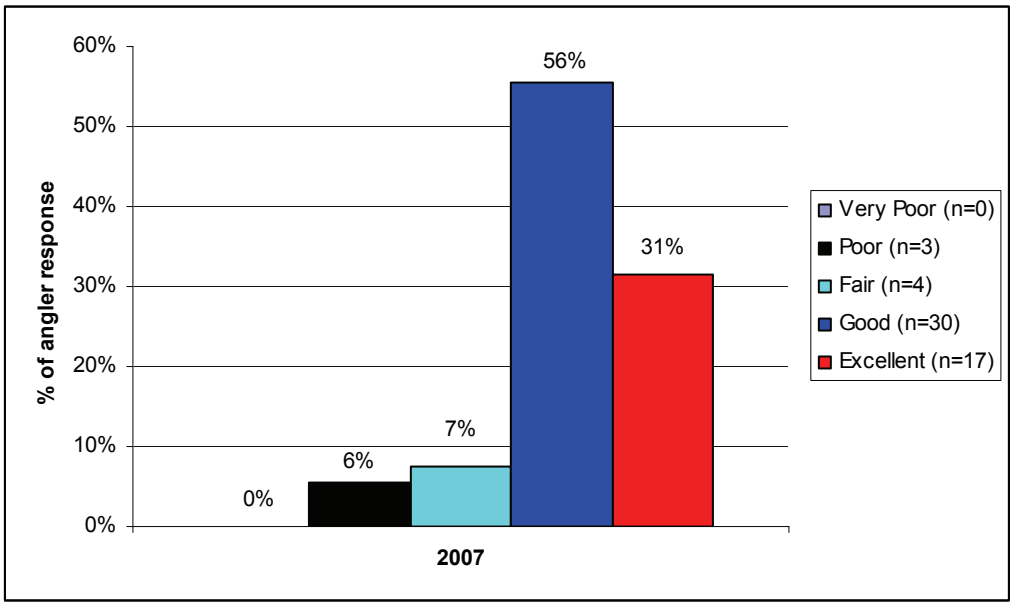
13.2.5.1 Quality of the angling experience

Of 55 anglers who were asked to rate their angling experience, 54 responded. A total of 3 anglers rated their experience as poor, 4 as fair, 30 as good and 17 as excellent (5.5%, 7.4%, 55.6% and 31.5%, respectively) (Table 75 & Figure 42).

Table 75. Quality of angling experience on the White River by residence.

Residence	Very Poor	Poor	Fair	Good	Excellent
B.C.	0	1	4	18	17
U.S.	0	0	0	4	0
Alberta	0	2	0	7	0
Other CDN.	0	0	0	1	0
Other	n/a	n/a	n/a	n/a	n/a
Total	0	3	4	30	17

Figure 42. Quality of angling experience response from anglers on the White 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 145 responses categorized into this list. There were 46 responses pertaining to the surrounding scenery, 30 to the quality of fish caught, 29 related to water conditions, 20 which listed the number of other anglers as a factor (positive and negative), 11 pertained to the quality of water access, 8 related to the quantity of fish caught and 1 response was listed under "other" (Table 76).

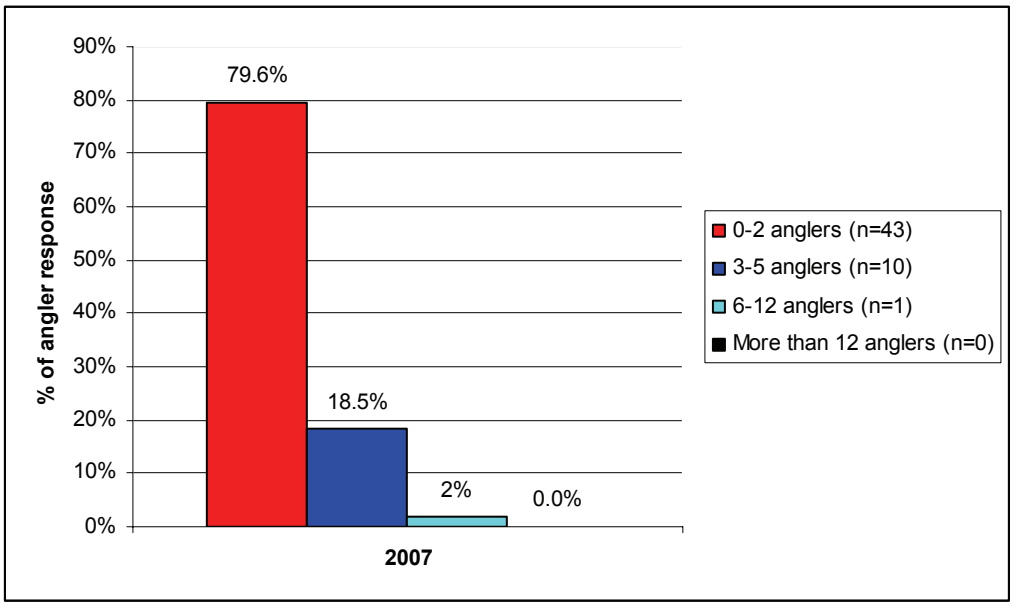
Table 76. Summary of factors contributing to the quality of angling experience for the White River.

Factor 1		Factor 2		Factor 3		Sum of Factors	
B	25	D	27	F	20	D (Surrounding scenery)	46
C	12	C	14	D	15	B (Quality of fish caught)	30
A	8	B	5	E	9	C (Water conditions)	29
D	4	E	2	C	3	F (Number of other anglers)	20
				H	1	E (Quality of access to water)	11
						A (Quantity of fish caught)	8
						H (Other)	1

13.2.5.2 Other anglers seen

Of the 55 anglers interviewed on the White River, 54 anglers responded to the question of how many other anglers they saw on their trip. Of these anglers, 43 saw 0-2 other anglers, 10 saw 3-5 anglers, 1 saw 6-12 other anglers and no anglers saw more than 12 other anglers on their trip (Figure 43).

Figure 43. Other anglers seen by anglers interviewed on the White River.



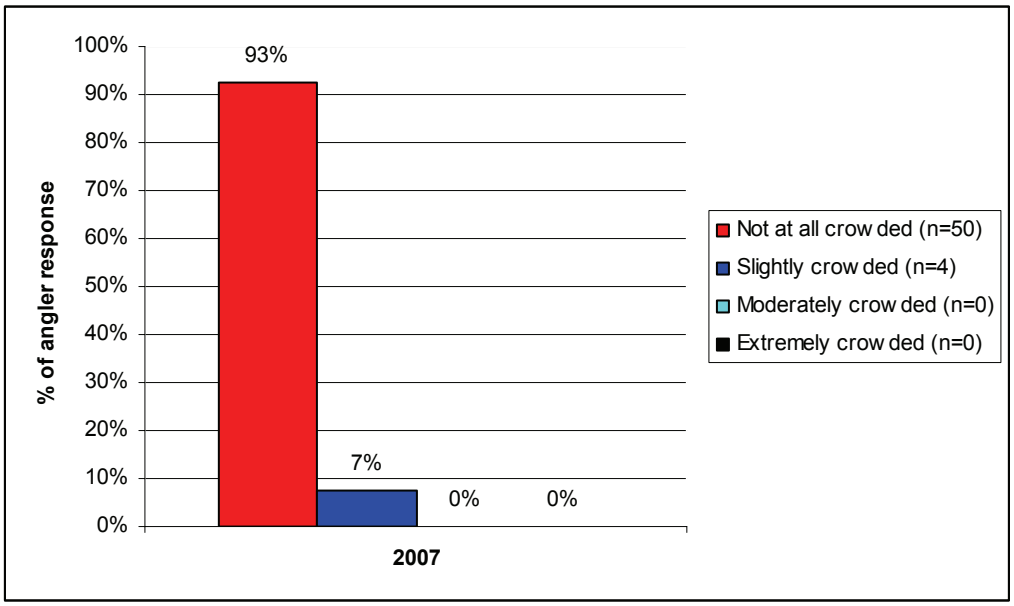
13.2.5.3 Crowding response

Of the 55 anglers interviewed on the White River, 54 anglers responded to the crowding questions. Overall, anglers did not feel that crowding was a significant issue (Figure 44). Of the 54 anglers, 50 rated the crowding level "not at all crowded" and 4 rated it as "slightly crowded" (Table 77).

Table 77. Summary of angler response related to crowding on the White River.

Crowding Description	Number of Anglers	Percent of Angler Response
Not at all Crowded	50	93%
Slightly Crowded	4	7%
Moderately Crowded	0	0%
Extremely Crowded	0	0%

Figure 44. Angler crowding rating on the White River.



14.0 WIGWAM RIVER

14.1 Study area

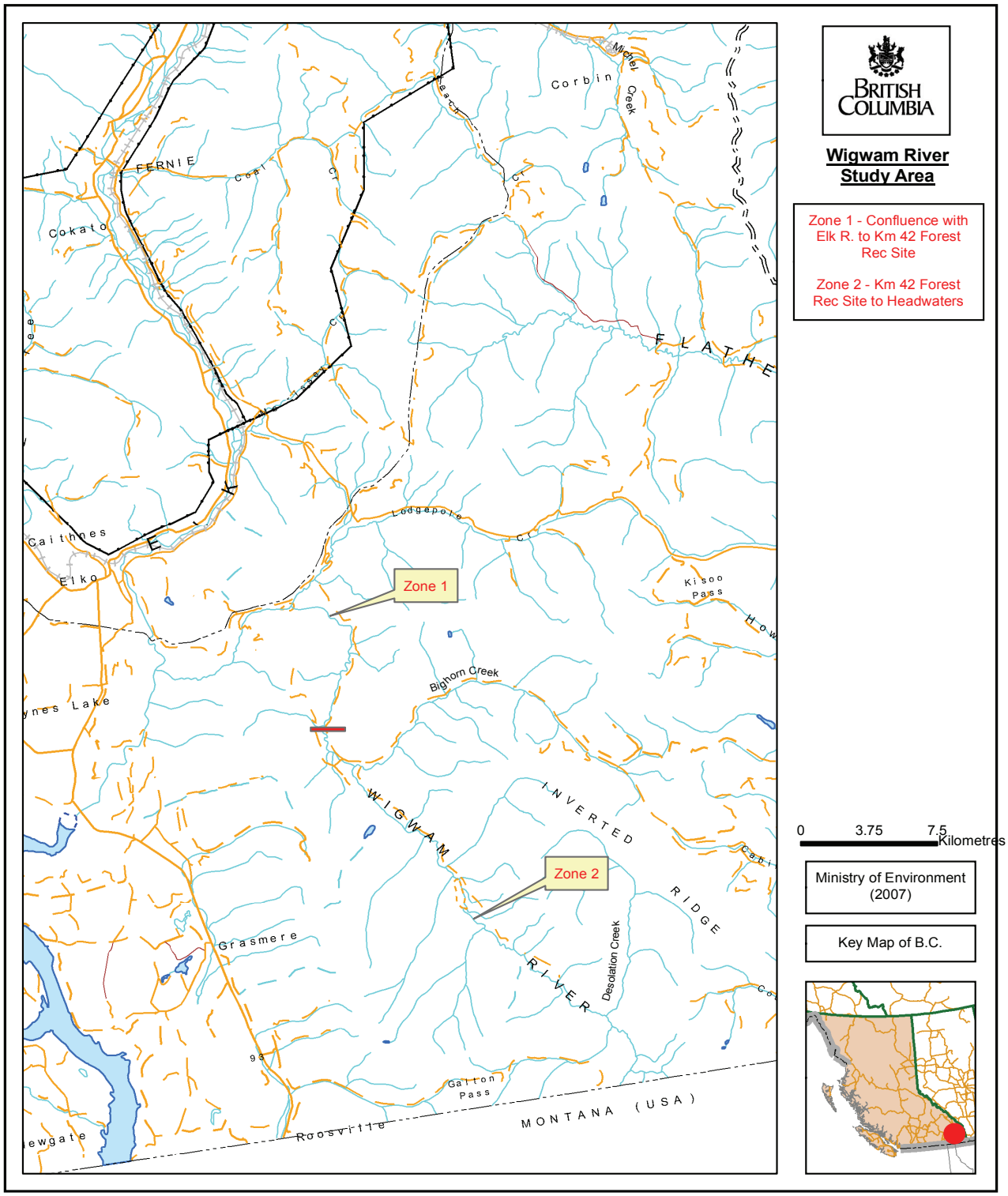
The Wigwam River originates in the Rocky Mountains within the state of Montana and flows approximately 57 km north/northwest between the Galton and Macdonald ranges in British Columbia to its confluence with the Elk River, approximately 10 km south of the town of Elko (Figure 45).

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 45. Map of the Wigwam River study area.



14.2 Results

14.2.1 Effort and Catch

A total of 110 anglers were interviewed over 14 days on the Wigwam River during the survey. They fished for 668 hours and caught 75 bull trout, 5 mountain whitefish, 1 rainbow and 432 westslope cutthroat trout (WCT) for an overall catch per unit effort (CPUE) of 0.8 fish per rod hour (Table 78).

Table 78. Total angler effort and catch success on the Wigwam River.

Angler Days	Hours Fished	BT	MW	RB	WCT	CPUE
110	668	75	5	1	432	0.8

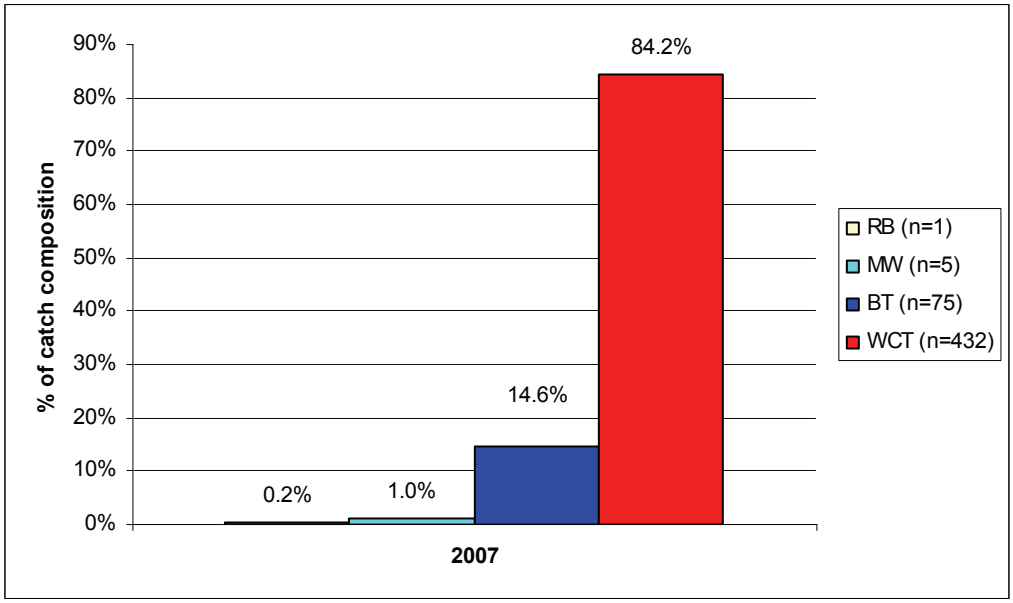
The entire Wigwam River is designated "catch and release" in the BC freshwater fishing regulations. Of the 513 fish caught by anglers interviewed on the Wigwam River, 512 fish were released (99.8% release rate) and 1 was harvested illegally. Potential post-hooking mortality numbers for fish caught and released on the Wigwam River range from 3 to 26 fish (Table 79).

Table 79. 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	3	26	1

Westslope cutthroat trout composed 84.2% of the catch during the Wigwam summer/fall fishery, with bull trout, mountain whitefish and rainbow trout comprising 14.6%, 1% and 0.2% of the total catch, respectively (Figure 46).

Figure 46. Catch composition for the 2007 summer/fall Wigwam fishery.



14.2.2 Guided vs. non-guided anglers

Of the 110 anglers interviewed on the Wigwam River, 5 were guided (4.5%) and 105 were non-guided (95.5%) (Table 80).

Table 80. Total angler days for guided and non-guided anglers on the Wigwam River.

Guided Angler Days	Non-Guided Angler Days	Total Angler Days
5	105	110

Guided anglers fished for 41 hours (6% of total hours fished), while non-guided anglers fished for 627 hours (94% of total hours fished) (Table 81).

Table 81. 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
41	627	668

Guided anglers caught 45 fish, while non-guided anglers caught 468 (9% and 91% of the total catch, respectively). Catch per unit effort for guided anglers (CPUE) was 1.10 fish per rod hour, while the CPUE for non-guided anglers was 0.75 fish per rod hour (Table 82).

Table 82. Catch, effort and CPUE for guided vs. non-guided anglers on the Wigwam.

Status	Angler Days	Angler Hours	Total Fish Caught	CPUE
Guided	5	41	45	1.10
Non-Guided	105	627	468	0.75
Total	110	668	513	0.8

14.2.3 Trip length

Overall, anglers interviewed on the Wigwam River spent an average of 7.2 hours fishing per day on the Wigwam River through the course of the survey (complete trip data only, n=72). Due to the limitation in sample size for complete trip guided angler data (n=3), comparative trip length data between different angler classes is not summarized.

14.2.4 Angling methods

Of the 110 anglers interviewed on the Wigwam River, all were fly anglers (100%) (Table 83). It should be noted that the Wigwam River is designated "fly fishing only" in the BC freshwater fishing regulations.

Table 83. Fishing methods by place of residence on the Wigwam River.

Place of Residence	Fly	Gear	Both
United States	54	0	0
British Columbia	27	0	0
Alberta	20	0	0
Other Canadians	8	0	0
Other Countries	1	0	0
Total	110	0	0

14.2.5 Angler residency

Of the 110 anglers interviewed on the Wigwam River, 55 were Canadian (50%), 54 were American (49%) and 1 angler was from the continent of Australia/Oceania (1%). Canadian anglers were from British Columbia, Alberta, Ontario, Saskatchewan and Quebec, while American anglers represented 16 different states and 1 angler was from New Zealand (Table 84).

Table 84. Place of residence for anglers fishing the Wigwam River.

Country of Residence	Total Anglers	%	Province/State	Number of Anglers	%
Canada	55	50%	British Columbia	27	24.5%
			Alberta	20	18.1%
			Ontario	5	4.5%
			Saskatchewan	2	1.8%
			Quebec	1	1%
United States	54	49%	Washington	8	7.3%
			California	7	6.3%
			Montana	7	6.3%
			Massachusetts	6	5.4%
			Colorado	5	4.5%
			New York	4	3.6%
			Minnesota	3	2.7%
			Hawaii	2	1.8%
			Idaho	2	1.8%
			North Carolina	2	1.8%
			Oregon	2	1.8%
			Texas	2	1.8%
			Maryland	1	1%
			Michigan	1	1%
			Nevada	1	1%
			New Jersey	1	1%
Australia/Oceania	1	1%	New Zealand	1	1%

14.2.6 Angling experience

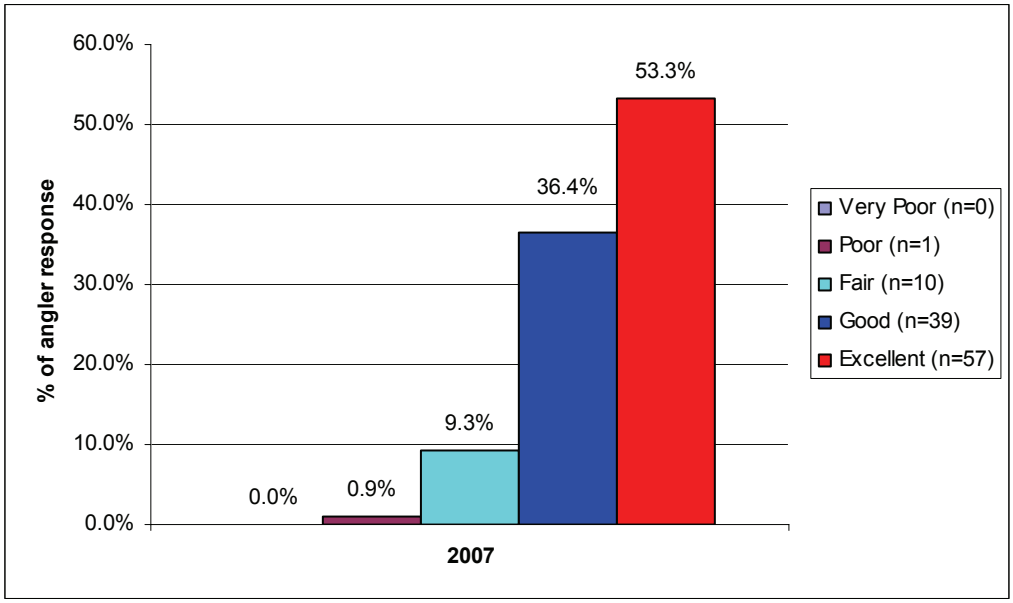
14.2.6.1 Quality of the angling experience

Of 110 anglers who were asked to rate their angling experience, 107 responded. A total of 1 angler rated their experience as poor, 10 as fair, 39 as good and 57 as excellent (0.9%, 9.3%, 36.4% and 53.3%, respectively) (Table 85 & Figure 47).

Table 85. Quality of angling experience on the Wigwam River by residence.

Residence	Very Poor	Poor	Fair	Good	Excellent
B.C.	0	1	2	11	10
U.S.	0	0	2	20	32
Alberta	0	0	4	6	10
Other CDN.	0	0	2	2	4
Other	0	0	0	0	1
Total	0	1	10	39	57

Figure 47. 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 315 responses categorized into this list. There were 92 responses pertaining to the quality of fish caught, 89 to the surrounding scenery, 63 related to water conditions, 32 which listed the number of other anglers as a factor, 30 related to the quantity of fish caught and 9 pertained to the quality of water access (Table 86).

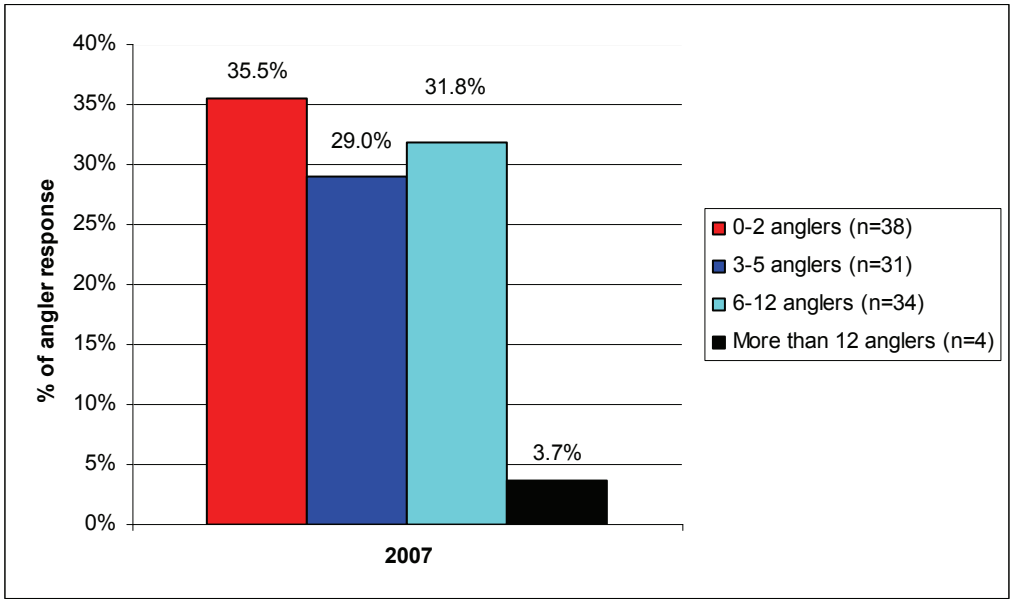
Table 86. Summary of factors contributing to the quality of angling experience for the Wigwam River.

Factor 1		Factor 2		Factor 3		Sum of Factors	
B	64	C	50	D	66	B (Quality of fish caught)	92
A	30	B	28	F	30	D (Surrounding scenery)	89
C	11	D	23	E	7	C (Water conditions)	63
		F	2	C	2	F (Number of other anglers)	32
		E	2			A (Quantity of fish caught)	30
						E (Quality of access to water)	9

14.2.6.2 Other anglers seen

Of the 110 anglers interviewed on the Wigwam River, 107 anglers responded to the question of how many other anglers they saw on their trip. Of these anglers, 38 saw 0-2 other anglers, 31 saw 3-5 anglers, 34 saw 6-12 anglers and 4 anglers saw more than 12 other anglers on their trip (Figure 48).

Figure 48. Other anglers seen by anglers interviewed on the Wigwam River.



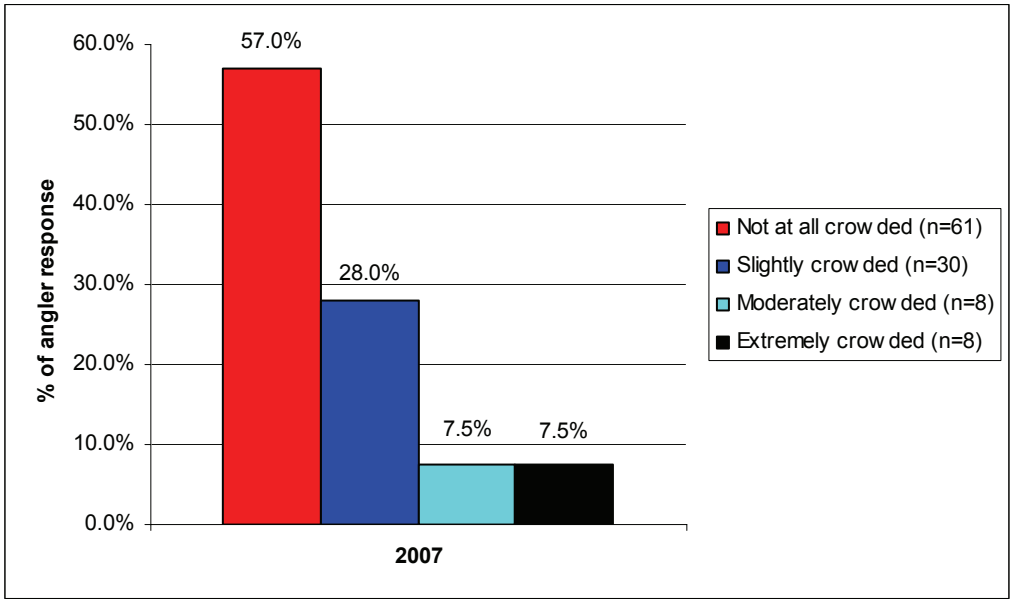
14.2.6.3 Crowding response

Of the 110 anglers interviewed on the Wigwam River, 107 anglers responded to the crowding questions. Overall, anglers did not feel that crowding was a significant issue (Figure 49). Of the 107 anglers, 61 rated the crowding level "not at all crowded", 30 rated it as "slightly crowded", 8 rated it as "moderately crowded" and 8 anglers rated it as "extremely crowded" (Table 87).

Table 87. Summary of angler response related to crowding on the Wigwam River.

Crowding Description	Number of Anglers	Percent of Angler Response
Not at all Crowded	61	57%
Slightly Crowded	30	28%
Moderately Crowded	8	7.5%
Extremely Crowded	8	7.5%

Figure 49. Angler crowding rating on the Wigwam River.



15.0 DISCUSSION & RECOMMENDATIONS

The increase in angler effort on major East Kootenay streams over the past decade is well documented. Over the past several years, anglers have begun targeting the regions smaller, remote stream systems as well. There is no question that the angling environment existing in the EK region a decade ago has evolved. Guided and non-guided angler days and catch rates have dramatically increased and there have been documented concerns pertaining to overcrowding and the potential for a diminishing quality of angling experience, particularly on the Elk and Wigwam systems. The implementation of the classified waters system in Region 4 during 2005 and the preliminary and ongoing consultation process with stakeholders regarding this system is in response to the rapidly evolving fisheries and concerns resulting from these changes.

Primary concerns for fisheries management pertaining to the rapid increase in angler effort on EK streams are for the biological health as well as social aspects (ie. overcrowding) of the fisheries. Clearly, concerns related to the sustainability and health of our sport fish populations over time, given increasing pressure, remain paramount in management decisions. However, maintaining the pristine qualities of EK classified streams, including the lack of crowding, which is documented to be a large part of the unique attractiveness of our stream fisheries, is an important factor to be considered. Managing crowding issues also contributes to conservation goals.

Initially, it was optimistically forecast that the Class II system would begin to curb overcrowding issues on EK streams, simply through the implementation of day specific licence requirements and the corresponding fees for non-resident anglers. As there was no mechanism in the system to accurately account for and limit rod day targets established in specific angling management plans for each system, it was hoped rod day fees would reduce pressure sufficiently to meet these targets. Current data shows that this situation has not occurred and that AMP targets are significantly oversubscribed (Tepper, pers. comm., 2005 Classified licence counterfoil data). The lack of an effective mechanism to measure and control angling pressure and a lack of accountability inherent in the system has failed to address overcrowding issues on EK classified streams. As of fall, 2007, an electronic licensing system was introduced in B.C. This was implemented on a partial basis for the fall of 2007 and will likely be the exclusive angling

licence system employed by the 2009 angling season. This system should give enforcement staff a mechanism to effectively monitor anglers by increasing angler accountability, reducing incidental licence error and by providing a tool for investigation and auditing. The system should also enable fisheries managers to monitor use, summarize data and effectively cap targets established in the AMPs.

From a conservation aspect, there remains concern as to the status of EK Class II fisheries. Regulatory regimes over the past decade have been increasingly restrictive and are largely responsible for the current perceived 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. The introduction of the classified waters system and established rod days for various angler classes is a positive step in proactive management; however, the only consistent mechanism currently available for fisheries managers to monitor populations is comparisons of CPUE estimates taken from River Guardian surveys. It remains vital to establish indicator sections, where possible, on all classified 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 three 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 2007 River Guardian season demonstrate a continued need for increased vigilance in monitoring classified waters. River Guardians are a vital part of the classified system in the region and have provided a significant contribution to resource protection. 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 and protection 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 concerns and inadequacies that can be found in the dissection of the system and its third season in this Region. It is critical that stakeholders 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. There were significantly more B.C. resident anglers interviewed on the Classified systems and they responded more positively overall during the last two surveys than in previous years.

As angler effort continues to increase in the region, it is paramount that fisheries managers are enabled to maintain a sufficient River Guardian presence to assist in enforcement and compliance capacities, carry out accurate assessments of fish populations and maintain accurate data pertaining to angler classes, effort and catch statistics. 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.

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Appendix I. River Guardian Infraction Sheet – 2007

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 – 2007

IF # _____ **Database ID #** _____

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) **Infraction** (**Y** – Yes **N** – No) _____

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

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