BIGHORN RIVER ANGLERS OPINION SURVEY and CREEL CENSUS

April 1992 - March 1993

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ABSTRACT

The Bighorn River is a highly publicized fishery and one of the most heavily used trout streams in Montana. Most angling pressure is concentrated on the first 12 miles of river downstream of Yellowtail Afterbay Dam with high concentrations of anglers occurring in this section of river during much of the year.

An angler survey consisting of both an on-site interview and an extensive mail-back survey was conducted on this upper 12-mile reach of the Bighorn between April 1992 and March 1993. This survey was developed to collect background information from anglers and look at issues surrounding crowding problems on the Bighorn River. The survey was designed to collect data from Bighorn anglers concerning their perception of the crowding problem on the river. It also asked for feedback on possible management options to be considered for the Bighorn River in the future, and looked at creel data and some of the economics surrounding the fishery. A total of 3,638 anglers responded to the on-site survey and took home a mail-back survey with an overall response rate of 66%. Anglers from all over the world were contacted during the survey with nonresident anglers out numbering resident anglers on the river from April through November.

Most anglers on the Bighorn were fly-fishermen who, despite very good catch rates and liberal limits, kept few of the trout they caught. Catch rates during the survey were up considerably from rates reported during the last creel census conducted in 1982-1983. The overall catch rate for both rainbow trout and brown trout was 1.04 trout per hour. Angler harvest during the survey was insignificant in the overall health of the Bighorn River Fishery.

Almost three-quarters of the anglers responding to the survey said they experienced some crowding during their trip to the Bighorn River. Over half of these anglers said they encountered other rude or inconsiderate anglers during their trip. Anglers also identified several other areas where the number of other anglers present on the river affected their angling experience. When presented with different management approaches designed to address the congestion problem on the Bighorn River, a large percentage of the current users said they would favor, or at least accept various restrictions, even if these restrictions could affect their own use on the Bighorn. Over three-quarters of the anglers contacted during the survey said they did not favor, or would not accept maintaining the status-quo on the Bighorn River. They felt it was time to implement some additional use restrictions on the river.

Despite a consensus that crowding was a problem on the Bighorn River, and something should be done about it, crowding was not a major factor affecting the quality of the angling experience on the river. Most anglers rated their angling experience on the Bighorn as good to excellent, and most were not willing to pay more for the same experience with only half as many other anglers present. Angling success was a major factor to anglers in determining the quality of their fishing trip to the Bighorn.

Anglers also expressed views on a variety of fisheries management issues concerning the Bighorn River. Analysis of economic data showed that both resident and nonresident anglers placed a high economic value on fishing the Bighorn and that this fishery was an important economic resource to the state of Montana.

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF TABLES

PAGE

LIST OF FIGURES

LIST OF FIGURES

PAGE

INTRODUCTION

The Bighorn River exemplifies a problem that is becoming a major concern throughout Montana. Montana's reputation as one of the top wild trout states in the nation combined with a surging interest in fly fishing, is drawing many new anglers into the state each year leading to increased congestion on many state waters. Problems associated with crowding are further aggravated on many rivers by increasing numbers of other users such as floaters and jet boaters competing for the same resources.

Although congestion is a problem on a number of Montana rivers, impacts are more apparent on the Bighorn River than on other stream in the state. The Bighorn River has developed a reputation among fly fishermen as one of the best trout streams in the country if not the world. This is exemplified by articles such as Hottest Trout Stream in America (Outdoor Life, March 1983) and America's Best Trout River (Sports Afield, August 1989). This kind of publicity is common for the Bighorn with two or three articles appearing annually in national outdoor magazines. The Bighorn River is also featured regularly on television fishing programs. Along with this publicity, commercial outfitters continue to advertize the Bighorn fishery on a worldwide basis, and once anglers experience the fishery on the Bighorn, many of them become regular visitors, often bringing friends with them on following trips. With this kind of promotion, use on the Bighorn will remain high.

One major reason that crowding is more of a problem on the Bighorn than on other famous trout streams in Montana is that most of the angling pressure on the Bighorn is concentrated on the upper 12 miles of river below Yellowtail Afterbay Dam. Due to limited shoreline access, most anglers on this section of the Bighorn use boats to float between holes. All walk-in anglers are concentrated at three public access points.

This study was developed to collect background information and look at issues surrounding crowding problems on the Bighorn River. The survey was designed to collect data from Bighorn anglers concerning their perception of the crowding problem on the river. It also asked for feedback on possible management options to be considered for the Bighorn River in the future, and looked at some of the economics surrounding the fishery.

This study was initiated with no preconceived agenda or preferred alternatives for dealing with the situation on the Bighorn River. As use continues to grow on Montana's streams, however, it appears inevitable that additional controls and regulations will be needed. It is likely the Bighorn River will be one of the first streams affected. Some information collected during this survey may be useful to user groups throughout the state in trying to develop use regulations for other streams in Montana.

Results of this survey are contained in two separate reports. This report includes a general profile of the angling population on the Bighorn River; a review of angler expenditures and the net economic value of the Bighorn River fishery; and summaries of creel data from the survey period, of anglers experiences and opinions concerning social interactions and crowding on the

Bighorn River during their trips, and of angler responses to various management approaches for the Bighorn River proposed as part of this survey. A second report completed by Neher and Duffield (1994) provides a more in-depth analysis of the economic value of an angling trip to the Bighorn River. It also provides a bivariate and multivariate analysis of two contingent valuation questions dealing with willingness to pay for current recreational conditions on the Bighorn River, as well as for a hypothetically improved recreational experience where anglers encounter only half the number of people as they did on their most recent trip to the Bighorn.

Both reports provide independent and slightly different evaluations of factors relating to angler crowding on the Bighorn River. Conclusions reached in both reports are the same although some slight variations occur in statistical results. These variations resulted from slightly different handling of non-responses on some questions.

Limitations of the Bighorn River Survey

Despite the large number of contacts made during this survey, the results do not provide a complete look at the crowding story on the Bighorn River. This survey contacted anglers fishing the Bighorn River at the current level of use. These anglers apparently felt any negative aspects of crowding they perceived on the river were outweighed by the angling opportunities available on the Bighorn. Another segment of the angling population fished the Bighorn River in the past, but no longer does, or lives close to the Bighorn and yet has never fished it despite its reputation as a fishery. These anglers had many reasons for not fish the Bighorn River during the period this survey was conducted, but their perception of the crowding on the Bighorn may be different from that of anglers still fishing the Bighorn. A second survey designed to reach these "non-use" anglers with questions similar to those asked in this survey would provide a more complete look at crowding effects on the Bighorn River.

STUDY AREA

The Bighorn River is located in south-central Montana approximately 45 miles east of Billings. It flows north 116 miles from the Wyoming border, past the town of Hardin, to its confluence with the Yellowstone River near Custer.

Historically, the Bighorn River was a silty, warm prairie stream that supported a marginal warmwater fishery. Yellowtail Dam closed off the Bighorn River in 1965 and totally changed the character of the river downstream. The dam trapped sediment coming down the Shoshone and Big Horn rivers out of Wyoming and cleared up the water below the dam. Deep withdrawal of water through the dam for power generation reduced summer water temperatures to levels more appropriate for trout than warmwater fish species. A reregulation dam, constructed as part of the Yellowtail project, stabilized daily water level fluctuations in the river.

This survey was conducted on the upper 12 miles of the Bighorn River from the Afterbay Dam to Bighorn Fishing Access Site (FAS) (Figure 1). This section of the Bighorn River has characteristics similar to a large spring creek with clear, cold water and stable flow conditions. The Bighorn River supports a world renowned tailwater trout fishery comprising wild populations of both rainbow and brown trout. Trout numbers in this section have ranged between about 4,000 and 10,000 trout per mile with many trout 17 inches and longer available to anglers (Frazer 1991).

The entire Bighorn River upstream of Hardin is within the confines of the Crow Indian Reservation where public access is limited. Public access to the upper 12 miles down to Bighorn FAS is limited to three access points (Figure 1). The National Park Service maintains two accesses, i.e., Afterbay Access located at the upper end of the section and Lind Access located three miles downstream. Montana Fish, Wildlife and Parks (MFWP) maintains Bighorn FAS at the bottom of the study section. A few anglers use other private accesses within the study section.

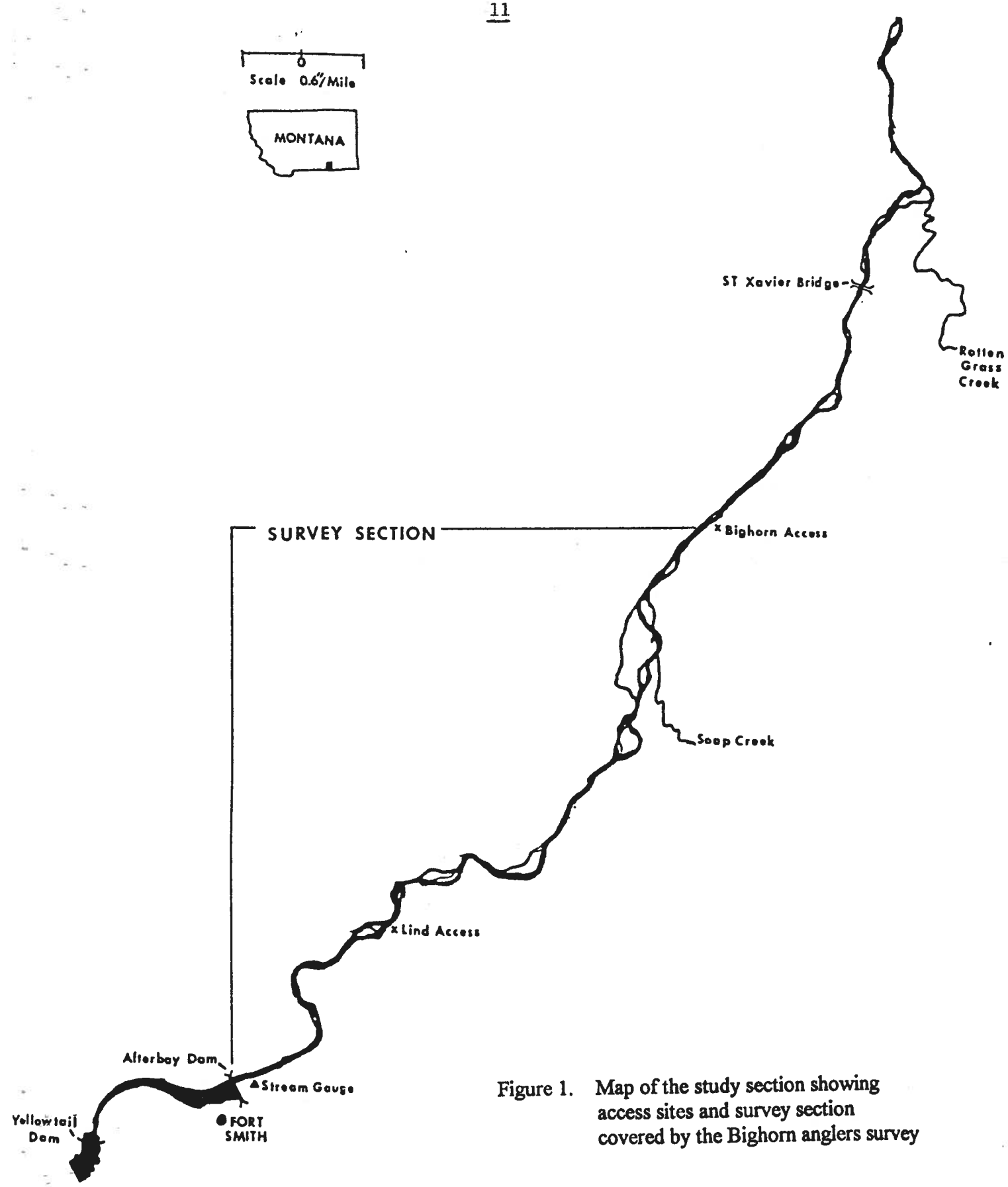

Figure 1. Map of the study section showing access sites and survey section covered by the Bighorn anglers survey

METHODS

The Bighorn Angler survey was developed through the joint effort of MFWP and Bioeconomics Associates of Missoula, MT, and included input from bioeconomists, sociologists, statisticians and biologists. A sample survey was developed and distributed to anglers on the Bighorn River during the fall of 1991 to test various formats and sample questions. A few minor changes were made based on this initial test before a final survey was printed.

A goal of this study was to distribute 4,000 mail-back surveys to anglers on the Bighorn River during a one year period between April 1992 and March 1993. Car counter data collected at Bighorn FAS during 1989 and 1990 were used to proportion distribution of surveys on a monthly basis. A total of 16,604 and 16,549 counts were recorded at this counter for 1989 and 1990 respectively, and use patterns were almost identical both years. These data were combined, and a percent of total use was calculated for each month. The target number of surveys to be distributed each month was then calculated by dividing these percentages into a total of 4,000 surveys. Monthly quotas ranged from a low of 60 surveys per month in December and January to a high of 760 surveys per month in August and September.

Survey dates were established by randomly selecting four weekend days and three week days out of each two week period from March through November, with holidays counted as weekends. During the three winter months, the survey schedule was dictated by the weather. Most winter surveys were conducted on warm, sunny days in an attempt to contact as many anglers as possible and distribute the required number of surveys.

During most of the year, surveys were distributed by a river ranger floating between Afterbay Access and Bighorn Access using a Coleman scanoe equipped with an electric trolling motor. Sampling times normally started between nine and 10:00 A.M. at the Afterbay Access, giving anglers time to distribute down river and do some fishing before being contacted. To hand out the required number of surveys each month, it was necessary for the river ranger to contact as many anglers as possible each day he was on the river. As the number of anglers increased during the busy months, the number of necessary contacts also increased. If anglers were in a location where it would be difficult to approach them without disrupting their fishing, they were passed by. All other anglers were contacted as time allowed.

Very few anglers float the Bighorn River during the winter months so all angler contacts were made at the three public access points during this time of year.

Sampling protocol involved approaching an angler and asking whether he or she would be willing to participate in a survey. If agreeable, they were asked to answer a series of questions from an on-site survey pertaining to that day of fishing. This survey contained questions on residency, areas fished, angling success and interactions with other anglers (Appendix A). Each angler was then asked to take home a more detailed mail-back survey and answer questions relating to their entire trip to the Bighorn River (Appendix A). Names and addressed of all

cooperating anglers were recorded for follow-up. Each angler within a party was treated as a separate contact.

All mail-back surveys were sequentially numbered and color coded on a monthly basis so they could be related back to a corresponding on-site survey, and to simplify follow-ups. Approximately 10 days after a survey was handed out, a follow-up postcard was sent to each angler thanking them for participating and reminding them to send in their survey if they had not already done so. Approximately 10 days later, a follow-up letter and second survey were sent to anyone who had not returned his original survey.

The mail-back survey contained two contingent valuation questions into which dollar values had to be inserted. These values were inserted in a repeating sequential order starting over with the lowest value at the beginning of each month. Numbered surveys were handed out in sequential order without regard to the residency of the angler. Follow-up surveys were also taken out of the normal monthly sequence with no attempt to match dollar values with those used in the original survey.

All data entry was contracted through Bioeconomics Associates. Data was entered and analyzed using a SAS database program. Following initial entry all data were verified and edited by referring to the original surveys as needed.

RESULTS AND DISCUSSION

Interviews and Response Rates

Angler cooperation was very good during this survey with most anglers contacted during the survey willing to respond to the questionnaire. A total of 3638 anglers responded to the on-site questions and took home a mail-back survey. Monthly return rates on the mail-back survey ranged from 48% to 73% with an overall response rate of 66%.

Angler Profiles

The median age of anglers on the Bighorn River was 42 years for resident anglers and 46 years for nonresident anglers. Only 4.8% of the anglers responding to the survey were females. Sixty-nine percent of the respondents reported they had at least a bachelors degree with many having advanced degrees. Resident anglers reported a median income of between $40,000 and $50,000, while nonresidents reported a median income of between $70,000 and $80,000.

Seventy percent of the anglers interviewed said they had fished the Bighorn River previous to the trip when they were contacted for this survey. Eighty-six percent of the respondents said that fishing the Bighorn was the primary purpose for their trip. More than 90% of the anglers reported they had been fishing for at least 10 years, and almost 50% reported they had been fishing for 30 or more years. Nonresident anglers spent an average of 3.9 days per trip fishing

the Bighorn and fished an average of 8.8 hours per day, while resident anglers spent an average of 1.95 days per trip and fished an average of 7.1 hours per day.

Angler Residence

Nonresident anglers outnumbered resident anglers on the Bighorn from April through November with nonresident anglers comprising 88% of the angling population on the river during August and September (Figure 2). Overall, nonresident anglers comprised 74% of the angling population on the Bighorn River during this survey. Residents from every state in the Union except Delaware were represented in the anglers contacted during this survey. Anglers from four Canadian Provinces and 10 other foreign countries were also represented in the sample (Table 1).

Table 1. List of countries represented by anglers contacted on the Bighorn River during the angler survey conducted April 1992 through March 1993.

USA	CANADA	OTHER COUNTRIES
All states represented except Delaware	Alberta British Columbia Ontario Quebec	Argentina Australia Germany Holland Italy Japan Mexico Norway Scotland Sweden

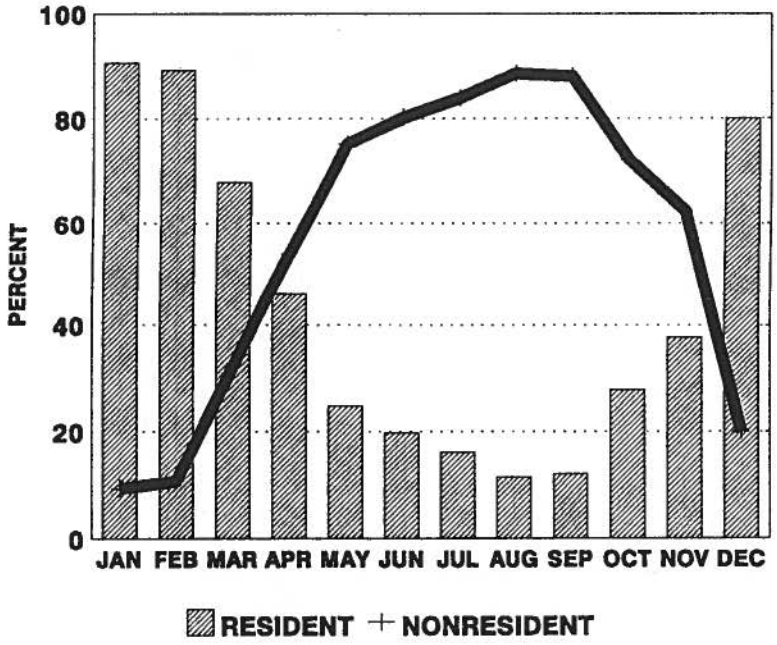

Figure 2. Residency of anglers contacted during the Bighorn River anglers survey compared on a monthly basis.

These figures represent a major shift toward nonresident angler use since the first Bighorn River creel census was conducted in 1982 and 1983, when nearly half of all anglers interviewed were either local anglers from the Fort Smith/Hardin area or from the Billings area. Other Montana residents accounted for an additional 17%. Nonresident anglers accounted for 34% of the anglers contacted on the Bighorn River between March 1982 and September 1983 (Fredenberg 1985). Maximum nonresident use observed during this creel census was during September 1983 when nonresidents comprised 49% of the angling population.

Tackle Selection

Most Bighorn anglers contacted during this survey were fly fishermen with 88% of the respondents reporting they fished exclusively with flies and 5% reporting they used a combination of flies and lures. Only 5.5% fished exclusively with lures and less than 2% fished with bait. Resident anglers were more likely to fish with lures or bait or a combination of tackle than nonresident anglers. Just under 67% of resident anglers reported they fished exclusively with flies, while 14% said they fished with lures, and 13% said they fished with a combination of tackle. Six percent of 605 resident anglers reported they fished exclusively with bait. In comparison, more than 94% of nonresident anglers fished exclusively with flies. More than 96% of guided anglers fished exclusively with flies. Fifty percent of anglers responding to this survey said they tied their own flies.

Only the upper 600 feet of the survey section was open for bait fishing, which helps account for the low number of bait fishermen contacted. However, the entire survey section was open to lure fishing.

In the 1982 - 1983 creel survey, fly fishermen comprised 49% of the anglers fishing section 2 (from the cable 600 foot below the Afterbay dam to Bighorn Fishing Access Site) and lure fishermen comprised 32%. The remaining 19% fished with a combination of flies and lures.

Use of Guides

A total of 937 anglers, or 38.4% of the anglers that responded to the mail-back survey, reported they employed a professional guide or outfitter sometime during their trip to the Bighorn River. Only 61% of these anglers used a guide during their entire trip. Many anglers on the Bighorn River hire a guide during the first two or three days on the river, then either rent a boat or fish from shore during the remainder of their trip.

As expected, most of the guides and outfitters were employed by nonresident anglers. During the initial on-site contact, 40.4% of nonresident anglers were fishing with a guide compared with only 4.1% of resident anglers.

Boat Use by Anglers

Seventy-eight percent of the respondents to the mail-back survey said they used a boat during their trip to the Bighorn River. Guide boats accounted for 36% of this use, while rental boats and personal boats each accounted for 23% of the boat use. The remaining 18% of anglers reported they were using a friend's boat.

Angler Expenditures and Net Economic Value

The amount of money spent by anglers fishing the Bighorn River is substantial. Survey respondents were asked how much they spent on gas, food, lodging, equipment, guides and boats, airfare, car rental, and other miscellaneous items associated with their trip to the Bighorn. This information is presented in Table 2 and is broken out by residency.

Table 2. Angler expenditures associated with fishing the Bighorn River by residency.

Expenditure Category	Resident Expenditures ($)	Nonresident Expenditures ($)
Gas	21.00	71.00
Food	27.00	119.00
Lodging/camping	18.00	149.00
Fishing equipment	31.00	92.00
Guide fees	24.00	188.00
Boat rental	6.00	48.00
Airfare	10.00	171.00
Car rental		65.00
Other expenses	4.00	68.00
Total Per Trip	**141.00**	**971.00**
Total Per Day	**70.50**	**243.75**

Angler expenditures are important to the businesses in the Fort Smith/Hardin area as well as those businesses elsewhere in Montana that benefit from this spending. According to the Montana Statewide Angling Pressure-1995 survey results, residents fished 21,914 days on the Bighorn River from the Afterbay Dam to the Bighorn FAS, while nonresident accounted for 32,992 angler days. Total expenditures due to fishing the Bighorn River were approximately

9.6 million dollars in 1992. About 50 percent of the money spent by resident anglers is spent in the local area with the rest being spent out of the area but in Montana. Nonresidents reported spending 60 - 70 percent of their money in the local area (Ft. Smith/Hardin) and most of the rest in Montana. About 10 percent is spent out of state by nonresidents.

In addition to asking respondents about their actual expenditures, anglers were also asked to respond to two contingent valuation questions that provided information about what they felt their current fishing opportunity was worth as well as a hypothetical improved situation with fewer anglers. A detailed report of this analysis is provided in the report by Neher and Duffield, 1994 titled, Bighorn River Angler Survey: Analysis of Responses to Congestion and Contingent Valuation Questions. The net economic values estimated and discussed below show what this fishing opportunity is worth over and above what the anglers actually paid.

Resident anglers responded that their recent fishing trip to the Bighorn River was worth, on average, $199.00 more than what they had to pay in expenses. Nonresidents, on the other hand, were willing to pay an additional $564.00 for this fishing opportunity.

When asked what they would be willing to pay for a fishing trip on the Bighorn that was essentially the same as their recent trip but they would see only half as many anglers; both resident and nonresident anglers were not willing to pay significantly more for this less crowded fishing opportunity. Residents were willing to pay $221.00 and nonresidents $550.00. The difference between the current trip and the improved trip were not statistically significant.

An analysis of a subgroup of anglers who felt the most crowded while on the river revealed that while they valued both the current trip and the improved condition trip higher than the complete sample, the differences are not significantly different in all cases except one. .

While respondents expressed concern over the numbers of anglers they encountered on the river and felt that fewer anglers would provide for a better fishing experience, the results show they are not willing to pay significantly more for these types of opportunities.

Angler Catch Rates

Angler catch rates on the upper Bighorn River were quite good during this survey. Ninety-five percent of the respondents reported they caught at least one trout during their trip, 79% reported catching at least five trout and 49% reported catching 20 or more trout during their trip to the Bighorn. The average catch rate reported for all 2,449 anglers, representing 69,627 hours fished, was 1.04 trout per hour. Brown trout were the dominant species in the catch, with about 2.3 brown trout (0.72 per hour) being caught for every rainbow trout (0.31 per hour) caught.

Monthly catch rates ranged from a low of 0.19 trout per hour in February to a high of 1.43 trout per hour in July (Table 3). The ratio of rainbow to brown trout in the catch remained fairly consistent throughout the year except during the fall when spawning brown trout became more prevalent in the catch.

Table 3. Comparison of monthly catch rates (fish per hour) for the upper 12 miles of the Bighorn River, April 1992 through March 1993.

Tackle Type	No. of Anglers	Total Hours Fished	Rainbow per hour	Brown Trout per hour	Combined Trout per hour
April	209	4,406	0.27	0.77	0.97
May	292	8,712	0.39	0.68	1.06
June	263	8,751	0.37	0.62	0.99
July	320	5,916	0.47	0.96	1.43
August	374	14,894	0.29	0.76	1.05
September	490	17,503	0.27	0.72	0.98
October	225	5,394	0.28	0.86	1.14
November	75	1,422	0.18	0.74	0.92
December	16	131	0.11	1.09	1.20
January	29	230	0.16	0.51	0.67
February	16	119	0.06	0.13	0.19
March	174	2,204	0.24	0.59	0.84

Overall catch rates observed during this survey were considerably better than catch rates reported in the 1983 Bighorn River creel census, when the highest monthly catch rate reported was 0.95 trout per hour for December 1982 (Fredenberg 1985). October and November 1982 were the only other times when monthly catch rates exceeded 0.50 trout per hour. Catch rates for several months were just over 0.30 trout per hour. The 1982-1883 ratio of brown trout to rainbows in the catch was comparable to this survey with a reported catch ratio of "nearly three to one" (Fredenberg 1985).

Catch Rate Comparisons by User Group

Nonresident anglers reported a 15% higher catch rate during this survey than resident anglers, and guided anglers, generally a select group of nonresidents, reported the highest combined catch rate of 1.18 trout per hour (Table 4). This pattern was similar to the 1983 creel census with nonresident and local anglers being slightly more successful than other Montana resident anglers, and guided anglers being the most successful group of anglers. Guided anglers in 1982-1983 reported a catch rate of 0.60 trout per hour compared with 1.18 trout per hour in this study (Fredenberg 1985). Some differences in reported catch rates may reflect different interpretations of a captured fish. Many guides count any hooked fish as a caught-and-released fish no matter how short of time it is on the line. This may have been reflected in the figures reported by their clients. On the other hand, most anglers only count a fish if it is actually brought to hand and released.

Anglers using a boat during their trip reported a slightly higher catch rate than wade and/or bank anglers (Table 4). The average catch rate for boat anglers was the same as the catch rate reported for all anglers combined.

Fly fishermen were more effective than other anglers with a total catch rate of 1.06 trout per hour. Bait fishermen were the next most successful group with an average catch rate of 0.89 trout per hour. Anglers fishing with a combination of tackle were next, and lure fishermen had the lowest average catch rate of 0.62 trout per hour (Table 5). The 1983 creel survey also found that fly fishermen had the highest catch rates followed by bait, then lure fishermen and finally anglers fishing with a combination of tackle (Fredenberg 1985). The best catch rate of 0.58 trout per hour reported for fly fishermen in 1982-1983 was less than the lowest catch rate of 0.62 trout per hour reported for "combination" anglers in this creel study.

Angler Harvest Rates

Although catch rates were very good during this survey, the number of trout actually harvested was extremely low (Table 6). Anglers returning the mail-back survey reported catching a total of 72,136 trout during the year, but keeping only 1,350 trout, for a total harvest rate of 1.9%. Eighty-one percent of all anglers reported they did not keep any fish, while only 2.1% reported they kept a limit of 5 trout during their trip.

Table 4. Comparison of catch rates (fish per hour) for various user groups fishing the upper 12 miles of the Bighorn River, April 1992 through March 1993.

Angler Group	No. of Anglers	Total Hours Fished	Rainbow Trout per Hour	Brown Trout per Hour	Combined Trout per Hour
Resident Anglers	607	8,375	0.24	0.64	0.88
Nonresident Anglers	1,845	62,864	0.31	0.72	1.03
Guided Anglers	932	30,450	0.37	0.81	1.18
Non-guided Anglers	1,494	38,902	0.26	0.66	0.93
Boat Anglers	1,911	61,608	0.32	0.73	1.04
Non boat Anglers	532	8,690	0.24	0.66	0.90

Table 5. Comparison of catch rates (fish per hour) on the upper 12 miles of the Bighorn River for anglers using various types of tackle, April 1992 through March 1993.

Tackle Type	No. of Anglers	Total Hours Fished	Rainbow per hour	Brown Trout per hour	Combined Trout per hour
Bait	45	619	0.25	0.64	0.89
Lure	134	1,726	0.14	0.48	0.62
Fly	2,166	65,611	0.32	0.74	1.06
Combination	127	2,058	0.27	0.42	0.69

Resident anglers reported the highest harvest rate of any group with 579 anglers keeping 638 trout out of 7,408 caught, for a harvest rate of 8.6% (Table 6). Nonresident anglers reported a harvest rate of 1.1%, with 1819 anglers keeping 712 trout. Guided anglers, as a group, had the lowest harvest rate. Nine hundred and twenty-six guided anglers reported keeping 255 of 36,053 trout, or 0.7% of the trout caught.

Harvest rates on the Bighorn River have historically been low. About 58% of the anglers contacted during the 1983 creel census reported keeping no fish, and only 8% reported they kept their limit, which was three trout at the time. When only study sections 1 and 2 in the 1983 creel census were considered, which was the same area covered by this survey, the number of anglers keeping fish was even lower (Fredenberg 1985).

Table 6. Comparison of harvest rates for various user groups fishing the upper 12 miles of the Bighorn River, April 1992 through March 1993.

Angler Group	No. of Anglers	No. Trout Caught	No. Trout Kept	Percent Harvest
Resident Anglers	579	7,408	638	8.6
Nonresident Anglers	1,819	64,728	712	1.1
Guided Anglers	926	36,053	255	0.7
Nonguided Anglers	1,448	36,159	1,104	3.1
All Anglers	**2,398**	**72,136**	**1,350**	**1.9**

River Crowding

Level of Recreational Use

One major purpose of this survey was to collect feedback from anglers on perceived crowding problems on the Bighorn River. One approach to this problem was to ask anglers to rate on a scale of 1 to 5 (with 1 being "plenty of room" and 5 being "crowded") how they felt about the level of recreational use on the Bighorn River during their recent trip.

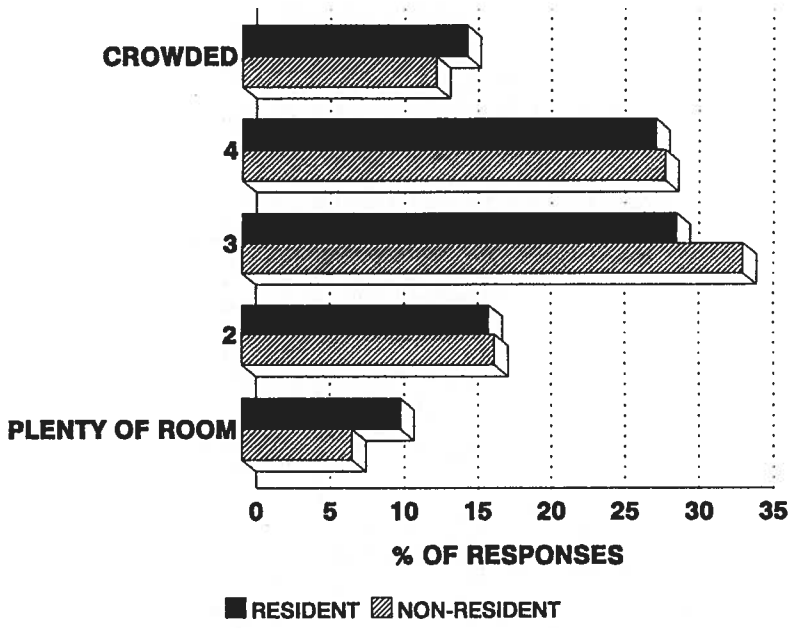

Figure 3. How anglers rated the level of recreational use on the Bighorn River during their fishing trip.

A similar question, "How crowded did you feel today?" has been used in more than 60 crowding surveys during the past 20 years. On this question, respondents were asked to rate the level of crowding from 1 to 8 with 3 and above indicating some crowding (Whittaker, D. & B. Shelby 1993). In the Bighorn survey, almost 75% of the anglers who responded to the question rated the level of crowding on their recent trip to the Bighorn as 3 or above on a scale of 5, and 42% rated it 4 or 5 (Figure 3). This was strong evidence that a majority of anglers fishing the Bighorn River during the survey felt there was some crowding on the river, and more than 40% felt the level of crowding was quite high.

When asked at what points during their trip anglers felt there were too many people, 76.3% felt crowded while fishing and 47.8% felt crowded while floating. Twenty-nine percent and 14% felt crowded at the put-in and take-out, respectively. Little difference was noted in the responses of resident and nonresident anglers (Figure 3). Resident anglers had a slightly higher response rate of 1 (Plenty of Room), 10.7% compared with 7.4% for nonresidents. This reflected the fact that resident anglers were more likely to fish the Bighorn during the winter months when crowding was less of a problem.

Solitude

Another approach to the crowding issue was to question anglers about the level of solitude they experienced on the Bighorn River during their trip. When asked how important various factors were in contributing to a quality fishing trip on the Bighorn, more than 76% of the anglers rated solitude as important or very important (Table 7). Yet, when asked to rate their recent trip for elements that anglers generally look forward to in a fishing trip, 61.7% of the respondents rated solitude on the Bighorn as only fair or poor (Table 8). When asked how "no solitude" affected their recent trip to the Bighorn, 39.7% of the anglers who responded listed it as a minor problem while 15.1% listed it as a major problem. "No solitude" ranked second behind "fishing holes occupied", another symptom of overcrowding, as an identified problem on the Bighorn caused by the number of people present (Table 8).

Table 7. Importance of various factors in contributing to a quality fishing trip on the Bighorn River. Percent response for all anglers returning the mail-back anglers survey.

	PERCENT				
	Very Important	Important	Not very Important	Not at all Important	Not Sure
Good weather	12.4	46.5	36.1	4.7	0.3
Good water levels	28.3	61.7	8.7	0.4	0.9
Landing large fish	19.5	53.9	24.2	2.1	0.1
Landing many fish	14.8	54.6	27.2	3.3	0.1
Keeping a limit of fish	2.3	4.5	10.9	81.6	0.7
Solitude	17.3	59.0	21.6	1.7	0.4
Just being on the river	45.6	47.0	5.5	1.3	0.6
No conflict with other anglers	48.3	43.6	6.9	1.0	0.2
No litter	48.7	48.1	3.1	0.1	0.1
Good insect hatches	33.7	48.6	14.4	2.4	0.8
River not mossy	13.8	52.0	30.4	2.6	1.2

Table 7. Importance of various factors in contributing to a quality fishing trip on the Bighorn River. Percent response for all anglers returning the mail-back anglers survey.

	PERCENT				
	Very Important	Important	Not very Important	Not at all Important	Not Sure
Good access	27.7	60.4	10.3	1.4	0.2
Quality guiding	22.7	20.1	13.7	38.3	5.2
Being with family or friends	40.1	41.7	11.6	6.2	0.4
Seeing no fish kept	28.0	31.7	23.9	14.1	2.3
Keeping a few fish to eat	3.9	15.1	25.9	53.7	1.3

Table 8. How respondents to the mail-back anglers survey, April 1992 through March 1993, rated their fishing trip to the Bighorn River in various elements anglers normally look forward to in a fishing trip.

ITEM	RATING (%)				
	Poor	Fair	Good	Very Good	Excellent
The weather	6.1	18.5	32.5	25.2	17.8
Catching large fish	13.3	15.5	24.9	27.2	19.1
Catching many fish	17.0	23.2	26.4	21.3	12.1
Water level	4.9	14.1	44.5	27.0	9.4
Solitude	27.6	34.1	24.3	10.6	3.4
Access	5.6	17.1	39.2	27.2	10.8
Insect hatches	21.1	28.3	25.6	15.4	9.6

Distance Between Anglers

An important factor in reducing angler conflicts is the distance maintained between anglers. The mail-back survey asked anglers what they felt was the minimum distance appropriate to maintain from another angler while fishing the Bighorn under the conditions experienced during their recent trip. The median minimum distance for all anglers was 150 feet with nonresident anglers favoring a greater distance than resident anglers (150 feet to 120 feet). Anglers were also asked to respond to a hypothetical situation where they were controlling a boat that came to a fishing hole that was several hundred feet long, where they wanted to fish. They were asked how frequently they would stop to fish this hole if two anglers they did not know were already fishing there. Thirty seven percent of the anglers said they would never stop under these circumstances and 36.2% said they would rarely stop. On the other hand, only 6.2% said they would usually stop and 20.6% said they would occasionally stop. If guides (who are normally controlling the boat on guided floats, and feel they are being paid to provide the maximum angling opportunity possible for their clients) were more likely to stop under these circumstances, they could be putting their clients in a confrontational situation that they would normally have avoided had they been on their own.

Inconsiderate and Rude Anglers

When asked about their recent experience on the Bighorn River, over half the respondents to the mail-back survey said they encountered other anglers during their trip who were rude or inconsiderate. Almost 25% identified this as a minor problem during their trip, and 6% identified it as a major problem (Table 8). Other "unethical anglers", which could reflect both social conflicts and philosophical differences between anglers, were encountered by almost 50% of the respondents. This was identified as a minor problem by 18.5% and a major problem by about 6% of the anglers who said they encountered this problem (Table 9).

Table 9. Percentage of anglers experiencing various impacts during their trip to the Bighorn River as a result of the number of other people using the river, according to the mail-back anglers survey, April 1992-March 1993.

Potential Impacts	Did Not Encounter	Did Encounter and It Was: Not a Problem	Minor Problem	Major Problem
Safety problem due to inexperienced boaters	72.4	14.2	11.9	1.4
No room to maneuver boat	60.7	21.7	16.6	1.0
Not enough space to cast	54.5	27.2	16.2	2.0
Fishing holes occupied	8.4	16.3	43.4	32.0
Other anglers rude or inconsiderate	44.9	24.1	24.6	6.4
Unethical anglers	52.7	23.0	18.5	5.9
No solitude	15.0	30.2	39.7	15.1
Less chance of catching fish	28.2	33.3	30.8	7.7
Perceived impacts to fish populations	29.7	32.4	25.9	12.0

Other Impacts of Crowding

More than 45% of the anglers encountered situations where the number of other people present on the river limited their room for casting, with 18% identifying this as a problem. Almost 40% of the anglers felt the number of people present restricted the room they had to maneuver their boats. Again, about 18% identified this as a problem (Table 9). Almost 40% of the anglers had a problem with the number of other people encountered because they felt it reduced their own chances of catching fish. Almost half the anglers felt the number of other people present was having a negative impact on the fish populations in the Bighorn River (Table 9).

Rating of Fishing Experience

Despite a general consensus that there was an overcrowding problem on the Bighorn, most anglers said they had a good trip. When asked how they would rate their fishing experience on their recent trip to the Bighorn, more than 82% of respondents rated it as good to excellent (Figure 4). When compared on a residency basis, resident anglers were more likely to rate their trip as poor or fair and less likely to rate it as excellent (Figure 4). Sixty-six percent of resident anglers rated their trip as good or above, compared to almost 88% of nonresidents.

The quality of a trip is affected by many different factors, each with a different value to the angler. Anglers were asked to rate the importance of several different factors in contributing to a quality fishing trip on the Bighorn River (Table 7). This list reflected what factors were important to anglers, but did not necessarily highlight their reasons for choosing the Bighorn River for their fishing trip. As previously discussed, anglers said solitude was important or very important to the quality of a fishing trip, but gave solitude a low rating on their recent trip to the Bighorn. More than 90% of anglers listed "no conflict with other anglers" as important or very important, yet over half of the anglers said they experienced other rude or inconsiderate anglers during their trip to the Bighorn. More than 30% of these anglers identified this as a problem during their trip (Table 9). High ratings in a few key areas may allow anglers to overlook problems in other areas. This appeared to be the case with the crowding issue on the Bighorn River. Because anglers contacted during this survey were people fishing the Bighorn

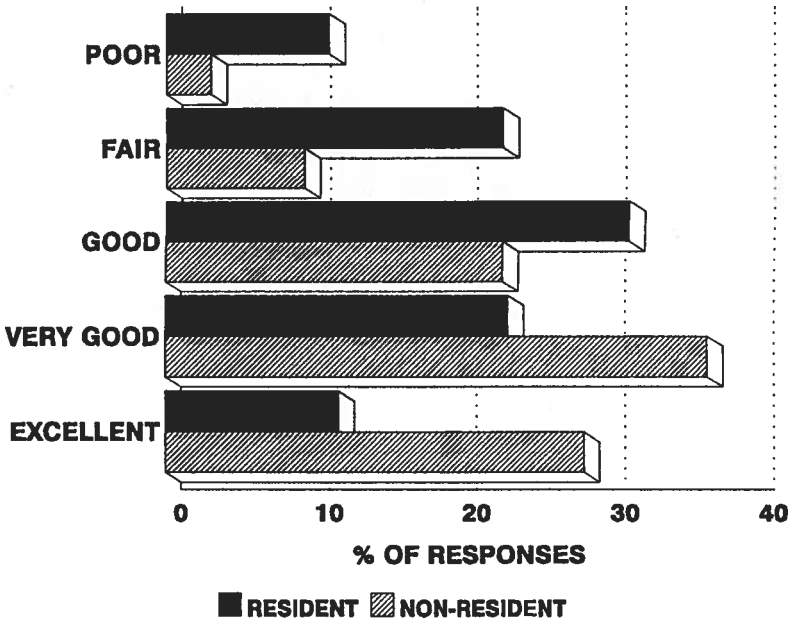

Figure 4. How anglers rated their fishing experience on their recent trip to the Bighorn River.

under existing conditions, they apparently saw other values in fishing the river that outweighed problems resulting from perceived crowding.

Anglers could have avoided crowding problems by going to other less crowded rivers in the state, or even fishing a different section of the Bighorn River, yet they choose to fish the most crowded section of the Bighorn. Just being on the river with family and friends under good conditions rated as important factors in contributing to a quality trip, yet these factors are not unique to the Bighorn River. Anglers could find many other, less crowded, rivers in the state where they could get out and enjoy the river with family and friends. Many of these rivers offer additional benefits not available on the Bighorn River such as better scenery, more camping and other recreational facilities, and better shoreline access along the river.

More than 86% of the anglers who returned the mail-back survey said the primary purpose of their trip was to fish the Bighorn River. Some anglers probably choose the Bighorn strictly because of the notoriety it enjoys, but most were selecting for factors they felt were most likely to be found on the Bighorn River, which was probably the angling opportunity available. Although landing many fish or large fish did not rank as important as other factors in determining a quality trip (Table 6), they were probably important factors drawing anglers to the Bighorn River.

Catch Rates Versus Satisfaction

Survey data showed a strong direct relationship between the number of trout reported caught during a trip and how anglers rated their fishing experience during their trip (Figure 5). This same type of relationship was evident for the number of large trout reported caught. In contrast, it was not possible to identify any relationship between the number and size of trout caught and how crowded anglers reported they felt during their trip to the Bighorn (Figure 6). Improved angling success did not appear to reduce an angler's perception of crowding on the Bighorn River during his trip.

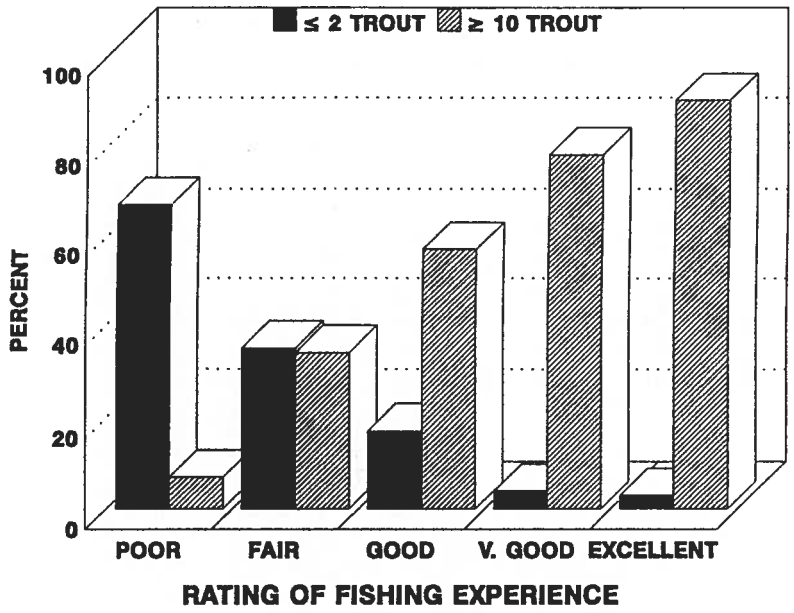

Figure 5. Percent of anglers in each rating group catching 2 or fewer trout and 10 or more trout during their trip.

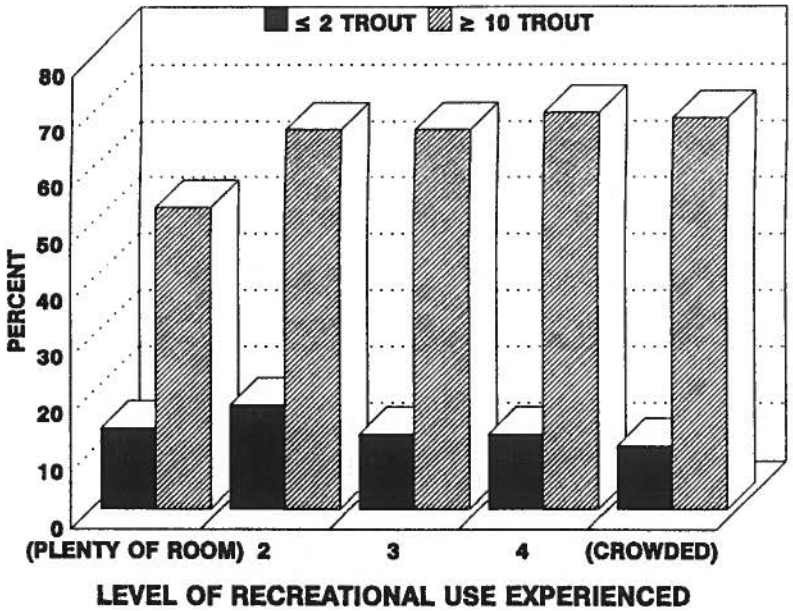

Figure 6. Percent of anglers in each rating group catching 2 or fewer trout And 10 or more trout during their trip.

Correlation Between Anglers Seen and Crowding

By comparing the number of anglers and other boats reported seen by respondents to the on-site survey, to how these anglers rated the level of crowding they experienced during their entire trip, Neher and Duffield (1994) identified a consistent relationship between perceived and actually experienced levels of congestion on the Bighorn River. However, when attempting to relate the quality of the fishing experience to congestion by comparing rating for fishing experience with rating for solitude, the relationship was much weaker. Neher and Duffield did find a limited positive relationship, but even anglers who rated their angling experience on the Bighorn as excellent only gave an average rating for solitude on their trip of between fair and good. Congestion levels experienced during the trip did not appear to be a major factor affecting the fishing experience.

An attempt to identify a relationship between the number of anglers or the number of boats reported seen during the on-site survey or the total number of anglers reported encountered during the entire trip to how anglers rated their angling experience on their Bighorn trip was also unsuccessful (Table 10). If anything, anglers who gave the highest rating for their fishing experience also reported seeing the most anglers and boats, although none of these differences were significant.

Table 10. Comparison of anglers ratings of their fishing experience on the Bighorn River to the average number of other anglers and boats reported seen during the on-site survey, and to average total numbers of other anglers encountered during their entire trip.

Rating of fishing experience	On-site Survey		Mail-back Survey
	Number anglers seen (Average)	Number boats seen (Average)	Total anglers encountered during trip (Average)
Poor	39	12	87
Fair	44	12	106
Good	45	14	107
Very Good	49	15	108
Excellent	44	16	117

Keeping Fish

Nonresident anglers placed more importance on catching large and many fish, while resident anglers place a higher value on keeping some fish. However, keeping a limit of fish, and keeping some fish to eat ranked at the bottom of the importance list for both resident and nonresident anglers. Thirty-nine percent of resident anglers listed being able to "keep a few fish to eat" as important or very

important, compared with only 12.4% of nonresidents. Almost 17% of resident anglers felt keeping a limit of fish was important or very important compared with 3.6% of nonresident anglers. In contrast, 68.3% of nonresident anglers said it was important or very important to the quality of their fishing trip on the Bighorn to "not see any fish kept"; as compared to 33.9% for resident anglers.

Other Factors

Anglers were asked to rate several factors for their recent trip to the Bighorn River (Table 7). As indicated earlier, almost 62% of both resident and nonresident anglers rated solitude as poor or fair. Ratings were generally very similar between resident and nonresident on all factors except angling success. Catching large fish was rated poor or fair by 50.3% of resident anglers and very good or excellent by only 25.1% of residents. In contrast, 17.3% of nonresident anglers rated catching large fish as poor or fair, and 53% rated it as very good or excellent. Catching many fish was also rated much lower by resident anglers with 58.1% giving a rating of poor or fair and only 17.5% giving a rating of very good or excellent. In comparison, 34.4% of nonresident anglers rated catching many fish as poor or fair, and 38.4% as very good or excellent.

Review of Potential Management Approaches

Anglers were asked to express their views on several new management approaches that could be considered for the Bighorn River. This section of the survey was separated into two parts. The first part dealt with the crowding issue on the Bighorn. The second part covered fisheries management issues. Anglers were presented with several different management alternatives and asked to indicate if they would favor, not favor-but accept, not accept or had no opinion on the different alternatives.

Management Alternatives Relating to River Congestion

Anglers were presented with several alternatives designed to address the current level of use on the Bighorn River. They were asked if they favored limiting the number of guided floats on the Bighorn River to current levels or reducing the number of guided floats below the current level; and if they favored limiting the number of nonguided floats (private parties and rental boats) to current levels or reducing them.

Acceptance of these alternatives was generally quite high among anglers using the Bighorn River. Over 52% of the anglers offering an opinion favored limiting guided floats on the Bighorn River to current levels, and 48.5% favored reducing the number of guided floats. Only 14.5% and 19.3%, respectively, said they would not accept these kinds of restrictions. Approximately one-third of the respondents to both questions said they did not favor these options, but would accept them. Response rates for resident and nonresident anglers were similar on limiting guided floats (Figure 7), while resident anglers showed a much greater interest in reducing the number of guided floats (Figure 8).

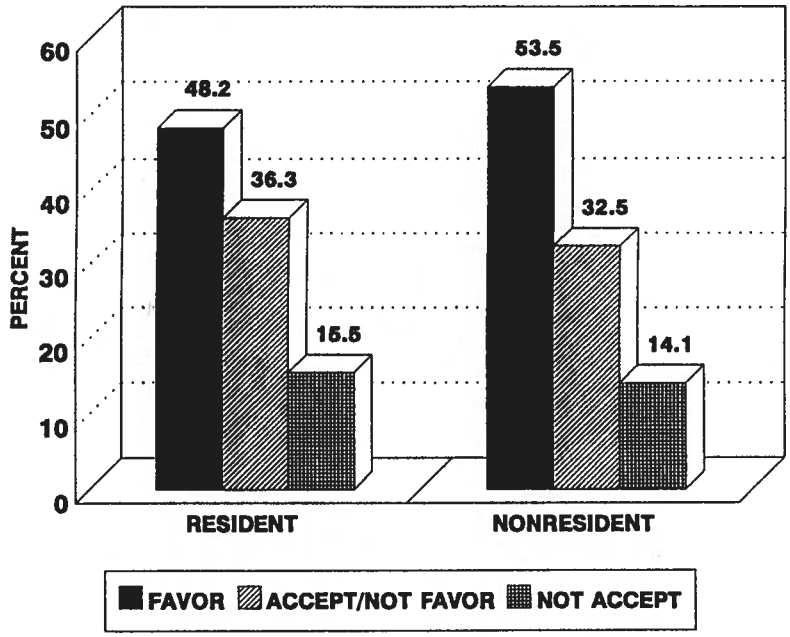

Figure 7. Anglers' response, by residency, to a proposed management option to limit the number of guided floats on the Bighorn River to current levels.

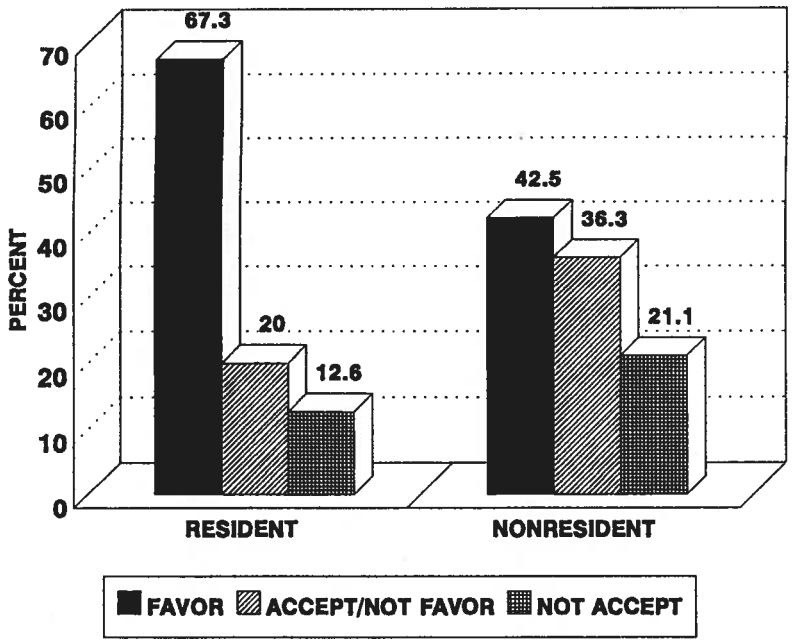

Figure 8. Anglers' response, by residency, to a proposed management option to reduce the number of guided floats on the Bighorn River.

When presented with the option of restricting nonguided floats, 38.5% of the anglers offering an opinion said they would favor limiting nonguided floats to current levels, and 28.4% would favor reducing the number of nonguided floats below the current use level. Again, about one-third of the respondents said they did not favor these management alternatives, but would accept them. Only 27.5% of the anglers said they would not accept limits to maintain the number of nonguided floats at current levels, and 38.6% said they would not accept reductions in the number of nonguided floats allowed. Fewer resident anglers supported this kind of restriction than nonresidents, with over half of resident anglers saying they would not accept a reduction in the number of nonguided floats allowed (Figures 9 & 10).

Perhaps the most interesting and revealing question on the survey offered anglers the alternative that there should be "no use restrictions on the Bighorn River". A total of 2,090 anglers expressed an opinion on this management alternative. Only 21.5% said they favored this alternative while 51.3% said they would not accept this alternative. The remaining 27.2% said they did not favor the "no use restrictions" alternative, but would accept it (Figure 11). Response rates were very similar for resident and nonresident anglers for this alternative (Figure 12). Based on these responses, more than 78% of the anglers fishing the Bighorn River during the survey felt it was time to establish some use restrictions on the Bighorn River.

These responses from the current users on the river provide strong documentation that the Bighorn River has already exceeded the acceptable level of congestion, and that it is time to manage use on the river. Responses to the various options offered above did not show overwhelming support for any particular alternative, but showed that most of the current users were willing to accept some form of restrictions, even if it affected their own use.

Another alternative presented was that use on the Bighorn should not be limited, but that all launch times would be scheduled to reduce conflicts and congestion. This alternative did not receive much support, with only 19.4% of the anglers favoring this idea. As discussed above, most of the anglers who did feel crowded on the Bighorn felt crowded while floating and/or fishing and not at the access sites. The management alternative receiving the greatest support was that all anglers should be educated in river etiquette. Only 3.3% said they would not accept this alternative, while 79.4% favored the idea.

Management Alternatives Relating to Fisheries Management

Anglers were also asked to express their views on several potential approaches relating to fisheries management on the Bighorn River. Fishing regulations during the survey period allowed anglers to keep five brown trout in the survey section, one of which could be over 18" long. All rainbow trout had to be released except in the first 600 feet of the survey section below the re-regulation dam. Here one rainbow trout could be kept.

Several questions on this part of the survey dealt with trout limits on the upper Bighorn River, and the issue of keeping fish. As previously discussed, anglers responding to this survey were already releasing more than 98% of the trout they caught under the existing regulations, which provided a

good indicator of their feelings about harvesting fish. Previous data also discussed different views of resident and nonresident anglers when it came to keeping fish. These differences were again evident in the responses to this section of the survey, although even the resident anglers responding to this survey were harvesting less than 9% of the trout they caught.

The first management alternative proposed was that anglers on the Bighorn River should be encouraged to keep a few fish. Almost 45% of resident anglers favored this idea, while only 17% of nonresident anglers favored it (Figure 13). About 23% of resident anglers said they would not accept this option compared with 43.8% of nonresident anglers. Approximately one-third of both resident and nonresident anglers said they would accept this alternative, but not favor it. When presented with the alternative of continuing the current five brown trout limit on the Bighorn, 63.4% of resident anglers were in favor compared with only 27.1% of nonresidents (Figure 14). Only 14.4% of resident anglers said they would not accept this alternative compared with 36.6% of nonresident anglers. When presented with the alternative of making the Bighorn River entirely catch-and-release, the response rate reversed, with 64.5% of nonresident anglers favoring total catch-and-release, while only 25.8% of resident anglers favored it (Figure 15).

Anglers were also asked two questions to learn if they felt fisheries management on the Bighorn River should be directed more toward brown trout or rainbow trout. Approximately one-third of the respondents had no opinion on this issue. Anglers expressing an opinion showed a strong preference for rainbow trout over brown trout, with close agreement between resident and nonresident anglers (Figures 17 & 18).

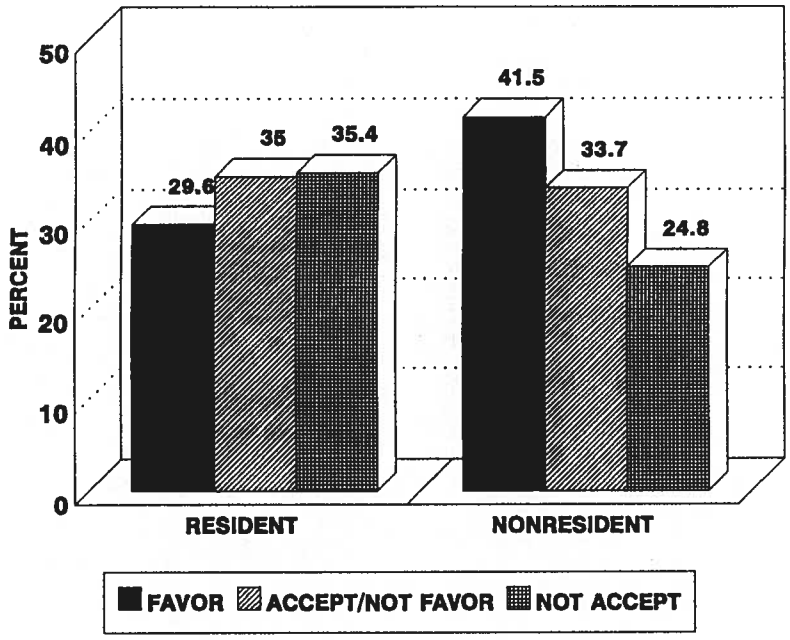

Figure 9. Anglers' response, by residency, to a proposed management option to limit the number of nonguided floats on the Bighorn River to current levels.

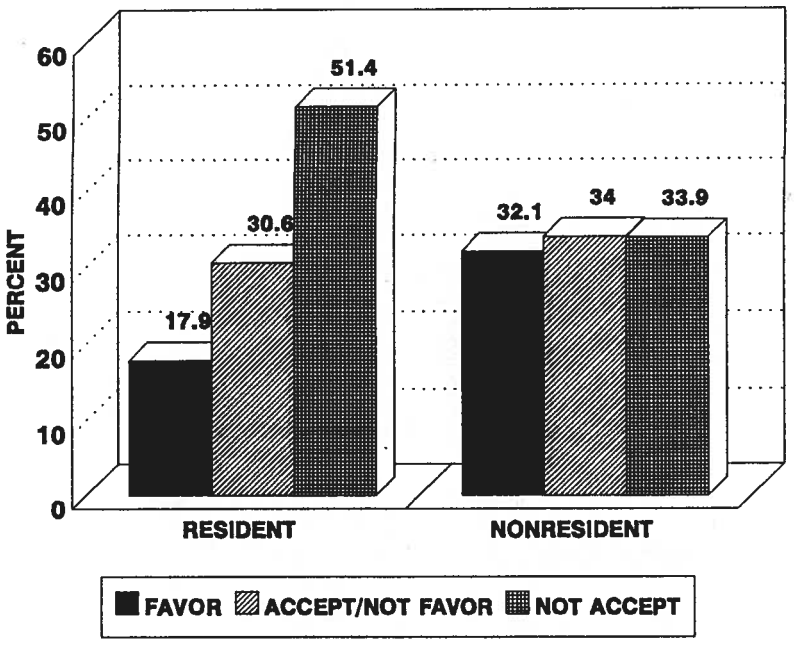

Figure 10. Anglers' response, by residency, to a proposed management option to reduce the number of nonguided floats on the Bighorn River.

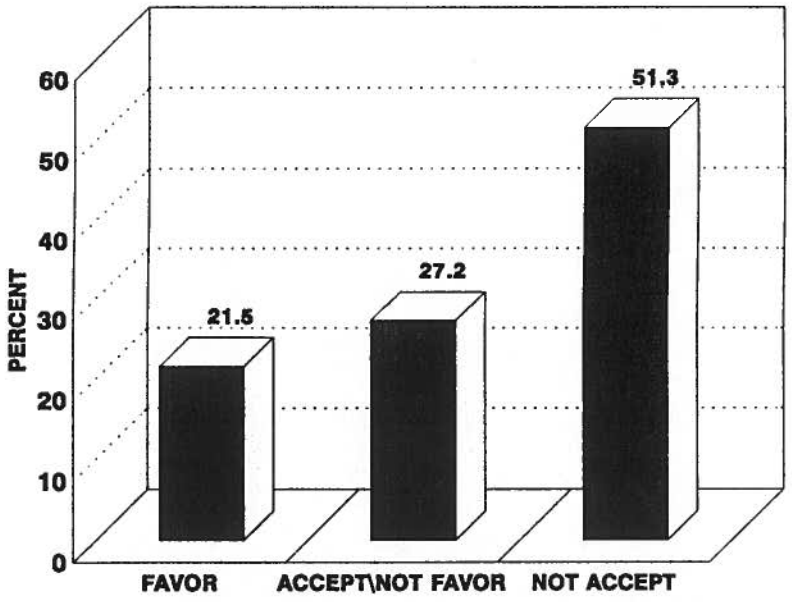

Figure 11. Anglers' response to a proposed management option that there should be no use restrictions on the Bighorn River.

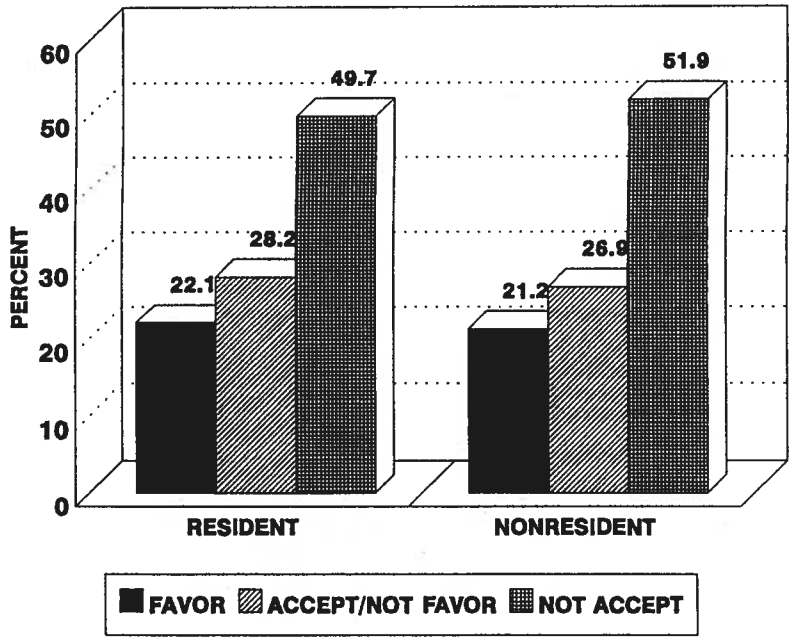

Figure 12. Anglers' response, by residency, to a proposed management option that there should be no use restrictions on the Bighorn River.

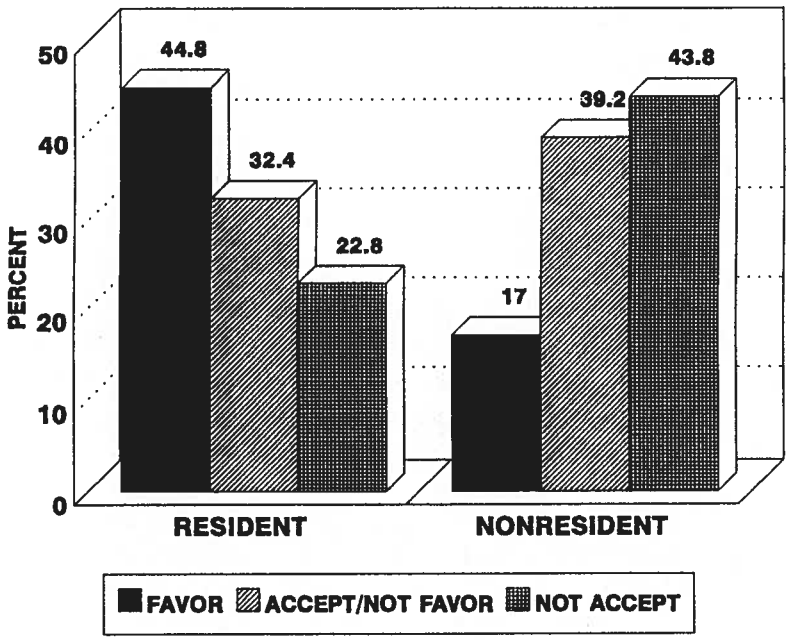

Figure 13. Anglers' response, by residency, to a proposed fisheries management option that anglers on the Bighorn River should be encouraged to keep a few fish.

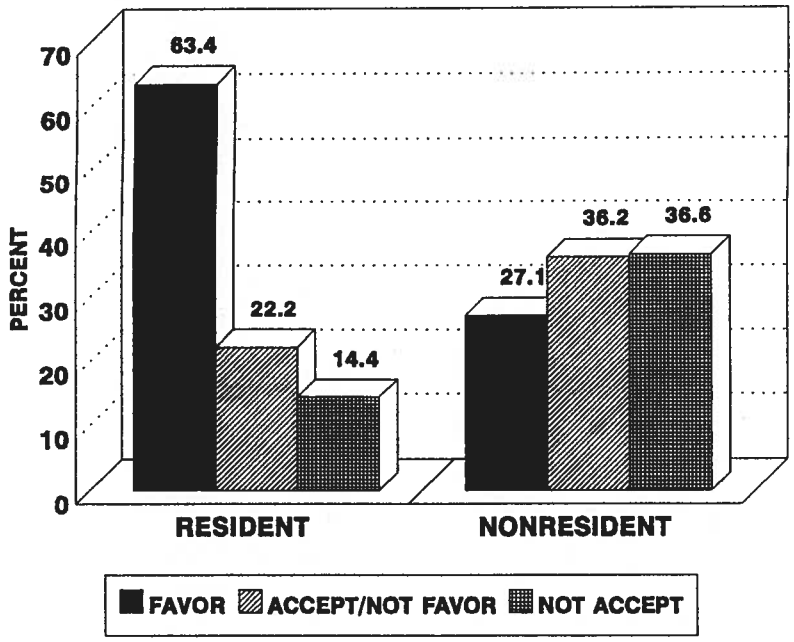

Figure 14. Anglers' response, by residency, to a proposed fisheries management option to maintain the current 5 brown trout limit on the upper 12 miles of the Bighorn River.

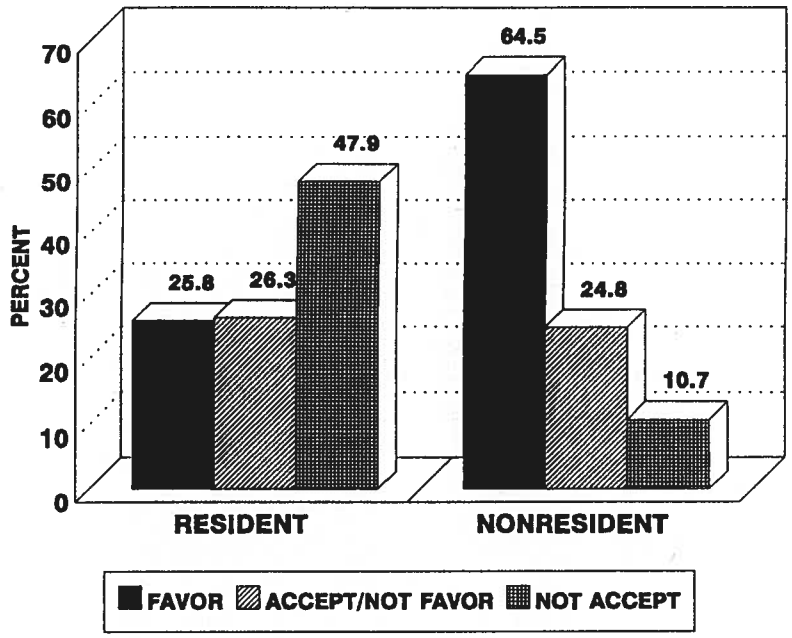

Figure 15. Anglers' response, by residency, to a proposed fisheries management option to make the Bighorn River entirely catch-and-release.

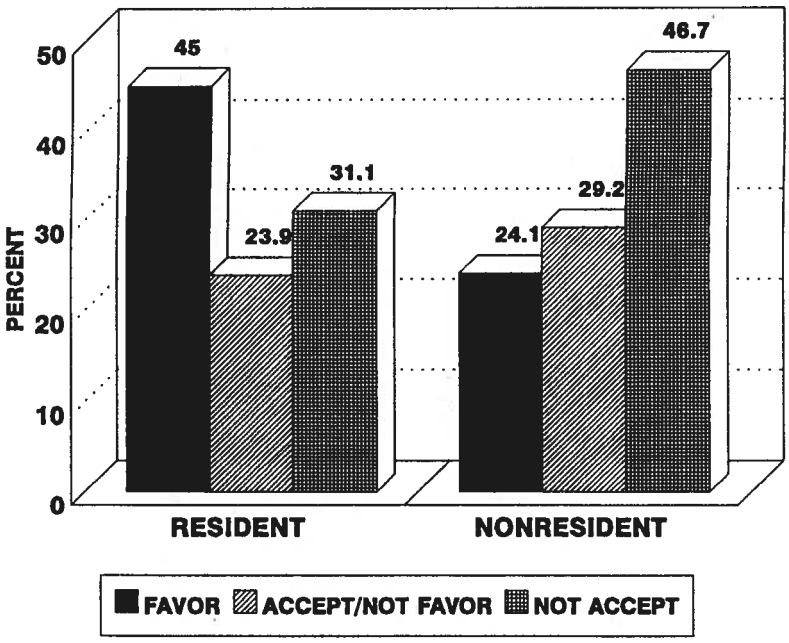

Figure 16. Anglers' response, by residency, to a proposed fisheries management option to allow anglers to keep one trophy rainbow on the upper Bighorn River.

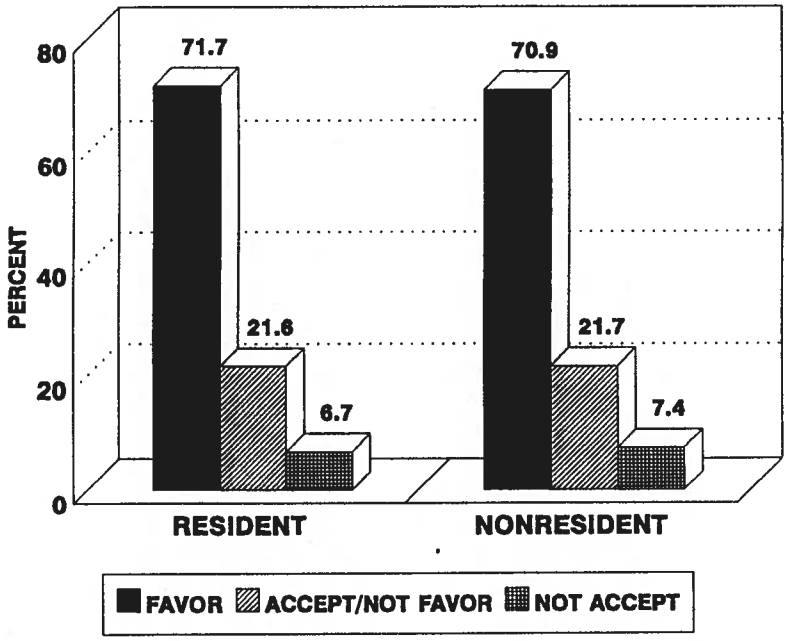

Figure 17. Anglers' response, by residency, to a proposed fisheries management option to manage the Bighorn River to increase the number of rainbow trout relative to brown trout.

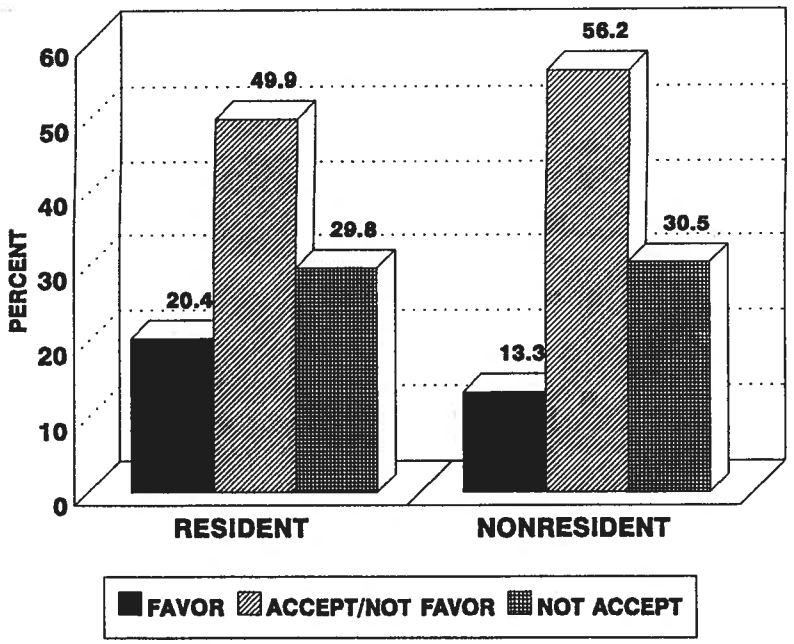

Figure 18. Anglers' response, by residency, to a proposed fisheries management option to manage the Bighorn River to increase the number of brown trout relative to rainbow trout.

CONCLUSION & SUMMARY

This survey provided a good profile of the predominantly nonresident angling population fishing the Bighorn River at the time of the survey. Nonresident anglers outnumbered resident anglers on the river from April through November. Anglers came from all over the world to fish the Bighorn River, and most of them planned their trips specifically around fishing the Bighorn. Both resident and nonresident anglers placed a high economic value on fishing the Bighorn River. Just over one-third of the anglers surveyed used a guide during part of their trip.

Most anglers on the Bighorn were fly-fishermen who, despite very good catch rates and liberal limits, kept very few of the trout they caught. Angler harvest during the survey was insignificant in the overall health of the Bighorn River fishery.

Both resident and nonresident anglers on the Bighorn generally agreed that solitude was an important factor in contributing to a quality fishing trip, yet most agreed that solitude was difficult to find on the Bighorn River. Almost three-quarters of the anglers contacted during this survey experienced some crowding during their trip to the Bighorn River. Responses showed a direct relationship between the level of perceived crowding experienced by anglers and the number of other anglers and boats encountered during their trip. Over half the anglers responding to the survey encountered other rude or inconsiderate anglers during their trip. Many anglers said the number of other people present on the Bighorn affected their angling experience. Some problems identified included occupied fishing holes, lack of room for casting and maneuvering a boat, reduced chances of catching fish, and perceived impacts to the fish population.

When presented with different management approaches designed to address the congestion problem on the Bighorn River, a large percentage of the current users said they would favor, or at least accept various restrictions, even if these restrictions could affect their own use on the Bighorn. Over three-quarters of the anglers contacted during the survey said they did not favor, or would not accept maintaining the status-quo on the Bighorn River. They felt it was time to implement some additional use restrictions on the river.

Despite a general consensus of a crowding problem on the Bighorn River, which most anglers wanted to see addressed, anglers contacted during this survey did not indicate this congestion was a major factor affecting their trip. A strong relationship between crowding and how anglers rated their fishing experience on the Bighorn River was not evident. A majority of anglers rated their angling experience as good to excellent, and most were not willing to pay more for the same experience with only half as many other anglers present. Angling success was a major factor in determining the quality of the fishing experience.

Most anglers who would be severely affected by crowding problems on the Bighorn have already been displaced by anglers who are more concerned with angling opportunities available on the Bighorn River than the social aspects of a quality fishing trip. If social problems on the Bighorn River are allowed to go unchecked, this selection process will continue, further restricting the group of anglers willing to fish the Bighorn River. As long as the fishing remains good, there will always be

anglers wanting to fish the Bighorn River no matter how congested it becomes. Yet, based on the responses from the current users on the river, it is time to develop some additional management restrictions for the Bighorn River. Results from this survey can provide a starting point for the intensive public involvement that this kind of undertaking will require.

LITERATURE CITED

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APPENDIX A:

BIGHORN RIVER ANGLER SURVEYS

A: Questions for on-site survey

B: Mail-back survey

LEGEND FOR BIGHORN ANGLER SURVEY 1991-92

1. **SURVEY NUMBER**: Enter the number of the survey that is handed to the angler. This number should appear in the lower right corner of the survey. This number should begin at number one and continue sequentially throughout the year.

2. **ORIGIN**: Montana Resident = 1 Nonresident = 2

3. **GUIDED/NONGUIDED**: Guided Angler = 1 Nonguided Angler - 2

4. **AREA IN**:

5. **AREA OUT**:

   Use following numbers for questions #4 and #5

Afterbay = 1	Bighorn = 5
Three Mile = 2	Phil Gonzales = 6
Bighorn Lodge = 3	Royal Bighorn Lodge = 7
Mike Craigs = 4	Mallards = 8

6. **HOURS FISHED**: Enter total number of hours ***fished*** at time of interview. Make sure not to count lunch time or other nonfishing activities (e.g.; berry picking, hunting, etc.)

7. & 8. **Rb OR LL LANDED**: Enter only number of rainbow and brown trout angler has gotten to hand. Long distance released fish don't count!

9. **NUMBER HARVESTED OR KILLED**: Record number of LL and Rb.

10. About how many other anglers did you see while you were fishing the Bighorn River today, including the put-in and take-out?

11. What was the greatest number of anglers you saw while fishing at any one point in time?

12. About how many boats did you see while you were fishing today including at the put-in and take-out?

13. How many fishing holes did you stop to fish today?

14. Did you feel crowded at any of these holes? **YES = 1** **NO = 2**

15. If **YES**, at how many of these did you feel crowded in?

16. Were there places you wanted to stop to fish today but couldn't because of the number of people? **YES = 1** **NO = 2**

17. If **YES**, how many times did this happen?