FLATHEAD RIVER ANGLER CREEL REPORT 2002-2003

Main Stem River and Sloughs

By

Mark Deleray
Montana Fish, Wildlife & Parks
490 N. Meridian Road
Kalispell, Montana 59901

April 2004

EXECUTIVE SUMMARY

Montana Fish Wildlife and Parks conducted an angler creel survey on the main stem of the Flathead River from June 2002 to May 2003. This reach of stream had diverse habitats and seasonal fisheries. This creel survey assessed angler use, harvest and catch, as well as certain angler characteristics.

We split the main stem river into four reaches and separated the sloughs adjacent to the lowest river section into Section 5. The lowermost river reach (Section 1) began at the confluence with the Stillwater River and went downstream to the inlet at Flathead Lake. This was approximately 22 miles of river. The river was partitioned at this point because during summer months Kerr Dam, at the outlet of Flathead Lake, impounds 10 feet of water which backs up lake water to this point creating a slow moving, low gradient river habitat that is distinct from the upstream river reaches. Section 2 comprised the river reach upstream of the Stillwater River confluence to the public Pressentine Bar Fishing Access Site, covering roughly 11 river miles. Section 3 was roughly 8 miles of stream from the public Teakettle Fishing Access Site at the Highway 40 Bridge crossing downstream to the Pressentine Bar Fishing Access. Section 4 began at the confluence of the North and Middle Forks of the Flathead River at Blankenship Bridge and went downstream to the Teakettle Fishing Access Site. This was about a 14.5-mile long reach.

Angler catch and demographic characteristics were collected through an interview process. We successfully collected 925 angler interviews, 571 from shore anglers and 354 from boat anglers. Fishing pressure estimates were based on random instantaneous angler counts. Counts were conducted from a fixed-wing aircraft. We successfully completed 175 survey flights, 64 on weekend days and 111 on weekdays. A computer program developed by MFWP was used to calculate angler pressure, harvest and catch rates.

For the June 2002 to May 2003 period, anglers fished an estimated 47,048 hours on the main stem Flathead River and sloughs. The overall average length of a fishing day was 2.3 hours for shore anglers and 4.1 hours for boat anglers. The average fishing day was 3.1 hours when all completed interview data were combined. The estimated 47,048 hours represented 14,992 days. The most popular fisheries were in the summer and fall months (July through November), with peaks in August and October. Weekend and holidays comprised 40 percent of fishing pressure.

The 2002-2003 fishing pressure varied between sections and across seasons. Flathead River fisheries are seasonal and dependent on migrations of different fish species. Section 2 (Pressentine Bar Fishing Access down to the confluence of the Stillwater River) followed by Section 4 (Blankenship Bridge down to Teakettle Fishing Access) received the highest fishing pressure of all five reaches. Sections 2, 3 and 4 were upstream of the backwater effect of Kerr Dam, consisted of river fisheries and contained 71 percent of the total angler use in the main stem river and associated sloughs. Unlike many river fisheries in Montana, the fisheries in these reaches dramatically change during the year as trout and whitefish populations migrate between the lake and river or river tributaries. Correspondingly, the angler use levels tracked the changing fisheries.

In 2002-2003, we estimated an angler harvest of 25,209 fish in the combined five river sections. Roughly 22,000 harvested fish were lake whitefish and over 1,200 were lake trout. Over 900

"Other" fish were harvested, which were mostly minnow species such as northern pikeminnow or peamouth chub that anglers caught to use or sell for bait. We estimated that 575 northern pike and 167 rainbow trout were harvested. During this survey, there were no westslope cutthroat trout or bull trout harvested due to the restrictive fishing regulations, which forbid harvest. Combining all strata, the lake whitefish harvest rate (0.7 fish per hour) and catch rate (0.8 fish per hour) were much higher than for any of the other fish species. Combining all strata, westslope cutthroat trout had the second highest catch rate (0.2 fish per hour). These values can be somewhat misleading due to the seasonal nature of Flathead River fisheries and the differences between river sections. As with angler pressure, harvest and catch rates varied with season and river section.

The upper three river sections (2, 3 and 4) are free-flowing river reaches. The lower two sections (1 and 5) are influenced by Flathead Lake levels and are either slow moving river, during summer and fall months, or slough habitats. These habitat differences lead to differences in fisheries with trout fisheries in the uppermost reaches, lake whitefish fisheries in the middle reaches and warm water fisheries in the sloughs. Section 4, the uppermost reach was predominately a summer fishery for westslope cutthroat trout, with lower numbers of rainbow trout, bull trout and mountain whitefish. Sections 2 and 3 had summer fisheries similar to Section 4, but also had a fall fishery for lake whitefish. In Section 2, the most popular fishery was for lake whitefish. The fisheries in Sections 1 and 5 consisted of low numbers of trout mixed in with catches of pike, perch, bass and non-game fish species. Section 5 included winter ice fishing.

Section 2 received an estimated 14,516 hours of fishing pressure. Pressure estimates in Section 2 showed low numbers of anglers during winter and spring months followed by two peaks, one in summer and the other in fall. The first increase began in July, peaked in August, and declined into September and represented the westslope cutthroat and rainbow trout fisheries. The highest levels of fishing pressure in Section 2 were in October and November. These represented the fall lake whitefish fishery. Lake whitefish comprised 94 percent of harvested fish, while lake trout just over five percent. Likewise, mean catch rates for these two species were also highest in this section. The mean catch rate for lake whitefish in Section 2 (1.38 fish per hour) was the highest mean catch rate for all species in all sections. The Section 2 lake whitefish harvest was roughly 84 percent of the total lake whitefish harvest across all sections. The fishery occurred from October through January. Harvest peaked in November, which corresponded with the peak in the fall spawning migration. Lake trout harvest in Section 2 was distributed much like lake whitefish harvest with most occurring in the fall months.

Lake trout harvest in Section 2 comprised 84 percent of all lake trout harvested in the survey. Over 90 percent of the lake trout harvested in Section 2 occurred in October through December, with the most (635) in November. It is thought that lake trout moved upstream with migrating whitefish (lake and pygmy) in the fall.

The summer (July through September) fishery in Section 2 consisted of westslope cutthroat trout and rainbow trout. Catch rates were relatively low during this period. Catch rates for cutthroat trout ranged from 0.04 to 0.39 fish per hour, with highest catch rates of 0.28 and 0.39 on weekdays and weekend days in September, respectively. Catch rates for rainbow trout were similar. The highest catch rates for cutthroat trout in Section 2 were 1.11 fish per hour on weekdays and 0.89 on weekend days in April. These were also the highest for all sections. Late winter and early spring

months traditionally provided good trout fishing as cutthroat trout from Flathead Lake move up into the river system beginning the spring spawning migration and staging period.

Section 3 is a river reach similar to Section 2. It was a free flowing river reach centrally located in the Flathead Valley. The 2002-2003 total pressure estimate (8,735 hours) was lower than those in Section 2, but the changes in use levels by month shows a similar shape, low pressure during winter and spring months followed by two peaks in use in summer and fall. Unlike Section 2, the summer months (July and August) in Section 3 showed the higher use levels (over 40 percent of the total use in the section) rather than the fall months. For July and August, there were over 5.5 times the numbers of boat fishing hours as shore fishing hours. There was a shift in angler type when moving into the fall months. During September and October, shore angler hours outnumbered boater hours almost 2 to 1. This shift corresponded with the change from the summer cutthroat trout to the fall lake whitefish fishery. Section 3, positioned between Sections 2 and 4, had angler use levels and patterns intermediate to those of the adjacent sections. Moving between these three sections the fisheries transformed from primarily trout fisheries in the upper reach to primarily a lake whitefish fishery in the lower reach.

Lake whitefish harvest in Section 3 occurred from September through December, depicting the seasonality of the lake whitefish fishery. Harvest peaked in November. Lake whitefish (3,607) comprised 96 percent of harvested fish in Section 3, while lake trout made up most of the remainder. Mean catch rate for lake whitefish (1.24 fish per hour) was the highest mean catch rate for all species in this section. Estimated lake trout harvest (141) was distributed much like lake whitefish harvest, with 89 percent occurring in November and December.

Westslope cutthroat trout comprised the summer (July through September) fishery in Section 3. Catch rates for westslope cutthroat trout were some of the highest during this period, ranging from 0.24 to 0.69 fish per hour, with highest catch rates of 0.69 and 0.52 on weekdays and weekend days in August, respectively. Together, cutthroat trout and rainbow trout provided summer catch rates ranging from 0.26 to 0.83 fish per hour, with the highest rates in August. Mountain whitefish and bull trout provided low catch rates during summer months.

Section 4 had the second highest level of angler use (10,246 hours) for the five sections. However unlike Sections 2 and 3, there was not a fall lake whitefish fishery of any importance. The fishery in Section 4 was almost exclusively a summer trout fishery. There were low levels of winter and spring angler use, followed by a rapid increase in use in July with a peak in August (42 percent of total use). After September there was a gradual decline through the fall months. Section 4 did not show a second peak in angler use during the fall months. Over 80 percent of angler fishing pressure occurred in July, August and September. In summer, boat angler hours were almost five times greater than shore angler hours.

In Section 4, the summer fishery was primarily for westslope cutthroat trout, with an overall mean catch rate of 0.43 fish per hour. Summer cutthroat trout catch rates ranged from 0.31 to 0.57 fish per hour, with the highest rates in August. During this period, rainbow trout, bull trout and mountain whitefish catch rates were low, ranging from 0.0 to 0.06. Anglers often caught a mix of the four fish species. Adding the catch rates for the four species, the overall trout and whitefish summer catch rate ranged from 0.37 to 0.72 fish per hour. The estimated numbers of harvested fish

were low. Only three lake trout (all in July), 97 rainbow trout (all in October), and 119 "Other" species were harvested. The "Other" species included northern pikeminnow and eastern brook trout.

Section 1 is impacted by the unnaturally high summer lake pool elevation of Flathead Lake and the storage capacity of Kerr Dam. During summer months this 22-mile reach is a low gradient slow moving reach without defined pool and riffle habitats. This section received the lowest angler pressure (4,930 hours) of all five sections. Low angler use was spread, relatively evenly, across all months. This reach did not have a popular or seasonal fishery that drew large numbers of anglers.

The fisheries in Section 1 were poor when compared to the upstream reaches. Mean catch rates for all species were low, ranging from 0.002 to 0.13 fish per hour. The highest mean catch rates were for cutthroat trout and "Other" species (northern pikeminnow and peamouth chub). Cutthroat trout catch was only noted in August and September. The relatively high September catch rate of 0.72 fish per hour produced the higher overall cutthroat trout catch rate, but the September rate resulted from only 12 angler interviews. The backwater effect of Flathead Lake was evident in the mix of fish species caught. Anglers caught all trout and both whitefish species in addition to pike, largemouth bass, yellow perch and non-game fish (mostly native minnow species). Fish harvest was split between game and non-game fish. We estimated harvest of 72 pike and 43 lake trout. All of the pike harvest in Section 1 occurred from July to September. Weekend day and weekday catch rates for pike during these months were low ranging from 0.0 to 0.09 fish per hour. Current fishing regulations for the Flathead River (sloughs not included) only allow harvest of lake whitefish and lake trout and not the other species from December through the third Saturday in May. Harvest for many species is allowed in the remainder of the year. Pike harvest was only observed in three of the six-plus months in which pike harvest was permitted. Lake trout harvest was only observed in February, June and September.

Section 5 (sloughs) had a relatively moderate level of angler use (8,621 hours) when compared to the other sections. The distribution of angler pressure over the year was much different than the distribution in the other sections. Section 5 had over 25 percent of use during January and February, during periods when the sloughs were covered with ice. The peak in use was in July. The July through September period accounted for roughly 42 percent of annual use. Unlike Sections 2 and 3, there was not an increase in angler use during the fall months. In contrast, the October through December period was the lowest use period of the year.

Section 5 is different than the other sections for a number of reasons. First, the sloughs are not riverine habitat, but rather shallow lakes or ponds. Secondly, the water temperature regime varies more widely than in the other river sections. For example, the water warms in the summer to provide warm water fish habitat and in the winter, ice forms on the surface to allow an ice fishery. For these reasons, the fisheries in Section 5 differ from those of the other sections and were comprised mostly of warm water fish species. Section 5 had the highest harvest levels for pike, perch, bass and "Other" fish species, which consisted of peamouth chub and northern pikeminnow. Anglers harvested an estimated 503 pike and 484 perch in the sloughs. Overall mean catch rates were generally low for all species but were highest for "Other" species (0.14 fish per hour) and perch (0.12 fish per hour), followed by pike and bass at 0.08 fish per hour. Pike harvest in Section 5 made up 88 % of all pike harvest observed during this survey. The highest estimated monthly

harvest (116) was in April, likely associated with spawning migrations into slough backwaters. The second highest harvests were in the winter ice fishery in January and February. Perch harvest was highest in the ice fishery, with 88% occurring in January through March. The highest catch rates for largemouth bass occurred in April and May, when we observed rates ranging from 0.77 to 0.96 fish per hour. July and August were the only other months in which we observed anglers catching bass.

Trout catch rates were low in Section 5 and likely resulted from incidental catch when targeting other fish species. We observed bull trout catch primarily in spring months. The highest catch rates for bull trout were 0.03 and 0.06 fish per hour and occurred on weekends in April and May, respectively. We also estimated low bull trout catch rates of 0.02 and 0.01 fish per hour in February and September, respectively. We estimated that 13 lake trout were harvested in March and none in the other months. We observed cutthroat trout catch only in September and at a low rate (0.01 fish per hour).

In the 1992-1993 creel survey of the Flathead River (Hanzel 1995), angler pressure, seasonal fisheries, and catch rate were very similar to those of this survey. The most notable exception to this was the catch and harvest of westslope cutthroat trout in Sections 2 and 3. In Section 2, the mean catch rate for cutthroat trout was 0.08 fish per hour for 2002-2003. Mean cutthroat trout catch rates for 1992-1993 were much higher at 0.34 fish per hour (Hanzel 1995). Also, in the earlier survey westslope cutthroat trout provided the highest mean catch rates (0.63 fish per hour) for Section 3, which was roughly twice the catch rate (0.30 fish per hour) observed for Section 3 in this survey. However, mean catch rates for the year may be somewhat misleading since summer 2002 catch rates for cutthroat trout in Sections 2 and 3 were much higher than the overall mean catch rates for the entire year and were at levels similar to those of the earlier survey. The 2002-2003 mean catch rates for the year for cutthroat trout were likely reduced due to the high level of angler pressure in the fall directed at the lake whitefish fishery. Techniques used to catch lake whitefish resulted in low catch rates for cutthroat trout during a period of high angler use.

Not surprisingly, anglers targeted fish species and used fishing methods and lures suited to the seasonal fisheries and river reach. For example, most fly fishers were summer trout anglers in the upper reaches. Lake whitefish was the most sought after species in the middle reaches and northern pike in the lower reaches. Moving downstream, the incidence of fly fishers declined, and casting artificial lures and bait fishing increased.

There was a distinct gradient between the river reaches in professional guided versus unguided fishing trips. Sections 4 and 3, which had relatively high summer use directed at a river trout fishery, had the highest incidence of guided fishing trips. The highest percentage of guided fishing trips was 42 percent of all interviews in Section 4 and 30 percent in Section 3; all professional guiding occurred during the summer months. There was only a four percent incidence of guided fishing trips in Section 2 and we did not observe any in Section 1 or in the sloughs. From these data, it appeared that all commercial fishing guides on the Flathead River are associated with the summer trout fisheries on the upper river reaches.

We also found that the percentages of nonresident anglers mirrored the results of the guided fishing trip data. There was a general decreasing trend in percentage of nonresident use as we moved downstream. The highest incidence of nonresident anglers (41 and 30 percent) occurred in Sections

4 and 3, respectively. Similarly, all observed nonresident use in these reaches was in the July though September period. Nonresident use was seven percent of the total interviews in Section 2 and 10 percent in Section 1. Only one percent of angler use in the sloughs was by nonresidents.

The fisheries of the Flathead River are seasonal and diverse. Seasonal fisheries were associated with the migrations of various fish species that moved into the river on upstream spawning migrations or in downstream migrations to the lake. No fish species provided a consistent fishery in the river throughout the year. Angler fishing pressure, harvest and catch all fluctuated according to these fisheries. Flathead anglers adjusted their fishing techniques when targeting the seasonal fisheries and diverse river sections.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACKNOWLEDGEMENTS

I express my appreciation for the time and effort individuals contributed to this survey. Jon Cavigli, Gary Anderson, Joel Rasmussen, Aaron Rasmussen, Tim Taylor and Matt Boyer conducted much of the angler interviews and data processing. Bob McFarland provided direction in data analysis and ran the creel computer program to estimate angler pressure, harvest and catch. Jim Vashro and Brian Marotz provided management and research direction and budgetary needs. Barry Hansen and Les Evarts provided flight scheduling and advice on data analysis. Sharon Johnston bound and distributed the report.

The majority of the funding for the project was provided through the Montana Fish Wildlife and Parks roving creel program. Additional funding came from the Confederated Salish and Kootenai Tribes, the Flathead Chapter of Trout Unlimited, and the Bonneville Power Administration through the Hungry Horse Dam Fisheries Mitigation Program.

INTRODUCTION

Montana Fish Wildlife and Parks conducted an angler creel survey on the main stem of the Flathead River from May 2002 to May 2003. This creel survey assessed angler use, harvest and catch, as well as certain angler demographics and fishing techniques. This reach of stream has diverse habitats and seasonal fisheries. The last creel survey on this stretch of river was completed in 1992-1993 (Hanzel D. 1995), ten years prior when fishing regulations allowed harvest of native trout species. In 2000, the Confederated Salish and Kootenai Tribes (CSKT) and Montana Fish Wildlife and Parks (MFWP) completed a Fisheries Co-Management Plan for the Flathead Lake and River System (MFWP and CSKT, 2000). The plan's direction was to protect and enhance native fish populations while maintaining a viable recreational fishery on non-native fish species. This report provides an opportunity to assess the current status of and recent changes to the river fisheries and to determine if management goals are being achieved by making direct comparisons to the previous creel survey. In addition, this creel provides an opportunity to assess changes to the fisheries in response to past and future fishery mitigation projects funded by Bonneville Power Administration, as part of Hungry Horse Dam Fisheries Mitigation Project.

From a fish community perspective, the Flathead Lake and River System has supported three very different species assemblages and fisheries. Prior to settlement by European man, the fish community was solely comprised of the native species, which colonized the waters following the last glacial period, roughly 10,000 years ago. Bull trout (*Salvelinus confluentus)*, westslope cutthroat trout (*Oncorhynchus clarki lewisi)*, and mountain (*Prosopium williamsoni*) and pygmy whitefish (*P. coulteri)* were the only salmonids present. In the mid 1880s, European settlers arrived and near the turn of the century began to introduce a number of non-native fish species. Federal and state government agencies aggressively introduced game fish, both native and non-native species, into Montana waters. By the 1920s, a new fish community was established with abundant kokanee salmon (*O. nerka*), lake trout (*S. namaycush*), lake whitefish (*Coregonus clupeaformis*), and yellow perch (*Perca flavenscens*) in addition to the native species. Kokanee dominated the lake recreational fishery and provided a very popular fall fishery for spawning adults. This new fishery composition was relatively stable until the mid 1980s. In 1968, 1975, and 1976 MFWP introduced *Mysis relicta* into the Flathead Lake drainage. Although no *Mysis* were stocked directly into Flathead Lake, *Mysis* moved downstream into Flathead Lake where they were first collected in 1981. By the mid-1980s, *Mysis* established an abundant population and caused the third shift in the fish assemblage in Flathead Lake. *Mysis* became a competitor with fish species dependent on the zooplankton forage base and not forage as managers desired. *Mysis* provided an abundant food source for benthic fishes, such as lake trout and lake whitefish, and substantially increased survival, recruitment, and abundance of these species. Bull trout and westslope cutthroat trout abundance declined and the kokanee population completely disappeared (Deleray et al 1999).

There was another creel survey conducted in 1981 (Fredenberg and Graham 1983). It depicted the fishery prior to the establishment of *Mysis* and the ensuing changes to the fish community and therefore does not provide a means to track changes in the current fisheries. The 1992-1993 creel survey was the first to depict the changed fishery; at that time it was legal for anglers to harvest native trout in the river and lake system. This report depicts current fisheries in this system 15 years after the extirpation of kokanee and 10 years after native trout declines, where angler harvest of

native trout is no longer allowed. Today, angler harvest is instead directed at non-native fish species with catch and release regulations or no fishing allowed for native species.

DESCRIPTION OF PROJECT AREA

The Flathead River System is a tributary to the Clarks Fork of the Columbia River, originating in northwest Montana and southern British Columbia. Three forks of the Flathead River flow from mostly public lands, including Glacier National Park, the Bob Marshall and Great Bear Wilderness Areas and other Flathead National Forest lands. Hungry Horse Dam impounds the South Fork of the Flathead River near its mouth. The North and Middle Forks are free-flowing rivers. The three forks of the Flathead River supply roughly 80 percent of the annual discharge (9 million acre-feet) in the Flathead System (Zackheim 1983). Near the town of Columbia Falls, mean peak river flows of roughly 32,000 ft3/sec occur near the end of May or early June.

The project area for this creel survey was smaller than that of the 1992-1993 creel survey. This survey did not include the three forks of the Flathead River. The project area began at the confluence of the North and Middle Forks at Blankenship Bridge, near the town of Coram, Montana and continued downstream to the inlet at Flathead Lake. This survey also included the larger connected sloughs of the lower 22 miles of river above the lake.

We split the area into four river reaches, at locations similar to those in the 1992-1993 survey (Figure 1). In addition, we separated the lower river sloughs from the lower river section. This was not done in the 1992-1993 survey, but allowed us to look separately at the two distinct fisheries. The lowermost river reach (Section 1) began at the confluence with the Stillwater River, locally called the Salmon Hole, and continued downstream to the inlet at Flathead Lake. This was approximately 22 miles of river. The river was partitioned at this point because during summer months Kerr Dam, at the outlet of Flathead Lake, impounds 10 feet of water which backs up water to the Stillwater River confluence, creating a slow moving low gradient river habitat that is distinct from the upstream river reaches, Sections 2, 3 and 4. Section 1 includes the popular and public Sportsman's Bridge Fishing Access at the Highway 82 crossing just upstream of Flathead Lake. During summer months when the lake pool elevation raises the river surface elevation, the section becomes popular with motor boaters. There are numerous private boat access points, private marinas and a few other public access sites along this reach. Also lake boaters can motor upstream into this reach.

The connected river sloughs adjacent to Section 1 comprised Section 5. The largest sloughs included were Church, Fennon and Halfmoon, which are old oxbow channels. Other smaller sloughs included those at the confluences with tributaries, such as Rose, Mill, Brenneman, and Ashley Creek Sloughs. All of these sloughs had very slow moving or no current and warm summer temperatures characteristic of lake rather than river habitat. Boaters accessed these from the main stem river or from public access points on Church Slough or private sites on other sloughs. Church and Fennon Sloughs were popular ice fishing spots during winter months.

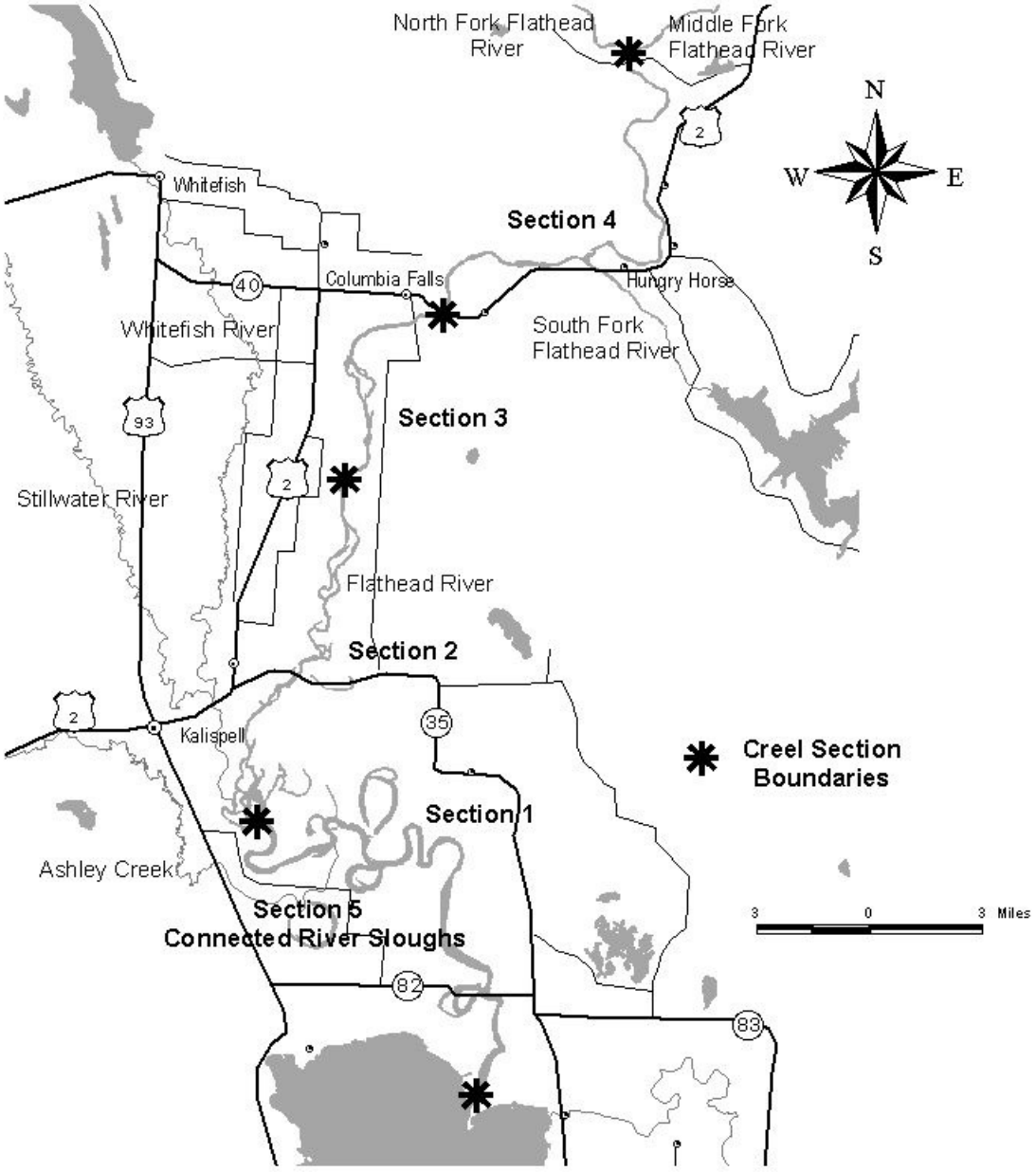

Figure 1. Map of study area showing five river sections. Asterisks depict river section boundaries. Section 5 was comprised of sloughs adjacent and connected to Section 1.

Section 2 comprised the river reach upstream of the Stillwater River confluence to the public Pressentine Bar Fishing Access Site, roughly 11 river miles. Section 2 included the heavily used river accesses at the Old Steel Bridge and the Highway 35 Bridge both just east of the town of Kalispell. For boaters, mostly rafts and drift boats, a popular float reach was Pressentine Bar down to the Old Steel Bridge, which was roughly a seven-mile float. Public fishing use and access in this reach was limited to bridge crossings and the Pressentine Bar access.

Section 3 comprised roughly 8 miles of stream from the public Teakettle Fishing Access Site at the Highway 40 Bridge crossing near the town of Columbia Falls downstream to the Pressentine Bar Fishing Access Site. This delineation was slightly different than the boundaries of the 1992-1993 survey in which this reach included another four miles upstream to Bad Rock Canyon. The earlier breakdown split a popular float between Sections 3 and 4 making it difficult to apply interview data to fishing pressure estimates. The 2002-2003 delineation allowed interview data from floaters beginning at the top of Section 4 and finishing at the Teakettle Fishing Access to be used in estimating angler success in Section 4. Also, the entire reach in Section 3 was a popular float for anglers, so isolating this reach improved the interview data's representation of the fishery. Besides the end points of this section, there is another public access point at Kokanee Bend. However this access is on the eastside of the river while the Pressentine Bar access is on the westside of the river, complicating the vehicle shuttle logistics and thus reducing its use by boaters.

Section 4 began at Blankenship Bridge, the confluence of the North and Middle Forks of the Flathead River, and went downstream to the Teakettle Fishing Access Site. This was about a 14.5-mile long reach. There was a boater's access roughly 4 miles upstream of the Teakettle access, which was used as a pullout or put in point. Five miles upstream of the Teakettle access is the confluence with the South Fork of the Flathead River, another access site used by some boaters. Throughout the section, there is public shore access at road crossings and the public fishing access points.

The major sport fish in the Flathead River System are westslope cutthroat trout, rainbow trout (*O. mykiss*), lake trout, lake whitefish, and mountain whitefish. Bull trout currently provide opportunity only through incidental catch while fishing for other species, as their current status and fishing regulations precludes targeting them as sport fish. Scattered populations of largemouth bass (*Micropterus salmoides*), yellow perch, and northern pike (*Esox lucius*) occur mostly in old oxbow sloughs of the river. Other native fish in the Flathead system include longnose sucker (*Catostomus catostomus*), largescale sucker (*C. macrocheilus*), northern pikeminnow (*Ptychocheilus oregonensis*), peamouth (*Mylocheilus caurinus*), pygmy whitefish, and reside shiner (*Richardsonius balteatus*).

The native trout and char, westslope cutthroat trout and bull trout, have evolved varied life histories to be successful in the Flathead drainage. There are three life history forms: (1) adfluvial stocks which spawn and rear in river tributaries and move downstream to grow and mature in Flathead Lake; (2) fluvial stocks which spawn and rear in river tributaries then move downstream to grow and mature in the Flathead River, and; (3) tributary or "resident" stocks which spawn, rear, and reside for their entire life cycle in a tributary stream (Fraley and Shepard 1989). Westslope cutthroat trout employ all three of these strategies in the Flathead system, while bull trout are adfluvial and fluvial. Adult lake whitefish also move into the river system to spawn. As juvenile or

adult fish migrate between tributaries and the lake, they move through the river system and provide fisheries within this project area. This has lead to seasonal fisheries with varied species composition and size structures. At times, the larger adults were present, while at other times only juveniles were available to the angler.

METHODS

Methodologies used in this survey were similar to those used in the 1992-1993 survey (Hanzel 1995) and to those presented in detail in the 1992 Flathead Lake survey (Evarts et al 1994). The survey consisted of stratified simple random sampling. We stratified survey data by month, river reach (see above section describing the sampling area), day types (weekend and week days), and boat and shore anglers. We expanded data on a monthly basis to allow for adequate sample sizes without extending into periods with dissimilar fishery characteristics. Days were the primary sample units. Ten holidays were grouped with weekend days. Daily fishing hours were defined by one half hour before sunrise and one half hour after sunset, assuming no fishing occurred at night.

Table 1. Daily fishing hours used to estimate fishing pressure in the Flathead River creel survey, 2002-2003. The 15th day of each month was used to represent sunrise and sunset times for the month.

MONTH	SUNRISE	SUNSET	HRS	HRS + 1 HR
JAN	8:23	17:11	8.8	9.8
FEB	7:44	18:00	10.3	11.3
MAR	6:51	18:43	11.9	12.9
APR	6:48	20:29	13.7	14.7
MAY	5:58	21:11	15.2	16.2
JUN	5:37	21:40	16.1	17.1
JUL	5:53	21:34	15.7	16.7
AUG	6:32	20:51	14.3	15.3
SEP	7:15	19:50	12.6	13.6
OCT	7:57	18:49	10.9	11.9
NOV	7:45	16:59	9.2	10.2
DEC	8:22	16:44	8.4	9.4

Angler catch and characteristics were collected through an interview process. Roving census procedures were used due to the large drainage and dispersed river access points. Clerks waited at access points and moved between points attempting to collect completed trip data. Catch and harvest estimates were based on both complete and incomplete trip data. Two creel clerks collected angler interview data from June through December. One clerk worked the area January through May. During periods of low fishing pressure, we directed clerks to areas where we observed the most activity and to areas where we had not made angler contacts. Interviews were conducted daily. We surveyed both week and weekend days. We successfully collected 925 angler interviews, 571 from shore anglers and 354 from boat anglers (Appendix A). There were numerous days in different strata that clerks were unsuccessful in making contact with anglers and no

interviews were collected. This generally occurred in river reaches or during periods with low fishing pressure.

Fishing pressure estimates were based on random instantaneous angler counts. Counts were conducted from a fixed-wing aircraft. Sample days and times were randomly selected during two-week intervals. The flight schedule was stratified to sample 60 percent of weekend days and 40 percent of weekdays (Table 2). We successfully completed 175 survey flights, 64 on weekend days and 111 on weekdays (Appendix B). River survey flights coincided with flights of a Flathead Lake angler creel survey being conducted at the same time. Boat and shore anglers were counted in each section. MFWP developed a computer program from formulas of Neuhold and Lu (1957) that was used to calculate angler pressure, harvest and catch rates. Catch rates included all fish caught, those harvested and those caught but released.

Table 2. Proportions of weekend days and weekdays sampled during aerial surveys of the Flathead River, 2002-2003.

Day Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
Weekend	0.50	0.67	0.50	0.56	0.56	0.60	0.67	0.78	0.67	0.56	0.30	0.50	0.57
Weekday	0.38	0.42	0.43	0.52	0.55	0.45	0.50	0.41	0.57	0.36	0.20	0.48	0.44

The program estimates angler fishing pressure by combining the angler count data collected during flights with interview data collected from anglers. Average angler party size for each stratum came from interview data. If there was no interview data for a stratum, generally in periods of low fishing pressure, the program used "0" for angler party size, which then lead to an estimate of "0" fishing pressure. If during these periods there were flight data indicating that angler pressure existed, I dubbed a "1" for party size in these strata. This allowed the program to estimate angler pressure from flight data, although likely underestimating the actual pressure level because party size was set at the minimum level. Thus, I was able to include an estimate of angler use in strata where we observed anglers but had limited interview data.

Time periods or strata with low levels or no interview data also created problems when estimating angler catch and harvest rates. By splitting the river into five reaches, use by month, days by weekend and weekdays, and anglers by shore and boaters, I created many strata and correspondingly during periods of low angler use spread our interview data thin. In strata where the interview data was nonexistent or less than three interviews, I combined day type, weekend, and weekdays data to increase interview sample sizes. In other words, I duplicated data in one day type and used it for the other. I did not combine data between different months, river reaches, or angler types. This allowed me to use the pressure estimates stratified by day type and to estimate angler success in strata with no or low numbers of interviews. This approach made the assumption that angler success was similar between weekends and weekdays, which at times may not be true. However, strata where I combined interview data were those with relatively low angler use levels, so errors would be small. Combining day types did allow better estimates for party size. I used the party size from weekend data to estimate party size for weekdays in the same strata, and vice versa, instead of using "1" for party size if there were no interview data.

RESULTS AND DISCUSSION

Angler Fishing Pressure

For the June 2002 to May 2003 period, anglers fished an estimated 47,048 hours (Variance = 5,709,128) on the main stem Flathead River (Table 3). It should be noted that the total number of angler hours in the last column of Table 3 does not equal the sum of the total hours from each of the five sections. This is due to how the program estimated angler hours, which was dependent on the average length of the angler day. The length of the angler day varied from month to month and between sections and differed from the overall average used to estimate the total. The overall average length of a fishing day was 2.3 hours for shore anglers and 4.1 hours for boat anglers. The average fishing day was 3.1 hours when all completed interview data were combined. The estimated 47,048 hours represented 14,992 days. The most popular fisheries were in the summer and fall months (July through November), with peaks in August and October. Weekend and holidays comprised 40 percent of fishing pressure.

Table 3. Estimates of angler fishing pressure (hours) by Flathead River section, 2002-2003.

Month	Section 1	Section 2	Section 3	Section 4	Sloughs	Totals
Jan	90.7	232.8	58.8	25.7	1212.8	1620.7
Feb	559.4	453.4	391.3	0.0	1149.8	2553.8
Mar	799.8	394.7	567.6	132.9	503.1	2398.1
Apr	310.2	363.1	208.7	234.5	837.9	1954.4
May	448.1	258.7	138.4	549.9	594.3	1989.4
Jun	279.3	0.0	0.0	0.0	459.8	739.1
Jul	501.0	563.6	1970.0	2182.7	1409.2	6626.6
Aug	111.1	1955.9	1790.2	4266.5	1056.9	9180.5
Sep	675.1	1266.5	957.7	1865.1	1133.8	5898.2
Oct	347.5	4553.9	1699.3	690.2	207.1	7498.0
Nov	312.8	3554.3	754.8	204.0	0.0	4825.9
Dec	495.5	919.2	198.5	94.0	56.4	1763.6
Totals	4930.3	14516.1	8735.3	10245.5	8621.0	47048.2
Days	1614.5	5253.2	3064.4	3659.0	1991.8	14992.4

The 2002-2003 totals were very similar to the results of the 1992-1993 angler creel survey (Hanzel 1995). In 1992, there was an estimated 52,834 hours fished, with highest pressure in summer and fall months. Although the highest use in 1992 was in August and September and not in the fall fishery as it was in 2002. In 1992, the lake whitefish fishery in the river was relatively new and with time its popularity has grown. In the 1992-1993 period, weekend and holidays comprised 48 percent of the angler use.

The 2002-2003 fishing pressure varied between sections and across seasons. Flathead River fisheries are seasonal and dependent on migrations of different fish species. Section 2 (Pressentine Bar fishing Access down to the confluence of the Stillwater River) followed by section 4 (Blankenship Bridge down to Teakettle Fishing Access) received the highest fishing pressure of all five reaches (Table 3). Sections 2, 3 and 4 are upstream of the backwater effect of Kerr Dam, which raises the pool elevation of Flathead Lakes during the summer and fall months. These

reaches consisted of river fisheries and contained 71 percent of the total angler use in the main stem river and associated sloughs. Unlike many river fisheries in Montana, the fisheries in these reaches dramatically change during the year as trout and whitefish populations migrate between the lake and river or river tributaries. Correspondingly, the angler use levels track the changing fisheries. Peaks in fishing pressure corresponded to fish migrations (Figure 2).

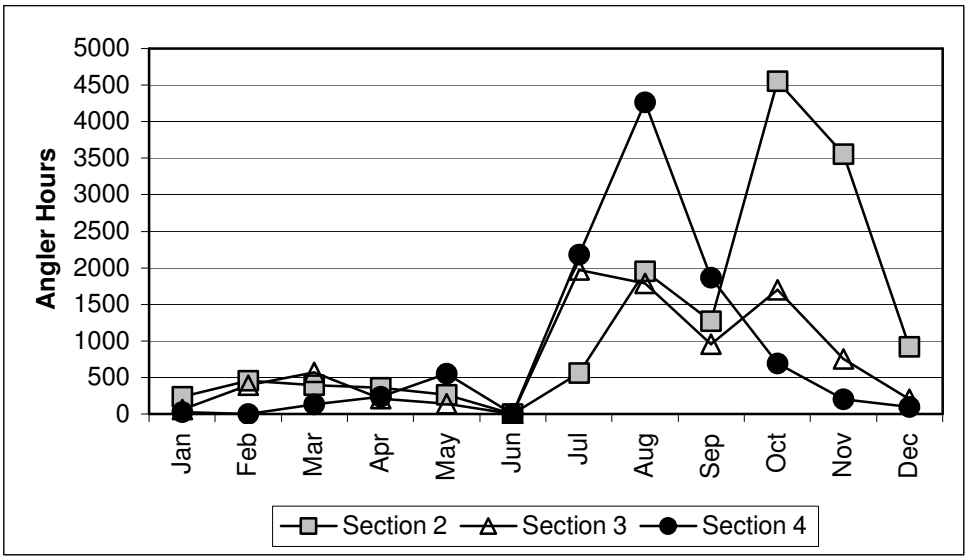

Figure 2. Angler pressure estimates for the Flathead River Sections 2, 3 and 4 from the confluence of the Stillwater River upstream to Blankenship Bridge, 2002-2003.

Section 2 (Pressentine Bar fishing Access down to the confluence of the Stillwater River)
The graph of pressure estimates in Section 2 shows low numbers of anglers during winter and spring months and then two peaks, one in summer and another in fall (Figure 2). The first peak began in July, peaked in August, and declined into September. This portion of the graph represents the westslope cutthroat trout and rainbow trout fisheries. In July and September, pressure was split between shore and boating hours with more from shore (Appendix C). In contrast, the August boating pressure was two times as large as the angling pressure from shore. Section 2 contained a reach (Pressentine Bar Fishing Access to Old Steel Bridge) that was popular with summer floaters.

The highest levels of fishing pressure in Section 2 were in October and November (Figure 2). These represent the fall lake whitefish fishery. During this period, shore anglers outnumbered boat anglers three to one (Appendix C). Section 2 contained two of the most popular access points for the lake whitefish fishery. These were the Highway 35 bridge crossing and the Old Steel Bridge Fishing Access Site.

The 2002-2003 results were very similar to the 1992-1993 results for Section 2. In the earlier survey (Hanzel 1995), Section 2 was also the most heavily fished of all sections, and the fall (October through December) fishery comprised over 40 percent of angler use in Section 2 (over 60 percent of angler use for the section in the 2002-2003 survey). These high use levels were likely due to a number of factors. This reach is close to Kalispell and central in the Flathead Valley. There are good public access points that are well distributed along the reach. Also, the lake

whitefish fishery provided one of the best fisheries in the area (see harvest and catch rate sections later in this report).

Section 3 (Teakettle fishing Access down to Pressentine Bar Fishing Access)
Section 3 is a river reach similar to Section 2. It's free flowing and centrally located in the Flathead Valley. The 2002-2003 total pressure estimate (8,735 hours) in Section 3 was lower than the estimate for Section 2 (Table 3), but the changes in angler use levels by month shows a similar shape, with low pressure during winter and spring months followed by two peaks in use in summer and fall (Figure 2). Unlike Section 2, the summer months (July and August) in Section 3 had higher use levels (over 40 percent of the total use in the section) than the fall months. Section 3 is also a popular reach for summer floaters. The entire reach is a half-day float trip for anglers pursuing trout. For July and August, there was over 5.5 times the number of boat fishing hours as shore fishing hours (Appendix C).

There was a shift in angler type when moving into the fall months. During September and October, shore angler hours outnumbered boater hours almost 2 to 1 (Appendix C). This shift corresponded with the change from the summer cutthroat trout fishery to the fall whitefish fishery. The Highway 2 crossing at the Teakettle Fishing Access Site was a popular location for whitefish fishing. Section 3, positioned between Sections 2 and 4, had angler use levels and patterns intermediate to those of the adjacent sections. Moving between these three sections the fisheries transformed from primarily trout fisheries in the upper reach to a dominant lake whitefish fishery in the lower reach.

Section 4 (Blankenship bridge downstream to Teakettle Fishing Access)
Section 4 had the second highest level of angler use (10,246 hours) for the five sections (Table 3). However unlike Sections 2 and 3, there was not a fall whitefish fishery of any significance (Figure 2). The fishery in Section 4 was almost exclusively comprised of a summer trout fishery (see following sections on angler catch rates). There were low levels of winter and spring angler use, followed by a rapid increase in use in July with a peak in August (42 percent of total use). After September there was a gradual decline through the fall months. Section 4 did not show a second peak in angler use during the fall months. Over 80 percent of angler fishing pressure occurred in July, August and September.

Most angler use during the summer months in Section 4 was from boat anglers. Boat angler hours were almost five times greater than the shore angler hours (Appendix C). A popular floating reach is from the top of the section at Blankenship Bridge to either the House of Mystery pullout or down to the Teakettle Fishing Access Site. Professional fishing guides heavily used these reaches (see following sections on angler demographics). Other boaters put-in in the South Fork of the Flathead River below the Highway 2 bridge and fished down to one of these pullouts. We did not include angler use of the South Fork in pressure estimates and we did not collect angler interview data from this short reach.

In the 1992-1993 survey (Hanzel 1995), angler pressure and use patterns were very similar. June, July and August had the highest angler pressure estimates, with August being the highest. Like the recent survey, there was not a second peak in use in the fall months. Also, boater angler hours were over 2.5 times greater than shore angler hours.

Section 1 (confluence of the Stillwater River down to Flathead Lake)

Section 1 is a river reach that is impacted by the unnaturally high summer lake pool elevation of Flathead Lake and the storage capacity of Kerr Dam. During summer months this 22-mile reach is a relatively low gradient slow moving reach without defined pool and riffle habitats. This section received the lowest angler pressure (4,930 hours) of all five sections (Table 3). Low angler use was spread, relatively evenly, across all months (Figure 3). The pressure estimate was lowest in January and highest in March. With the exception of low levels of shore angling in May and February, there was no shore angler use during the year and all pressure was from boat anglers (Appendix C).

This reach did not have a popular or seasonal fishery that drew large numbers of anglers (see following section on angler harvest and catch). The most heavily used access point was the Sportsman's Bridge Fishing Access Site at the Highway 82 crossing. Anglers used this access to fish this river reach (Section 1), Flathead Lake, or the river sloughs (Section 5).

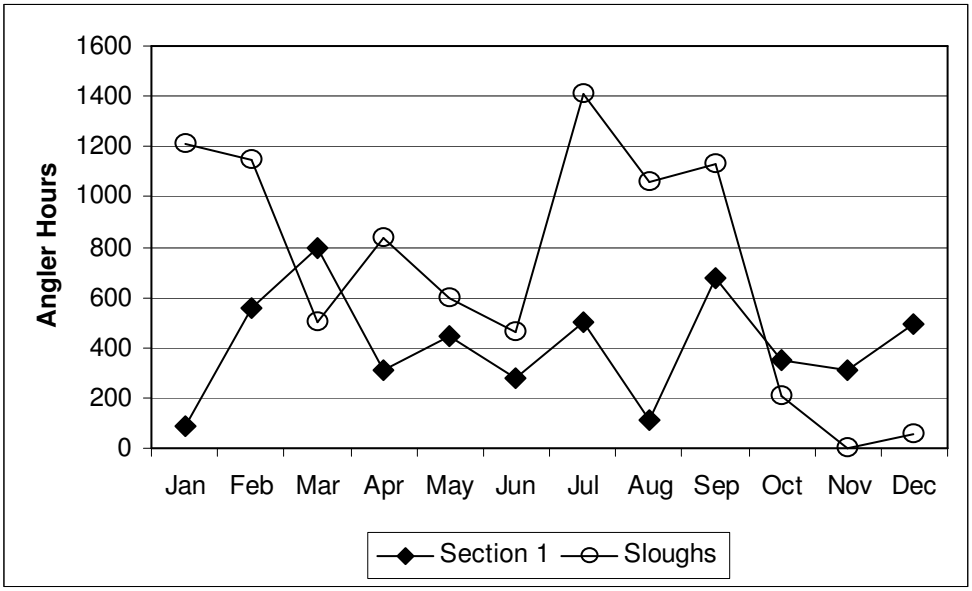

Figure 3. Angler pressure estimates for Section 1 on the Flathead River and Section 5, the associated sloughs, 2002-2003.

Section 5 (river sloughs adjacent and connected to Section 1)

Section 5 had a relatively moderate level of angler use (8,621 hours) when compared to the other sections (Table 3). Use in this section was about equal to that in Section 3, greater than Section 1 and less than Sections 2 and 4. The distribution of angler pressure over the year was much different than the distribution in the other sections (Figure 3). Section 5 had over 25 percent of its use during January and February, during periods when the sloughs were covered in ice. The peak in use was in July and the July through September period accounted for roughly 42 percent of annual use. Unlike Sections 2 and 3, there was not an increase in angler use during the fall months. In contrast, the October through December period was the lowest use period of the year. It is likely that this low use corresponds to angler demographics (see later sections), lack of a fall migratory fishery, and possibly conflicts with big game and waterfowl hunting seasons.

In Section 5, during January and February when ice covered the sloughs, there were only shore (ice) anglers (Appendix C). This is obviously due to the limited boating access and improved foot access. In March, use was split between shore and boat anglers as ice receded. For the remaining nine months of the year boat anglers comprised all use.

Harvest, Harvest Rates and Catch Rates

In 2002-2003, we estimated that anglers harvested 25,209 fish in the combined five river sections (Table 4). Roughly 22,000 harvested fish were lake whitefish and over 1,200 were lake trout. Over 900 "Other" fish were harvested, which were mostly minnow species such as northern pikeminnow or peamouth chub that anglers caught to use or sell for bait. We estimated that 575 pike and 167 rainbow trout were harvested. During this survey, there were no westslope cutthroat trout or bull trout harvested due to restrictive fishing regulations, which forbid harvest. Combining all strata, lake whitefish harvest rate (0.7 fish per hour) and catch rate (0.8 fish per hour) were much higher than for any of the other fish species (Table 4). Combining all strata, westslope cutthroat trout had the second highest catch rate (0.2 fish per hour). These values can be somewhat deceiving due to the seasonal nature of Flathead River fisheries and the differences between river sections (see following discussions for each river section). As with angler pressure estimates, harvest and catch rates varied with season and river section.

The upper three sections (2, 3 and 4) are free-flowing river reaches. The lower two sections (1 and 5) are influenced by Flathead Lake levels and are either slow moving river, during summer and fall months, or slough habitats. Section 4, the uppermost reach was predominately a summer fishery for westslope cutthroat trout, with lower numbers of rainbow trout, bull trout and mountain whitefish. Sections 2 and 3 had summer fisheries similar to Section 4, but of lower use levels. Sections 2 and 3 also had fall fisheries for lake whitefish. In Section 2, the most popular fishery was for lake whitefish. The fisheries in Sections 1 and 5 consisted of low numbers of trout mixed in with catches of pike, perch, and non-game fish species. Section 5 included winter ice fishing. The following sections of this report describe harvest and catch rates by month and fish species for each river section.

Table 4. Angler harvest rates (fish per hour), harvest, and catch rates (fish per hour) for all strata combined, Flathead River and associated sloughs 2002-2003.

Species	Harvest Rate	Variance	Number Harvested	Variance	Catch Rate	Variance
Lake Trout	0.05	3.54E-05	1,246	8.41E+04	0.07	5.37E-05
Lake Whitefish	0.70	1.43E-03	21,824	1.11E+07	0.79	7.02E-03
Yellow Perch	0.02	2.36E-05	484	5.74E+04	0.03	4.61E-05
W. Cutthroat Trout	0.00	0.00E+00	0	0.00E+00	0.16	1.10E-04
Rainbow Trout	0.003	2.18E-06	167	1.64E+04	0.03	1.08E-05
Bull Trout	0.00	0.00E+00	0	0.00E+00	0.02	1.01E-05
Pike	0.01	2.39E-06	575	9.35E+03	0.02	5.84E-06
Largemouth Bass	0.0001	6.97E-09	10	1.16E+02	0.02	1.82E-05
Mountain Whitefish	0.00	0.00E+00	0	0.00E+00	0.07	4.61E-05
Other	0.04	1.06E-04	904	1.75E+05	0.06	1.39E-04
Total	0.82	1.60E-03	25,209	1.28E+07	1.25	7.47E-03

Section 2 (Pressentine Bar Fishing Access down to the confluence of the Stillwater River)
Similar to the seasonal changes in angler pressure estimates, fisheries changed over the year in Section 2. We observed changes in the fish species anglers caught and harvested as well as seasonal variation in catch and harvest rates.

Lake whitefish and lake trout dominated the numbers of harvested fish (Table 5). Lake whitefish comprised 94 percent of harvested fish, while lake trout tallied just over five percent. Likewise, mean catch rates for these two species were also highest in the section. In Section 2, the mean catch rate for lake whitefish (1.38 fish per hour) was the highest for all species in all river sections.

Table 5. Mean harvest rate (fish per hour), harvest, and catch rate (fish per hour) by fish species for Flathead River Section 2, 2002-2003.

Species	Harvest Rate	Variance	Number Harvested	Variance	Catch Rate	Variance
Lake Trout	0.10	1.92E-04	1,046	7.90E+04	0.13	3.13E-04
Lake Whitefish	1.37	9.77E-03	18,217	1.02E+07	1.38	9.83E-03
Yellow Perch	0.00	0.00E+00	0	0.00E+00	0.00	0.00E+00
W. Cutthroat Trout	0.00	0.00E+00	0	0.00E+00	0.08	1.24E-04
Rainbow Trout	0.00	8.32E-06	66	2.57E+03	0.03	5.78E-05
Bull Trout	0.00	0.00E+00	0	0.00E+00	0.02	5.63E-05
Pike	0.00	0.00E+00	0	0.00E+00	0.00	0.00E+00
Largemouth Bass	0.00	0.00E+00	0	0.00E+00	0.00	0.00E+00
Mountain Whitefish	0.00	0.00E+00	0	0.00E+00	0.09	2.94E-04
Other	0.01	1.95E-06	13	1.08E+02	0.03	1.13E-04
Total	1.48	9.96E-03	19,342	1.15E+07	1.76	1.13E-02

The Section 2 lake whitefish harvest was roughly 84 percent of the total lake whitefish harvest across all sections (Table 6). The seasonality of the lake whitefish fishery is shown in Table 6 where almost all lake whitefish harvest occurred in the October through December period. Harvest peaked in November, which corresponds with the peak in the fall spawning migration.

Lake trout harvest in Section 2 was distributed much like lake whitefish harvest with most occurring in the fall months (Table 7). Over 90 percent of the lake trout harvested in Section 2 occurred in October through December, with most (635) in November. Lake trout harvest in Section 2 comprised 84 percent of all lake trout harvested during the survey. It is thought that lake trout may move upstream with migrating whitefish (lake and pygmy) in the fall months, seasonally increasing in abundance, which results in increased catch.

In the 1992-1993 creel survey (Hanzel 1995), lake whitefish and lake trout harvest in Section 2 were similar to those in this survey. There were an estimated 17,643 lake whitefish harvested in Section 2, which was the highest harvest of any section. Harvest was in the fall months, and also peaked in November. The estimated number of lake trout harvested in 1992-1993 was 1,897 fish, the highest of any section, with harvest peaking in November. The 1992-1993 lake trout harvest was almost twice the estimated lake trout harvested in the 2002-2003 survey.

Table 6. Lake whitefish harvest by Flathead River section, 2002-2003.

Month	Section 1	Section 2	Section 3	Section 4	Section 5	All Combined
Jan	0	212	0	0	0	212
Feb	0	0	0	0	0	0
Mar	0	0	0	0	0	0
Apr	0	0	0	0	0	0
May	0	0	0	0	0	0
Jun	0	0	0	0	0	0
Jul	0	10	0	0	0	10
Aug	0	0	0	0	0	0
Sep	0	0	21	0	0	21
Oct	0	6,856	1,435	0	0	8,291
Nov	0	9,364	1,729	0	0	11,093
Dec	0	1,775	422	0	0	2,197
Total	0	18,217	3,607	0	0	21,824

The summer (July through September) fishery in Section 2 consisted of a westslope cutthroat trout and rainbow trout fishery. Catch rates were relatively low during this period. Catch rates for cutthroat trout ranged from 0.04 to 0.39 fish per hour, with highest catch rates of 0.28 and 0.39 on weekdays and weekend days in September, respectively (Appendix D). Catch rates for rainbow trout were similar, ranging from 0.04 to 0.33 fish per hour with highest rates of 0.33 and 0.17 on weekdays and weekend days in September, respectively (Appendix D). Together, the two species provided catch rates ranging from 0.12 to 0.61 fish per hour, with the highest rates of 0.6 trout per hour in September (Appendix D). Mountain whitefish provided low catch rates during summer months, ranging from 0.0 to 0.04 fish per hour (Appendix E).

Table 7. Lake trout harvested by Flathead River section, 2002-2003.

Month	Section 1	Section 2	Section 3	Section 4	Section 5 Sloughs	All Combined
Jan	0	30	0	0	0	30
Feb	21	0	0	0	0	21
Mar	0	0	0	0	13	13
Apr	0	0	0	0	0	0
May	0	0	0	0	0	0
Jun	9	0	0	0	0	9
Jul	0	47	16	3	0	66
Aug	0	13	0	0	0	13
Sep	13	0	0	0	0	13
Oct	0	75	0	0	0	75
Nov	0	635	106	0	0	741
Dec	0	246	19	0	0	265
Total	43	1046	141	3	13	1246

The highest catch rates for cutthroat trout in Section 2 were 1.11 and 0.89 on weekdays and weekend days in April (Appendix D). These were also the highest for all sections. Late winter and early spring months traditionally provided good trout fishing as cutthroat trout from Flathead Lake move up into the river system beginning the spring spawning migration and staging period. Over the entire year, catch rates for cutthroat trout and rainbow trout were 0.08 and 0.03 fish per hour, respectively (Table 5). Mean cutthroat trout catch rates in the 1992-1993 creel survey (Hanzel 1995) were much higher at 0.34 fish per hour over the entire year.

Mountain whitefish provided relatively high catch rates (1.0 to 11.0 fish per hour, although angler interview numbers were low, 1 to 4) during winter months (January through March). Over the year, the mountain whitefish catch rate was 0.09 fish per hour in Section 2 (Table 5). Bull trout catch rates were also low ranging from 0.0 to 0.3 fish per hour (Appendix E), although the highest rates in January were from very low interview numbers. Bull trout catch was only observed in January, July and August in Section 2. July and August catch rates ranged from 0.02 to 0.19 fish per hour.

Section 3 (Teakettle Fishing Access down to Pressentine Bar Fishing Access)

The fisheries of Section 3 and Section 2 were similar in a number of ways. For example, fisheries changed over the year and angler pressure estimates showed two peaks in angler use, one in summer and the other in fall (Figure 2). In Section 3, the summer and fall peaks were of similar magnitudes, unlike the high fall peak in Section 2. There were two distinct fisheries in this section. The fall fishery dominated by catch and harvest of lake whitefish and lake trout and a summer fishery largely dependent on westslope cutthroat trout catch.

The seasonality of the lake whitefish fishery is shown in Table 6 where all lake whitefish harvest in Section 3 occurred from September through December. Harvest peaked in November, which was similar to the peak harvest in Section 2. Like section 2, lake whitefish (3,607) dominated the numbers of harvested fish in Section 3 (Table 8). Lake whitefish comprised 96 percent of harvested fish, while lake trout made-up most of the remainder. Mean catch rate for lake whitefish (1.24 fish per hour) was the greatest mean catch rate for all species in this section.

Table 8. Mean harvest rate (fish per hour), harvest, and catch rate (fish per hour) by fish species for Flathead River Section 3, 2002-2003.

Species	Harvest Rate	Variance	Number Harvested	Variance	Catch Rate	Variance
Lake Trout	0.06	2.00E-04	141	4.53E+03	0.08	2.16E-04
Lake Whitefish	0.92	4.67E-03	3,607	9.23E+05	1.24	9.06E-02
Yellow Perch	0.00	0.00E+00	0	0.00E+00	0.00	0.00E+00
W. Cutthroat Trout	0.00	0.00E+00	0	0.00E+00	0.30	1.09E-03
Rainbow Trout	0.00	5.84E-06	5	2.26E+01	0.04	4.12E-05
Bull Trout	0.00	0.00E+00	0	0.00E+00	0.03	3.15E-05
Pike	0.00	0.00E+00	0	0.00E+00	0.00	0.00E+00
Largemouth Bass	0.00	0.00E+00	0	0.00E+00	0.00	0.00E+00
Mountain Whitefish	0.00	0.00E+00	0	0.00E+00	0.03	8.05E-05
Other	0.00	0.00E+00	0	0.00E+00	0.02	1.35E-04
Total	0.98	4.89E-03	3,753	9.99E+05	1.74	9.14E-02

Estimated lake trout harvest (141) was distributed much like lake whitefish harvest, with most occurring in the fall months (Table 7). In Section 3, 89 percent of the lake trout harvest occurred in November and December, with most (106) in November.

In the 1992-1993 creel survey (Hanzel 1995), the estimated lake whitefish harvest in Section 3 was low (575) when compared to this survey. Lake trout harvest (113) in the earlier creel survey was similar to that of this survey.

Westslope cutthroat trout made up the summer (July through September) fishery in Section 3. Monthly catch rates for westslope cutthroat trout were some of the highest during this period, ranging from 0.24 to 0.69 fish per hour, with highest catch rates of 0.69 and 0.52 on weekdays and weekend days in August, respectively (Appendix D). Together, cutthroat trout and rainbow trout provided summer catch rates ranging from 0.26 to 0.83 fish per hour, with the highest rates in August (Appendix D). Mountain whitefish and bull trout provided low catch rates during summer months, ranging from 0.01 to 0.09 fish per hour and 0.01 to 0.07 fish per hour, respectively (Appendix E).

In the 1992-1993 creel survey (Hanzel 1995), westslope cutthroat trout provided the highest mean catch rates (0.63 fish per hour) for the section, which is roughly twice the catch rate (0.30 fish per hour) observed in this survey (Table 8). However, this may be somewhat deceiving since summer catch rates for cutthroat trout in Sections 2 and 3 were much higher than the overall mean catch rates for the year and were at levels similar to those of the earlier survey. The mean catch rates for the year for cutthroat trout were reduced due to the high level of angler pressure in fall 2002 directed at the lake whitefish fishery. Techniques used to catch lake whitefish resulted in low catch rates for cutthroat trout. In Section 3, mean catch rates for rainbow trout and mountain whitefish were also low in the earlier survey, but roughly twice those in this survey. Bull trout mean catch rates were similar in both surveys.

Section 4 (Blankenship Bridge downstream to Teakettle Fishing Access)

The fishery in Section 4 was different than those of the two downstream sections (2 and 3). As seen in Figure 2, Section 4 had a summer fishery where the majority of angler use was in July, August, and September. There was not a fall peak as seen in Sections 2 and 3. That is, there was no lake whitefish fishery or harvest (Table 9). Moving upstream through Sections 2, 3 and 4, there was a change from downstream fisheries dominated by lake whitefish to upstream fisheries dominated by westslope cutthroat trout, with the middle section comprised of both. In Section 4, the summer fishery was primarily for westslope cutthroat trout (Table 9), with overall mean catch rate of 0.43 fish per hour. The relatively high catch rate for mountain whitefish (0.26 fish per hour) was largely based on the very high estimated catch rate (5.33 fish per hour) in October (Appendix E). This high catch rate was based on only 3 angler interviews, so it may be misleading. However, it coincides with the fall spawning migration of mountain whitefish, which would support higher catch rates. Regardless, angler use during October was low compared to use in summer months.

The summer (July through September) cutthroat trout fishery provided the highest catch rates for Section 4, with the exception of the October mountain whitefish catch rates mentioned above. Summer cutthroat trout catch rates ranged from 0.31 to 0.57 fish per hour, with the highest rates in August (Appendix D). During this period, rainbow trout, bull trout and mountain whitefish catch

rates were low, ranging from 0.0 to 0.06 (Appendixes D and E). Anglers often caught a mix of the four fish species. Adding the catch rates for the four species, the overall trout and whitefish summer catch rate ranged from 0.37 to 0.72 fish per hour. The estimated numbers of harvested fish were low. Only three lake trout (all in July), 97 rainbow trout (all in October), and 119 "Other" species were harvested. The "Other" species included northern pikeminnow and eastern brook trout.

Table 9. Mean harvest rate (fish per hour), harvest, and catch rate (fish per hour) by fish species for Flathead River Section 4, 2002-2003.

Species	Harvest Rate	Variance	Number Harvested	Variance	Catch Rate	Variance
Lake Trout	0.003	2.20E-06	3	1.36E+01	0.02	2.04E-05
Lake Whitefish	0.00	0.00E+00	0	0.00E+00	0.00	0.00E+00
Yellow Perch	0.00	0.00E+00	0	0.00E+00	0.00	0.00E+00
W. Cutthroat Trout	0.00	0.00E+00	0	0.00E+00	0.43	2.49E-03
Rainbow Trout	0.01	8.49E-05	97	1.38E+04	0.05	1.40E-04
Bull Trout	0.00	0.00E+00	0	0.00E+00	0.04	1.17E-04
Pike	0.00	0.00E+00	0	0.00E+00	0.00	0.00E+00
Largemouth Bass	0.00	0.00E+00	0	0.00E+00	0.00	0.00E+00
Mountain Whitefish	0.001	0.00E+00	0	0.00E+00	0.26	5.61E-04
Other	0.01	4.04E-05	119	7.68E+03	0.02	3.05E-05
Total	0.02	1.28E-04	219	2.15E+04	0.82	3.31E-03

In the 1992-1993 creel survey (Hanzel 1995), mean catch rates were similar to those in this survey. Westslope cutthroat trout dominated the fisheries with an overall mean catch rate of 0.6 fish per hour, peaking in August and September. Mean catch rates for the other trout and whitefish species ranged from 0.02 to 0.1.

Section 1 (confluence of the Stillwater River down to Flathead Lake)

The river section below the confluence of the Stillwater River downstream to Flathead Lake has much different characteristics than the three upstream sections. Section 1 is lower gradient, slower moving, has a streambed comprised of fine substrates, and suffers from inundation from the artificially high Flathead Lake summer pool elevation. These physical differences create aquatic habitats and fisheries much different to those of the upstream free-flowing sections.

The fisheries in Section 1 were poor when compared to the upstream reaches. Mean catch rates for all species were low, ranging from 0.002 to 0.13 fish per hour (Table 10). The highest mean catch rates were for cutthroat trout and "Other" species (northern pikeminnow and peamouth chub). Cutthroat trout catch was only noted in August and September (Appendix D). The relatively high September catch rate of 0.72 fish per hour produced the higher overall cutthroat trout catch rate, but the September rate resulted from only 12 interviews.

The backwater effect of Flathead Lake is evident in the mix of fish species caught (Table 10). Anglers caught all trout and both whitefish species in addition to pike, largemouth bass, yellow perch and non-game fish (mostly native minnow species). Section 1 was the only section where this occurred, although Section 5 was similar but lacked the whitefish species (see following section).

Table 10. Mean harvest rate (fish per hour), harvest, and catch rate (fish per hour) by fish species for Flathead River Section 1, 2002-2003.

Species	Harvest Rate	Variance	Number Harvested	Variance	Catch Rate	Variance
Lake Trout	0.01	1.85E-05	43	4.61E+02	0.04	2.95E-04
Lake Whitefish	0.004	2.46E-06	0	0.00E+00	0.01	1.75E-05
Yellow Perch	0.02	2.10E-04	0	0.00E+00	0.03	2.21E-04
W. Cutthroat Trout	0.00	0.00E+00	0	0.00E+00	0.13	3.28E-05
Rainbow Trout	0.000	0.00E+00	0	0.00E+00	0.002	2.55E-06
Bull Trout	0.00	0.00E+00	0	0.00E+00	0.01	1.57E-05
Pike	0.02	6.23E-05	72	1.20E+03	0.03	6.63E-05
Largemouth Bass	0.0000	0.00E+00	0	0.00E+00	0.05	9.16E-04
Mountain Whitefish	0.0000	0.00E+00	0	0.00E+00	0.02	1.32E-04
Other	0.05	1.01E-04	101	4.43E+05	0.12	1.18E-03
Total	0.11	4.15E-04	215	6.08E+03	0.44	3.06E-03

Fish harvest in Section 1 was split between game and non-game fish (Table 10). We estimated harvest of 72 pike and 43 lake trout. All of the pike harvest in Section 1 occurred from July to September (Table 11). Weekend day and weekday catch rates for pike during these months were low ranging from 0.0 to 0.09 fish per hour. Current fishing regulations for the Flathead River (sloughs not included) only allow harvest of lake whitefish and lake trout from December through the third Saturday in May. Harvest for many species is allowed in the remainder of the year. Pike harvest was only observed in three of the six-plus months in which pike harvest was permitted. Lake trout harvest was only observed in February, June and September (Table 7), although angler use was low throughout the year in Section 1 and correspondingly, angler interview numbers were also low in some months. The "Other" species harvested included northern pikeminnow and peamouth chub; anglers use both species for bait.

Table 11. Estimated pike harvest by month and Flathead River section, 2002-2003.

Month	Section 1	Section 2	Section 3	Section 4	Section 5 Sloughs	All Combined
Jan	0	0	0	0	86	86
Feb	0	0	0	0	89	89
Mar	0	0	0	0	6	6
Apr	0	0	0	0	116	116
May	0	0	0	0	54	54
Jun	0	0	0	0	20	20
Jul	17	0	0	0	40	57
Aug	3	0	0	0	31	34
Sep	52	0	0	0	49	100
Oct	0	0	0	0	14	14
Nov	0	0	0	0	0	0
Dec	0	0	0	0	0	0
Total	72	0	0	0	503	575

In the 1992-1993 creel survey, Sections 1 and 5 were not separated and very few angler interviews were completed on Section 1 (Hanzel 1995). This makes it difficult to draw conclusions or comparisons to this survey. Also, in the earlier survey, a number of species were combined into the "Other" species category, including pike, bass, and perch. This made comparisons between the two creel surveys difficult.

Section 5 (river sloughs adjacent and connected to River Section 1)

Section 5 was different than the other sections for a number of reasons. First, the sloughs are not riverine habitat, but rather shallow lakes or ponds. Secondly, the water temperature regime varies more widely than the river sections. For example, the water warms in the summer to provide warm water fish habitat and in the winter ice forms on the surface to allow an ice fishery. For these reasons, the fisheries in Section 5 differ from those of the other sections and were comprised mostly of warm water fish species. Section 5 had the highest harvest levels for pike, perch, bass and "Other" fish species, which consisted of peamouth chub and northern pikeminnow. Anglers harvested an estimated 503 pike and 484 perch (Table 12). Overall mean catch rates were generally low for all species but were highest for "Other" species (0.14 fish per hour) and perch (0.12 fish per hour), followed by pike and bass at 0.08 fish per hour (Table 12). As described above in the angler fishing pressure section, Section 5 received most fishing pressure during the summer months and the winter ice fishery.

Table 12. Mean harvest rate (fish per hour), harvest, and catch rate (fish per hour) by fish species for Flathead River Section 5, 2002-2003.

Species	Harvest Rate	Variance	Number Harvested	Variance	Catch Rate	Variance
Lake Trout	0.001	3.93E-07	13	1.43E+02	0.01	7.34E-06
Lake Whitefish	0.00	0.00E+00	0	0.00E+00	0.00	0.00E+00
Yellow Perch	0.07	5.20E-04	484	5.74E+04	0.12	1.07E-03
W. Cutthroat Trout	0.00	0.00E+00	0	0.00E+00	0.001	5.56E-07
Rainbow Trout	0.00	0.00E+00	0	0.00E+00	0.00	0.00E+00
Bull Trout	0.00	0.00E+00	0	0.00E+00	0.01	6.09E-06
Pike	0.05	4.20E-05	503	8.16E+03	0.08	1.25E-04
Largemouth Bass	0.0004	1.70E-07	10	1.16E+02	0.08	2.04E-04
Mountain Whitefish	0.001	0.00E+00	0	0.00E+00	0.00	0.00E+00
Other	0.13	2.54E-03	671	1.62E+05	0.14	2.54E-03
Total	0.25	3.18E-03	1,681	2.82E+05	0.45	3.93E-03

Pike harvest in Section 5 made up 88 % of all pike harvest observed during this survey (Table 11). Pike harvest was highest in January, February, and April. The highest estimated monthly harvest (116) was in April (Table 11), likely associated with spawning behavior and migrations into shallow slough habitats. The second highest harvests were in the winter ice fisheries in January and February. We observed pike harvest in all months except November and December, which maybe due to pike angler demographics (see following sections) and/or conflicts with hunting seasons.

Perch harvest was highest in the ice fishery, with 88% occurring in January through March. In February, anglers harvested an estimated 318 perch. January had the second highest harvest of 73 perch. March (33 perch) and September (49 perch) contained most of the remaining harvest. The

highest catch rates for largemouth bass occurred in April and May, when we observed rates ranging from 0.77 to 0.96 fish per hour. July and August were the only other months in which we observed anglers catching bass. Catch rates ranged from 0.01 to 0.04 fish per hour for these two months. The estimated harvest of 10 bass occurred in July. Most bass anglers practiced catch and release techniques.

Trout catch rates were low in Section 5 and likely resulted from incidental catch when targeting other fish species. We observed bull trout catch primarily in spring months. The highest catch rates for bull trout were 0.03 and 0.06 fish per hour and occurred on weekends in April and May, respectively (Appendix E). These higher bull trout catch rates were likely related to bull trout spawning behavior. Bull trout begin their spawning migration from Flathead Lake into the river system during April and move slowly upstream (Fraley and Shepard 1989). We also estimated lower bull trout catch rates of 0.02 and 0.01 fish per hour in February and September, respectively. We estimated that 13 lake trout were harvested in March and none in the other months (Table 7). We observed cutthroat trout catch only in September and at a low rate (0.01 fish per hour, Appendix D). We did not observe any catch of rainbow trout or the two whitefish species (Appendix D and Table 6).

Comparisons with the 1992-1993 creel are difficult for reasons stated above. It was noted that similar to this survey, "Other" species, which included northern pike, largemouth bass, yellow perch, peamouth chub, and northern pikeminnow, made up the majority of harvested fish and occurred during the ice fisheries (Hanzel 1995). Lake trout harvest was estimated at 234 fish, which was likely under estimated (Hanzel 1995). Our survey estimated only 13 harvested. In 1992-1993, it was legal to harvest westslope cutthroat trout and bull trout. In 1992-1993, the majority of bull trout harvest was in May (river Sections 1 and 5 were combined), the same month in which we observed the highest catch rates for bull trout in the 2002-2003 survey of Section 5.

Angler and Fisheries Characteristics from Interview Data

In addition to asking anglers questions about what fish they caught and harvested, creel clerks included a number of questions to describe certain characteristics of anglers using the Flathead River in 2002-2003. We asked questions to determine what fish species anglers were targeting, what types of fishing gear they were using, if they were with a fishing guide and whether or not they were residents of Montana. It is important to realize that the results from these questions are specific to the anglers we spoke to and not to potentially all anglers using the river. To minimize bias associated with sampling certain angler groups at a higher frequency than their proportion to the total angler population, I summarized and separated responses by river section, and at times season.

The following characteristics further described the differences between the upstream river sections and the lower river and slough sections. As previously reported, estimates of angler pressure, catch, and harvest depicted a gradient in fisheries down the Flathead River. Summer trout fisheries were represented in the uppermost sections, fall lake whitefish fisheries in the middle sections, and warm water fisheries in the lowest river reach and in the sloughs. The following data further explain and define these differences.

Target Species

During the interview process, creel clerks asked anglers which fish species they were trying to catch. This species was called the target species. Target species included the major game fish including all trout species, mountain and lake whitefish, yellow perch, northern pike, and largemouth bass. If the target species was not a traditional game species, such as peamouth chub or northern pikeminnow, we grouped theses into a category as "non-game" fish. If the angler was not specifically targeting any species, then we grouped these under the category "no target". Anglers who were not targeting a species either fished for multiple species in the river reach or were unaware of which species were present.

Not surprisingly, target species shifted with seasonal fisheries and varied between sections (Figure 4, Table 13). For example, starting in the uppermost reach (Section 4) the most targeted species were westslope cutthroat trout and rainbow trout, which were the predominant fisheries in Section 4. Anglers did not state a target species in 65 percent of the interviews in Section 4. As we moved downstream into Sections 3 and 2, the summer trout fishery was still evident, but also anglers targeted the lake whitefish fishery. Lake whitefish was the species most targeted (73 percent) in Section 2. Moving further downstream, anglers did not target the trout and whitefish fisheries. In Sections 1 and 5 (sloughs), the warmer water fish species were most targeted. Northern pike was the most sought after species in 70 percent and 20 percent of the interviews in the lowest river reach and sloughs, respectively. Lake trout was a significant target species only in Section 1, making up just over 15 percent of interviews.

Figure 4. Targeted fish species identified through angler interviews for the five Flathead River reaches, 2002-2003. Section 4 is the uppermost reach; section number decreased moving downstream, with Sloughs being Section 5.

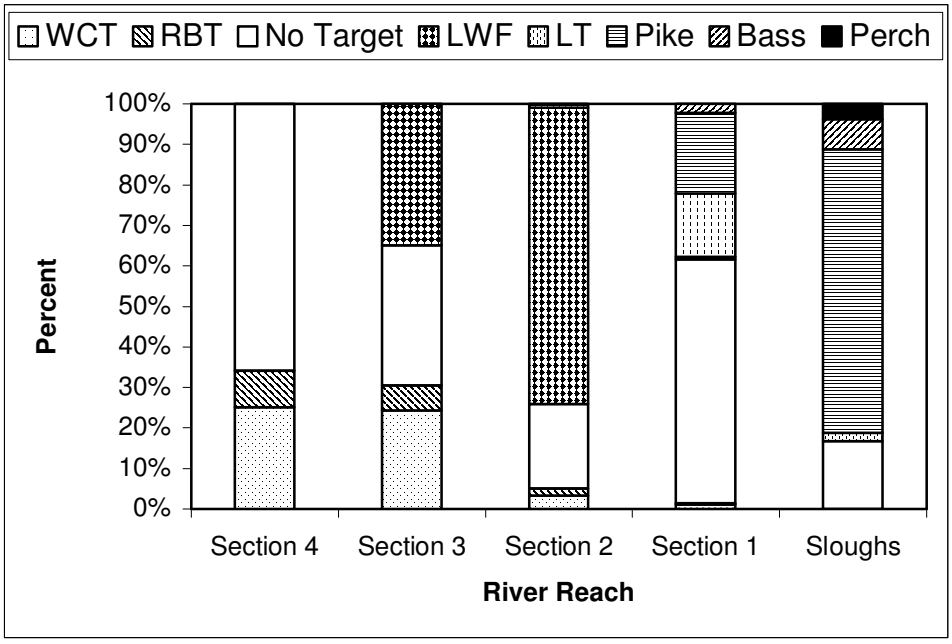

Table 13. Targeted fish species identified through angler interviews for the five Flathead River reaches, 2002-2003. Section 4 is the uppermost reach; section number decreased moving downstream, with Sloughs being Section 5. Values are percentages of angler interviews in each section.

	WCT	RBT	No Target	LWF	LT	Pike	Bass	Perch	MWF	Non-Game
Section 4	25.0	9.0	65.4	0.0	0.0	0.0	0.0	0.0	0.6	0.0
Section 3	24.3	6.2	34.6	34.9	0.0	0.0	0.0	0.0	0.0	0.0
Section 2	3.3	1.7	20.7	72.5	0.7	0.1	0.0	0.1	0.6	0.4
Section 1	1.1	0.4	59.3	0.7	15.4	19.6	2.1	0.0	0.0	1.4
Sloughs	0.0	0.0	16.7	0.0	2.1	70.0	7.4	3.8	0.0	0.0

Fishing Method and Lure Type

We separated fishing method into four categories, trolling, jigging, casting and fly fishing. Trolling involved pulling a lure behind a moving boat. Jigging consisted of vertically moving a lure, generally from a relatively stationary position either from a boat or while ice fishing. Casting involved using spin fishing or bait casting gear for either casting out a lure and retrieving it or casting out bait and allowing it to rest. Fly fishing involved using a fly rod and line to cast the lure. Fishing methods and lure types were closely related. Lure type was comprised of three categories, bait, artificial, and a combination of the two.

Similar to angler responses for targeted species, anglers chose gear specific to the fisheries available seasonally and in the river reach. The upper river sections contained the summer trout fishery. Correspondingly, 64 and 51 percent of anglers who were interviewed fly-fished and 36 and 25 percent cast lures in Sections 4 and 3, respectively (Table 14). The percentage of fly fishers declined rapidly as moving downstream into Sections 2 and 1. Fly fishing was one method not observed in the sloughs (Section 5).

Anglers used casting techniques at higher proportions in Section 1 and in the sloughs. Casting and jigging are the two techniques used in the lake whitefish and warm water fisheries and comprised the highest percentages in Sections 2, 1 and in the sloughs (Table 14). Trolling showed up mostly in Section 1, likely as a technique targeting lake trout (also see Table 13).

Table 14. Percent use of fishing methods by anglers in the Flathead River, 2002-2003.

	Trolling	Jigging	Casting	Fly Fishing
Section 4	0.0	0.0	36.2	63.8
Section 3	0.0	23.8	25.0	51.2
Section 2	0.2	41.2	49.1	9.5
Section 1	9.3	26.4	63.2	1.1
Sloughs	1.4	39.1	59.5	0.0

Angler's choice of lure type, artificial lures or natural bait, differed between the three upper river reaches and the lower river reach and sloughs. Artificial lures comprised roughly 78 percent of the lure type used in Sections 4 and 3 (Table 15). This was largely the result of fly fishing and likely spoon and spinner casting. These techniques and lures are popular in river trout fisheries. In Section 2, percentages of lure types were similar to those in the upper reaches (Table 15). This was

due to the summer trout fishery and the fall lake whitefish fishery. In the fall lake whitefish fishery, most anglers cast small artificial jigs. In Section 2, 96 percent of the fall anglers we interviewed used artificial lures. The greatest use of bait occurred in Section 1 and the sloughs (Section 5). In these sections, 45 to 52 percent of anglers were bait fishing, while 73 to 78 percent of anglers were either bait fishing or using a baited artificial lure (Table 15). Anglers fishing for northern pike, lake trout, or perch commonly used bait or baited an artificial lure with a piece of fish or a maggot.

Table 15. Percent use of lure types by anglers in the Flathead River, 2002-2003.

	Bait	Artificial	Combination
Section 4	9.0	78.2	12.8
Section 3	1.7	78.6	19.8
Section 2	3.5	83.9	12.7
Section 1	51.8	22.1	26.1
Sloughs	45.3	27.2	27.4

Guided or Unguided Fishing Trips

As with other characteristics of the diverse Flathead River fisheries, there was a distinct gradient in professional guided verse unguided fishing trips between the river reaches. Sections 4 and 3, which had relatively high summer use directed at a river trout fishery, had the highest incidence of guided fishing trips (Table 16). The highest percentage of guided fishing trips was 42 percent of interviews in Section 4, and all professional guiding occurred in July, August and September. In Section 3, 30 percent of interviews were associated with guided fishing trips and like Section 4; all professional guiding took place in the summer months. There was only a four percent incidence of guided fishing trips in Section 2 and they too occurred in the July though September period. In all three of these sections, August had the highest incidence of guided trips. In Sections 2 and 3, over half the interviews in August were from anglers on guided trips. We did not observe any professional guiding in Section 1 and in the sloughs (Section 5). From these data, it appeared that all commercial fishing guides on the Flathead River were associated with the summer trout fisheries on the upper river reaches. The popular fall whitefish fishery did not appear to attract the commercial fishing guide business. Similarly, there appeared to be no professional guiding on the lower river reach or in the sloughs.

Table 16. Percentages of professionally guided fishing trips recorded in angler interviews, Flathead River 2002-2003.

	% Guided	% Unguided
Section 4	42	58
Section 3	30	70
Section 2	4	96
Section 1	0	100
Sloughs	0	100

Resident and Nonresident Anglers

We categorized anglers as Montana residents or residents of another state and found that the percentages of nonresident anglers mirrored the results of the guided fishing trip data (Tables 16 and 17). The highest incidence of nonresident anglers (41 and 30 percent) occurred in Sections 4

and 3, respectively, as did the incidence of guided fishing trips. Similarly, all observed nonresident use in these reaches occurred in the July though September period. Nonresident use in Section 2 was only seven percent of the total interviews and occurred within the July through November period, with highest levels in July, August and October. It appeared from the October data that a low level of nonresident use is associated with the fall lake whitefish fishery. Nonresident use in Section 1 occurred in June, July and August and made up 10 percent of the total interviews for the reach. There was almost no nonresident use (one percent) in the sloughs and it occurred in August. There was a general increasing trend in percentage of resident use as we moved downstream (Table 17).

Table 17. Percentages of Montana resident and nonresident anglers recorded in angler interviews, Flathead River 2002-2003.

	Nonresident	Resident
Section 4	41	59
Section 3	30	70
Section 2	7	93
Section 1	10	90
Sloughs	1	99

LITERATURE CITED

Deleray, M., L. Knotek, S. Rumsey, and T. Weaver. 1999. Flathead Lake and River System Fisheries Status Report. Montana Department of Fish, Wildlife and Parks, Kalispell, Montana. 229 pp.

Evarts, L., B. Hansen, and J. DosSantos. 1994. Flathead Lake angler survey. Report DOE/BP-60479-1. Bonneville Power Administration. Portland, Oregon.

Fraley, J. J. and B. B. Shepard. 1989. Life history, ecology and population status of bull trout (*Salvelinus confluentus*) in the Flathead Lake and River system, Montana. Northwest Science 63:133-143.

Fredenberg, W. and P. Graham. 1983. Flathead River fisherman census. Montana Department of Fish, Wildlife and Parks, Kalispell, Montana. 80 pp.

Hanzel, D. 1995. Flathead River Creel Report, 1992-1993. Report DOE/BP-60424-1. Bonneville Power Administration. Portland, Oregon.

MFWP and CSKT. 2000. Flathead Lake and River Fisheries Co-Management Plan 2001-2010. Montana Department of Fish, Wildlife and Parks, Kalispell, Montana and Confederated Salish and Kootenai Tribes, Pablo, Montana.

Neuhold, J.M. and K.H. Lu. 1957. Creel census method. Utah State Department of Fish and Game Publication 8, Salt Lake City, Utah, USA.

Zackheim, H. 1983. Final report of the steering committee for the Flathead River Basin Environmental Impact Study. Funded by EPA under grant number R00822201, Kalispell, Montana, USA.

APPENDIX A

Table A1. Number of successful angler interviews completed on the Flathead River, 2002-2003.

	Section 1		Section 2		Section 3		Section 4		Section 5 Sloughs		All Combined	
Month	Shore	Boat	Shore	Boat	Shore	Boat	Shore	Boat	Shore	Boat	Shore	Boat
Jan	0	0	3	1	0	0	0	0	21	0	24	1
Feb	0	2	1	0	0	0	0	1	30	1	31	4
Mar	0	0	2	0	2	0	1	1	8	3	13	4
Apr	1	0	4	0	0	0	0	0	0	6	5	6
May	5	0	0	1	0	0	0	0	0	7	5	8
Jun	3	3	1	0	0	0	1	0	5	9	10	12
Jul	14	7	29	4	11	27	19	14	3	25	76	77
Aug	8	22	23	6	11	53	6	28	4	31	52	140
Sep	1	14	14	1	9	5	2	7	1	18	27	45
Oct	0	3	135	18	47	4	2	0	0	3	184	28
Nov	0	0	66	14	44	2	0	0	0	0	110	16
Dec	0	0	18	10	16	3	0	0	0	0	34	13
Totals	32	51	296	55	140	94	31	51	72	103	571	354
											Grand Total	925

APPENDIX B

Table B1. Dates of successfully completed aerial surveys (A) of angler pressure on the Flathead River, 2002-2003.

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1		A	A	A		A	A	A	A			
2		A								A		
3					A		A	A	A		A	
4				A		A			A			
5				A	A	A	A	A	A			
6						A	A			A		
7				A	A		A			A		
8		A		A	A			A	A		A	A
9	A	A		A	A		A		A		A	
10	A		A		A	A		A				A
11	A	A	A			A		A			A	A
12	A	A	A	A		A				A		
13	A	A	A				A	A	A	A		A
14			A		A				A			A
15			A	A		A			A	A	A	A
16				A		A					A	A
17			A	A	A		A	A				A
18	A	A		A	A		A	A	A	A		A
19		A	A	A	A	A	A	A		A		A
20	A		A	A			A			A		
21			A	A	A	A		A		A		
22		A	A		A	A	A	A	A			
23	A	A	A	A			A		A	A		A
24	A				A				A			
25		A				A		A				
26	A	A				A		A	A			
27		A		A	A		A	A	A	A	A	
28					A		A		A			A
29	A		A		A	A			A			A
30					A	A	A		A	A		A
31	A						A	A				A

APPENDIX C

Table C1. Angler fishing pressure estimates broken into strata for Flathead River, 2002-2003.

		Section 1		Section 2		Section 3		Section 4		Section 5		Totals		
Month	Day Type	Shore	Boat	Shore	Boat	Shore	Boat	Shore	Boat	Shore	Boat	Shore	Boat	Combined
Jan	Weekday	0.0	51.5	102.9	51.5	0.0	0.0	25.7	0.0	566.0	0.0	694.6	102.9	797.5
	Weekend	0.0	39.2	39.2	39.2	58.8	0.0	0.0	0.0	646.8	0.0	744.8	78.4	823.2
	Combined	0.0	90.7	142.1	90.7	58.8	0.0	25.7	0.0	1,212.8	0.0	1,439.4	181.3	1,620.7
Feb	Weekday	0.0	322.1	348.9	53.7	26.8	161.0	0.0	0.0	912.5	0.0	1,288.2	536.8	1,825.0
	Weekend	33.9	203.4	50.9	0.0	169.5	33.9	0.0	0.0	237.3	0.0	491.6	237.3	728.9
	Combined	33.9	525.5	399.7	53.7	196.3	194.9	0.0	0.0	1,149.8	0.0	1,779.8	774.1	2,553.8
Mar	Weekday	0.0	541.8	108.4	54.2	216.7	325.1	27.1	54.2	27.1	243.8	379.3	1,219.1	1,598.3
	Weekend	0.0	258.0	180.6	51.6	25.8	0.0	0.0	51.6	154.8	77.4	361.2	438.6	799.8
	Combined	0.0	799.8	289.0	105.8	242.5	325.1	27.1	105.8	181.9	321.2	740.5	1,657.7	2,398.1
Apr	Weekday	0.0	257.3	257.3	0.0	51.5	51.5	77.2	51.5	0.0	555.7	385.9	915.8	1,301.7
	Weekend	0.0	52.9	105.8	0.0	105.8	0.0	0.0	105.8	0.0	282.2	211.7	441.0	652.7
	Combined	0.0	310.2	363.1	0.0	157.3	51.5	77.2	157.3	0.0	837.9	597.6	1,356.8	1,954.4
May	Weekday	25.5	101.8	25.5	0.0	0.0	50.9	127.3	101.8	0.0	427.7	178.2	682.3	860.5
	Weekend	145.8	175.0	233.3	0.0	87.5	0.0	145.8	175.0	0.0	166.6	612.4	516.6	1,128.9
	Combined	171.3	276.8	258.7	0.0	87.5	50.9	273.1	276.8	0.0	594.3	790.6	1,198.8	1,989.4
Jun	Weekday	0.0	79.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	307.8	0.0	387.6	387.6
	Weekend	0.0	199.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	152.0	0.0	351.5	351.5
	Combined	0.0	279.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	459.8	0.0	739.1	739.1
Jul	Weekday	0.0	0.0	233.8	66.8	200.4	1,013.1	267.2	1,389.4	0.0	1,085.5	701.4	3,554.9	4,256.3
	Weekend	0.0	501.0	150.3	112.7	275.6	481.0	25.1	501.0	0.0	323.7	450.9	1,919.4	2,370.3
	Combined	0.0	501.0	384.1	179.5	476.0	1,494.1	292.3	1,890.4	0.0	1,409.2	1,152.3	5,474.3	6,626.6
Aug	Weekday	0.0	0.0	411.4	961.7	37.4	1,134.2	523.6	2,531.7	0.0	466.8	972.4	5,094.4	6,066.8
	Weekend	0.0	111.1	255.7	327.0	59.0	559.5	157.4	1,053.8	0.0	590.1	472.1	2,641.6	3,113.8
	Combined	0.0	111.1	667.1	1,288.8	96.4	1,693.7	681.0	3,585.5	0.0	1,056.9	1,444.5	7,736.0	9,180.5
Sep	Weekday	0.0	337.5	476.0	321.3	95.2	349.1	285.6	775.2	0.0	721.5	856.8	2,504.6	3,361.4
	Weekend	0.0	337.5	285.6	183.6	326.4	187.0	163.2	641.1	0.0	412.3	775.2	1,761.6	2,536.8
	Combined	0.0	675.1	761.6	504.9	421.6	536.1	448.8	1,416.3	0.0	1,133.8	1,632.0	4,266.2	5,898.2
Oct	Weekday	0.0	261.8	1,737.4	404.6	714.0	428.4	190.4	71.4	0.0	142.8	2,641.8	1,309.0	3,950.8
	Weekend	0.0	85.7	1,692.2	719.7	364.1	192.8	171.4	257.0	0.0	64.3	2,227.7	1,319.5	3,547.2
	Combined	0.0	347.5	3,429.6	1,124.3	1,078.1	621.2	361.8	328.4	0.0	207.1	4,869.5	2,628.5	7,498.0
Nov	Weekday	0.0	244.8	1,632.0	596.3	326.4	122.4	204.0	0.0	0.0	0.0	2,162.4	963.5	3,125.9
	Weekend	0.0	68.0	1,122.0	204.0	255.0	51.0	0.0	0.0	0.0	0.0	1,377.0	323.0	1,700.0
	Combined	0.0	312.8	2,754.0	800.3	581.4	173.4	204.0	0.0	0.0	0.0	3,539.4	1,286.5	4,825.9
Dec	Weekday	0.0	253.8	296.1	253.8	45.6	45.6	0.0	0.0	0.0	56.4	341.7	609.6	951.2
	Weekend	0.0	241.7	308.9	60.4	80.6	26.9	94.0	0.0	0.0	0.0	483.4	329.0	812.4
	Combined	0.0	495.5	605.0	314.2	126.1	72.4	94.0	0.0	0.0	56.4	825.1	938.6	1,763.6
Total	Weekday	25.5	2,452.1	5,629.6	2,763.8	1,714.0	3,681.2	1,728.1	4,975.2	1,505.5	4,007.9	10,602.6	17,880.3	28,482.9
	Weekend	179.7	2,273.0	4,424.4	1,698.3	1,808.1	1,532.0	756.8	2,785.4	1,038.9	2,068.7	8,207.9	10,357.4	18,565.4
	Combined	205.2	4,725.1	10,054.0	4,462.1	3,522.1	5,213.3	2,484.9	7,760.6	2,544.4	6,076.6	18,810.5	28,237.7	47,048.2

APPENDIX D

Table D1. Mean monthly catch rates for westslope cutthroat trout (WCT), rainbow trout (RB), and the two species combined (WCT + RB) in the Flathead River, 2002-2003.

WCT	Section 1		Section 2		Section 3		Section 4		Section 5 (Sloughs)	
Month	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
Jan	0.00	0.00	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.00
Feb	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar	0.00	0.00	0.22	0.22	0.27	0.40	0.00	0.00	0.00	0.00
Apr	0.00	0.00	1.11	0.89	0.00	0.00	0.00	0.00	0.00	0.00
May	0.00	0.00	1.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jul	0.00	0.00	0.04	0.08	0.48	0.24	0.31	0.49	0.00	0.00
Aug	0.02	0.01	0.16	0.16	0.69	0.52	0.57	0.57	0.00	0.00
Sep	0.72	0.72	0.28	0.39	0.48	0.48	0.48	0.48	0.01	0.01
Oct	0.00	0.00	0.004	0.03	0.01	0.09	0.00	0.00	0.00	0.00
Nov	0.00	0.00	0.04	0.00	0.10	0.09	0.00	0.00	0.00	0.00
Dec	0.00	0.00	0.03	0.03	0.29	0.25	0.00	0.00	0.00	0.00

Rainbow	Section 1		Section 2		Section 3		Section 4		Section 5 (Sloughs)	
Month	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
Jan	0.00	0.00	0.17	0.17	0.00	0.00	0.00	0.00	0.00	0.00
Feb	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Apr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.07	0.00	0.00
Jul	0.00	0.00	0.08	0.04	0.05	0.02	0.02	0.02	0.00	0.00
Aug	0.00	0.00	0.08	0.08	0.14	0.07	0.06	0.06	0.00	0.00
Sep	0.00	0.00	0.33	0.17	0.03	0.03	0.05	0.05	0.00	0.00
Oct	0.00	0.00	0.000	0.00	0.00	0.01	0.18	0.18	0.00	0.00
Nov	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00
Dec	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00

WCT+RB	Section 1		Section 2		Section 3		Section 4		Section 5 (Sloughs)	
Month	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
Jan	0.00	0.00	0.42	0.42	0.00	0.00	0.00	0.00	0.00	0.00
Feb	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar	0.00	0.00	0.22	0.22	0.27	0.40	0.00	0.00	0.00	0.00
Apr	0.00	0.00	1.11	0.89	0.00	0.00	0.00	0.00	0.00	0.00
May	0.00	0.00	1.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.07	0.00	0.00
Jul	0.00	0.00	0.12	0.12	0.53	0.26	0.33	0.51	0.00	0.00
Aug	0.02	0.01	0.24	0.24	0.83	0.59	0.63	0.63	0.00	0.00
Sep	0.72	0.72	0.61	0.56	0.51	0.51	0.53	0.53	0.01	0.01
Oct	0.00	0.00	0.00	0.03	0.01	0.10	0.18	0.18	0.00	0.00
Nov	0.00	0.00	0.05	0.00	0.11	0.10	0.00	0.00	0.00	0.00
Dec	0.00	0.00	0.03	0.03	0.31	0.27	0.00	0.00	0.00	0.00

APPENDIX E

Table E1. Mean monthly catch rates for mountain whitefish and bull trout in the Flathead River, 2002-2003.

Mountain whitefish Catch Rates

	Section 1		Section 2		Section 3		Section 4		Section 5 (Sloughs)	
Month	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
Jan	0.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb	0.00	0.00	5.50	11.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar	0.00	0.00	1.33	1.33	0.00	0.00	0.00	0.00	0.00	0.00
Apr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.07	0.00	0.00
Jul	0.00	0.00	0.04	0.01	0.03	0.01	0.01	0.00	0.00	0.00
Aug	0.04	0.04	0.00	0.00	0.07	0.09	0.03	0.03	0.00	0.00
Sep	0.00	0.00	0.00	0.00	0.07	0.07	0.02	0.02	0.00	0.00
Oct	0.00	0.00	0.00	0.00	0.00	0.00	5.33	5.33	0.00	0.00
Nov	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dec	0.00	0.00	0.00	0.00	0.05	0.04	0.00	0.00	0.00	0.00

Bull Trout Catch Rates

	Section 1		Section 2		Section 3		Section 4		Section 5 Sloughs	
Month	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
Jan	0.00	0.00	0.33	0.33	0.00	0.00	0.00	0.00	0.00	0.00
Feb	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Mar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Apr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
May	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
Jun	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jul	0.00	0.00	0.19	0.03	0.01	0.07	0.03	0.04	0.00	0.00
Aug	0.00	0.00	0.02	0.02	0.04	0.06	0.06	0.05	0.00	0.00
Sep	0.02	0.02	0.00	0.00	0.01	0.01	0.02	0.02	0.01	0.01
Oct	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nov	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
Dec	0.00	0.00	0.00	0.00	0.07	0.06	0.00	0.00	0.00	0.00