TASK 7

INVESTIGATION OF WATER-BASED RECREATION ON THE YELLOWSTONE RIVER

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December 1976

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

TASK 7 INVESTIGATION OF WATER-BASED RECREATION ON THE YELLOWSTONE RIVER

The Grantee shall perform three subtasks:

A) Compile and review current recreation usage of the Yellowstone study area in terms of volume, type, and geographic location.

B) Assess the impact of altered stream flows on current and potential recreational uses.

C) Conduct a field evaluation of alternative and additional recreation sites with potential for water-based recreation.

YELLOWSTONE RIVER RECREATION STUDY

INTRODUCTION

The Yellowstone River is free-flowing its entire length and provides very diverse recreational opportunities. Potential agricultural and industrial water-use demands threaten its present status. This study was initiated to evaluate present recreational use on the River and determine the potential effects of altered stream flows on current and potential recreational uses. A secondary objective was to evaluate potential alternative and additional recreation sites along the River. The study was initiated in November 1974 and continued until October 1976.

DESCRIPTION OF STUDY AREA

The study area included the Yellowstone River from Big Timber to the North Dakota border, a distance of approximately 456 miles (figure 1). Major tributaries include the Big Horn, Tongue, and Powder River which total more than 550 river miles. The boundaries of five major subbasins were used to divide the study area into five sub-sections.

The large size of the area dictated, to some degree, differences in recreational pursuit. The five illustrated sections (figure 3) were delineated by drainage basins and elevational change in visibly apparent within sections.

Figure 1

The westernmost section (5) has an elevation difference of approximately 825 feet in 76.8 river miles. The easternmost section (1) drops approximately 300 feet during 149.5 river miles. The upper reaches are considered a cold water environment, and the lower reaches are considered a warm water environment. The river reach between Columbus and Custer is considered as transitional.

Of the counties included in the study area (figure 2), Yellowstone County has the largest population, 97,400. Other counties within the study area are distinctly smaller; Custer 12,000, Big Horn 10,900, Dawson 10,400, Richland 9,700, Rosebud 8,600, Carbon 7,700, Stillwater 5,300, Fallon 4,000, Sweetgrass 3,000, Powder River 2,300, Carter 1,900, Prairie 1,900, Wibaux 1,500, and Treasure 1,200.

METHODS

LITERATURE REVIEW

While the literature on recreation is voluminous, research relating changes in recreation behavior to changes in stream environments is almost nonexistant. Approaches for specifically assessing recreation-streamflow relationships have not been developed (Andrews et al.,1976)

The approach used in this study was a combination of two of three main techniques to measure various aspects of recreational behavior (Burdge and Field, 1972). Foremost is the measurement of demographic, social, and other individual and group characteristics that may be related to the recreation experience. Secondly, examination of the resource itself to determine available recreational opportunities is conducted. The third facet, the quantification of recreational benefits in terms of dollars, was undertaken by Task 11.

One study (Northwest Region, Bureau of Outdoor Recreation 1974:123) utilized subjective evaluations by an expert of the recreational adequacy of a particular site. Five categories of flow were established from controlled flow levels over a three day span. Some procedures used in this study resemble the BOR study.

A matrix system used for impact ratings in this study resembled a matrix (Bishop 1972) constructed to display the impacts on various beneficial uses of stream water related to a measurable range of flows. A difference existed, however, in that all stream oriented recreational activities were included within the new matrix and the flow needed to maintain fish life was only one consideration.

Figure 2

There are pros and cons to most other methods of water-based recreational evaluations (Andrew et al, 1976) and the Yellowstone River recreational study utilized portions of each, not from dissidence, but from necessity and circumstance.

DATA COLLECTION

Due to increased recreational usage during the summer months and a limited budget, most data collection was accomplished from the latter part of June to mid-September for 1975 and 1976. Other data collection was hindered by geographical expanse, time, and budgetary limitations. Off-season use data were compiled more extensively in areas close to Miles City, headquarters of the study. Personal communication, literature review and flights made with a piper super cub (PA-18), Skyhawk 172 (C-172) or Skyland (C-182) accounted for most tributary and off-season surveys of use of areas not within a 75 mile radius of Miles City.

Certain site specific data were considered separately from seemingly normal use data but were incorporated in the total use figures. Personal communication and news releases were helpful in finding dates of specific events. Numbers of recreationists, activities engaged in and means of travel were noted.

A pilot study questionnaire (Appendix: p 1-5) was designed to survey people engaged in water-based recreation within the Yellowstone study area. Questions were mainly related to:

1) Age, sex, and residency
2) Length of stay
3) Recreation site preference
4) Frequency of visits
5) Attitudes of fulfillment
6) Public knowledge of public lands
7) Income
8) Favorite activities
9) Area problems (crowding, litter, insects, etc.)

The objectives of the May 5 to May 27, 1975 pilot study were to eliminate design errors and to evaluate attitudes

of recreationists at Intake Fishing Access Site, 17 miles northeast of Glendive, on the Yellowstone River (figure 4). Questionnaires were dispensed to one person from each group. From visual observations, groups could usually be easily identified. A group was defined as a person or persons who had traveled to an area together. This definition was used for all questionnaire work throughout the entire study. Response from the pilot study questionnaire dictated certain design changes for the summer questionnaire (Appendix: p. 6).

SITE EVALUATION

Due to geographical distances within the study area, concentrated efforts to evaluate recreational use were directed toward the Yellowstone River only. Car counter data, personal communication and literature review were used for tributary use documentation.

Each of the five (figure 3) sub-major drainage basins ("sections") of the Yellowstone River Study area contained various popular recreational sites (figures 4-8). Each section was visited randomly via automobile one day a week, including weekends, from June 22 to September 13, 1975 and from June 28 to September 10, 1976. Time of survey occurred randomly from 6:00 am to 2:00 pm or 2:00 pm to 10:00 pm in 1975. During 1976 no survey time periods were used. To reduce error, sections were visited from west to east one week and from east to west the next. Thus, the time of survey was different at each site from week to week.

In addition to questionnaire completion at each designated recreational site, an observed use form (Appendix: p. 7) was also completed by the observer. Observed activities within sections were then compared. Car counters were used in some selected areas (6) to determine total use figures. Percentages of activities not observed were assumed to be similar to observed percentages. Aerial censuses were undertaken intermittently to further substantiate results. Site visitation varied slightly in 1976 within sections due to limited 1975 data collection or the closing of certain areas for a variety of reasons.

Analysis of the questionnaire data was by computer at Montana State University. Summations for each question were tabulated for each section only (text) and in total (Appendix: p. 8-19). Cross tabulations of questions were also compiled to determine specific relationships.

Budgetary problems limited year round data collection using this method, so aerial censuses and personal communication were major modes of data collection during other periods of the study.

Figure 3.

The number of registered boats in 15 counties of the study area was obtained and questionnaires (Appendix: p. 20) were randomly mailed to at least 15 percent of the boat owners of each county. Since actual observations of boat use were difficult to obtain, boat owners were asked where most of their boating occurred, their favorite activities, and the number of boating days per year. If more than one favorite site response was received, each was given an equal preference rating. This method introduces error, but obvious site groupings became apparent.

During July 1976, four channel cross sections were taken on the Yellowstone River. Site selection was determined by difficulty in navigation (Hinz, pers. comm.). Section two and three each contained two sites (figures 5 and 6). Depth data were correlated with the amount of water required for a 14 foot aluminum boat powered by a 15 to 25 horsepower engine, the most popular combination documented among river users (Erickson, unpublished data). Critical (cfs) flows contributed to sectional impact ratings.

Since the vast majority of Yellowstone River frontage is privately owned, local property listings and personal communications were used to find land available with potential for a future recreational site. Areas within a 110.5 river mile stretch between Forsyth and Fallon were given first priority due to lack of existing sites.

After landowner contact, evaluations were based on priorities including 30 mile site-to-site planning, boat launching potential, proximity to population centers and existing access. If the area received a high evaluation, the appraised price and detailed description of possible areas were completed. Site acquisition preferences were then made.

Site acquisition preferences were based upon Montana Department of Fish and Game standards. City, county, federal, or privately owned recreation areas were not considered within the 30 mile site-to-site plan. Facilities are currently almost non-existant within these areas and privately owned areas are subject to closure at any time.

IMPACT ASSESSMENT

Certain obvious factors, such as weather, affected the summer 1975-76 observed total use data. For 1975, a multiple regression ($Y=A_0X_0 +A_2X_2 +A_3X_3 +A_4X_4 +A_5$ where A_{12345}= constants and X_{12345}= variables) correlated the

total observed number of recreationists (Y) with river section (location), maximum temperature of each day, river discharge and discharge^2, a description of weather conditions, the month, the date, the time of day (one of two time periods) the time of week (weekdays vs weekends). The object of the regression was, given certain conditions, to quantify the number of recreationists one might observe on a particular day within a given section.

The summer, 1976 data were treated in a similar fashion but turbidity was used instead of the time of day, which was insignificant in the 1975 correlation. From personal communication and observation, lower turbidity seemed to attract greater number of anglers, with the exception of paddlefisherman. The constants and equation model from the multiple regression analysis were then compared for 1975 and 1976.

In addition, discharge was graphically incorporated with recreational use for 1975 and 1976. However, the assumption was made that recreational use was dictated by many factors, of which discharge was only one.

Preference for each recreational activity was the basis for a matrix system designed to assess impacts of surface flow alterations. Within each section, popularity of various activities was calculated by combining 1975 and 1976 percentages (table 25). A sectional rating preference (SRP) of one (1) signifies from 0 to 5 percent participation; two (2), 6 to 15 percent; and three (3), above 15 percent. The sectional rating preference number is then multiplied by an impact modification number (IMN), which is either a -1 (negative impact), 0 (no impact), or +1 (positive impact). Error is possibly introduced due to the subjective nature of the IMN but objective data area used wherever possible.

Products of the SRP and IMN are added for each of the scenarios (high, medium, and low) and overall impacts compared and discussed.

CURRENT SITUATION

RESULTS

Pilot Study

Questionnaire data obtained from the May 1975 pilot study were mostly (84.1%) from recreationists at Intake Fishing Access 17 miles northeast of Glendive on the Yellowstone River. Paddlefishing is the major recreational attraction in late

spring in eastern Montana. Fish caught in the 50-65 pound range are not uncommon.

The summations of 88 questionnaires are listed here. If response to a certain question was less than 10 percent (9 people) the results will not be discussed. (See appendix for sample questionnaire).

Question 1. Have you noticed much: a) Deterioration in water quality or b) increase in litter since you started using the Yellowstone River for recreation, and c) does it affect your enjoyment of the river?

a) Of 80 valid observations 15 percent had noted a deterioration in water quality, whereas 85 percent had not. Through personal communication, water quality, to the interviewees, was defined as the color of the water. Clear, blue water would be good water quality, opposed to the murky brownish water of the Yellowstone at survey sites.

b) Of 82 valid observations, 29.3 percent noted increased litter, while 70.7 percent replied they had not.

c) Of 82 valid observations, 35.4 percent indicated that either litter or deterioration in water quality had affected the enjoyment received from the river. In a survey done in southern Saskatchewan (Parkes 1974) over two-thirds of 560 recreation users indicated they were willing to pay between 49 cents and 61 cents each per use day per season over and above the additional expenses to which recreationists are subject for improved water quality.

Question 2. Length of present stay. Of 83 valid observations, 53 percent were day users only, 10.8 percent stayed one night, 10.8 percent stayed two nights, 13.3 percent stayed three nights, 2.4 percent replied six to eights nights, and 3.6 percent indicated over ten nights.

Question 3. Please record the access and waterway you are presently enjoying. Of 88 valid observations, 84.1 percent were completed at Intake Fishing Access, 11.4 percent at East Rosebud Fishing Access, 1.1 percent at the Twelve Mile Dam on the Tongue River, 2.3 percent at the mouth of the Tongue and 1.1 percent at the Pumpkin Creek Bridge near Twelve Mile Dam.

Question 4. a) Are you presently on your vacation? Of 85 valid responses, 16.5 percent were on their vacation, while 83.5 percent were not.

b) Was recreation on the Yellowstone River and/or tributaries the primary purpose for you trip? Of 75 valid observations, 69.3 percent replied yes and 30.7 percent replied no.

c) If no, what is the main reason for your trip? Of the 23 people that replied "no" to the previous question only one non-response was received. Although the question was open ended, the purposes fell into the following categories: 1) visiting relatives and/or friends, 27.3 percent; 2) sightseeing, 9.1 percent; 3) enjoyment and/or rest and relaxation, 9.1 percent; 4) business or work related activities, 13.5 percent.

Question 5. How often do you visit this particular site each year? (Spring, summer, fall and winter).

a) Spring - of 84 valid responses, 17.9 percent indicated first time ever, 15.5 percent replied once, 20.2 percent replied two to three times, 9.5 percent replied four to six times, 4.8 percent replied six to eight times, and 32.1 percent replied over eight times.

b) Summer - of 45 valid observations, 22.2 percent visit the area once, 20 percent visit two to three times, 6.7 percent visit four to six times, 2.2 percent visit seven to eight times, and 48.9 percent visit over eight times.

c) Fall - of 17 valid observations, 41.2 percent indicated that visitation occurred over eight times.

d) Winter - only seven valid responses were received, indicating relatively light winter recreational use.

Question 6. Yearly, how many days do you spend enjoying recreational activities at other sites on the Yellowstone River and/or its tributaries? Of 73 valid responses, 49.3 percent, replied one to nine days, 16.4 percent, ten to fifteen days, 5.5 percent, 16 to 20 days, and 28.8 percent over 20 days of use.

Question 7. Please mark (x) the activities you have engaged in or plan to engage in while in the immediate area, as well as the number of hours spent doing each. A note must be made here that a non-response was considered a definite "no" rather than a missing observation.

a) Picnicking - of 46 valid responses 52.3 percent indicated they did picnic while in the area and the most common duration was two hours.

b) Swimming - of 14 valid responses 84 percent indicated that they did not engage in swimming.

c) Of 88 valid responses 48.9 percent indicated they enjoy solely rest and relaxation. A note must be made here to emphasize that rest and relaxation entails no definite outdoor recreational activity such as fishing, picnicking, etc. Rest and relaxation can be closely related with sightseeing, but generally is defined as enjoying an area with no specific purpose in mind.

d) Boating-motorized - of the 88 valid responses 15.9 percent indicated that motorized boating had been engaged in. The hourly data was deemed not valid.

e, f, g, h, i, j) Boating-nonmotorized river floating, horseback riding, bicycling, motor biking, driving for pleasure, and playing outdoor game categories all had poor response. During the spring season at the sites surveyed, only light use, if any, was apparent.

k) Rock hounding - of 88 valid observations, 17.0 percent replied they had engaged in rock hounding. A two to three hour rock hunt was most popular (45.5 percent).

l) Sightseeing - of 88 valid responses, 17.0 percent replied that they had actually engaged in sightseeing. Seventy-seven and seven tenths percent indicated a two to five hour sightseeing trip. From personal communication, people who were visiting the area for the first time were most likely to consider themselves sightseers, i.e. 17.9 percent of 84 valid observations were visiting the surveyed site for the first time.

m) Walking for pleasure - of 88 valid responses, 15.9 percent indicated they walked for pleasure, although the hourly data were deemed invalid.

n) Water-skiing - the data were not valid.

0) Bird watching - the data were not valid.

r) Fishing - of 88 valid responses, 75 percent responded they had engaged in fishing and 21.7 percent indicated a two to five hour time span.

1) For which species in particular? Of the 63 valid responses 84.1 percent indicated that paddlefish were sought; 84.1 percent of the 88 questionnaires were completed at Intake Fishing Access, where paddlefishing is the major attraction.

2) Which species, if any, did you catch? Of 25 valid responses, 60 percent replied paddlefish.

3) How many of each species? Of 20 valid responses, 50 percent replied that two paddlefish had been caught, which is the daily limit.

4) What is your favorite activity or activities of this site? Of 65 valid responses, 84.6 percent replied fishing was the favorite activity.

Question 8. How does this particular site fulfill your recreational demands? a) Of 83 valid responses, 22.9 percent replied completely, 67.5 percent responded adequately, and 9.6 percent responded not adequately or poorly.

b) If "not adequately" or "poorly", why? Of ten valid responses 50 percent replied the area was too crowded. From personal observation Intake Fishing Access received the highest annual use on the Memorial Day weekend in 1975 and 1976.

Question 9. a) Where would you go to participate in the same activities if this site was not available? Of 54 valid observations, 20.4 percent replied Fort Peck Reservoir. See table 1 for other responses.

b) Do you like that site as well as this one? Of 45 valid responses, 66.7 percent indicated that they like their second choice as well as the site they were presently using. From personal communication, people indicated that in many cases a second choice site was enjoyed as much, even more, than the present area, but time, money, and/or distance presented problems.

Question 19. a) Do you think this site presently is too crowded, not used enough, or just right? Of 84 valid observations, 60.7 percent thought the site was too crowded, 2.4 percent thought the area was not used enough, and 36.9 percent thought the area was just right.

b) If you think this area is too crowded, would you prefer more available sites? Of 63 valid responses, 83.3 percent replied yes.

Table 1. Where would you go to participate in the same activities if this site was not available?

Alternative Site	Number of Responses	Percent of 54 Responses
Twelve Mile Dam	1	1.9
East Rosebud	1	1.9
Don't Know	1	1.9
Yellowtail	2	3.7
Ft. Peck	11	20.4
Stay Home	5	9.3
Spotted Eagle	3	5.6
Yellowstone River	6	11.1
Powder River	2	3.7
Fred Robinson	10	18.5
North Dakota	3	5.6
South Side Intake	2	3.7
South Dakota	1	1.9
Fairview	1	1.9
Gartside	1	1.9
Other	4	7.5
Totals	54	100.0

c) If "yes", within how many miles upstream or downstream would you like to see at least one more site? Of 40 valid responses, 17.5 percent replied within one mile, 15 percent one to two miles, 15 percent three to five miles, 17.6 percent six to ten miles, 10 percent 11 to 20 miles, 22.5 percent 20 to 50 miles, and 2.5 percent replied over 50 miles.

d) Should this site be more fully developed? Of 78 valid responses, 66.7 percent replied yes.

Question 11. a) Has the increasing cost of gasoline decreased the distance you will travel to enjoy a recreational area? Of 83 valid responses 39.8 percent replied yes.

b) If "yes" typical years recreational trip covered approximately__ miles, while this year's trip covered only__ miles, round trip.

1. Of 23 valid observations, 47.8 percent indicated trips of over 450 miles, and 17.4 percent indicated trips from 0-50 miles.

2. Of 22 valid observations, 22.7 percent indicated trips of over 450 miles, whereas 45.5 percent indicated trips of 50 miles or less. Thus, of a similar sample size the percentage of people taking trips of over 450 miles in previous years decreased by 25.1 percent when compared to 1975. The percentage of trips covering from 0-50 miles in previous years had consequently increased 28.1 percent for 1975.

c) Per person, how much will your trip cost per day? (See questionnaire in appendix). Of 55 valid responses, 21.8 percent noted from $0-5.00, 20 percent $6-10.00, 12.7 percent $21-25.00, 1.8 percent $26-35.00, and 12.7 percent replied over $35.00.

Question 12. Please check the items of equipment you have with you. Of 88 valid responses, 14.8 percent had boats (there were no canoes), 2.3 percent water skiis, 78.4 percent fishing gear, 42.0 percent cars, 44.2 percent pickups, 27.3 percent pickups with campers, 12.5 percent camper trailers, 5.7 percent motor homes, 8.0 percent tents, 5.7 percent motor bikes, 2.3 percent bicycles, 5.7 percent hiking gear, and 34.1 percent sleeping bags.

Question 13. What is your age and sex?

Table 2. a) Age and sex of people in each of 88 groups.

Sex	1-12	13-18	19-30	30-50	50+
Male	47	33	61	41	24
Female	23	14	25	23	13
Total	70	47	86	64	37

The largest grouping, 19-30 years, could be related generally to the physical strength needed for paddlefishing.

b) Are you resident of Montana? Of 56 valid responses, 77.9 percent were residents.

c) If "yes" which town and county? Of 56 valid responses, (the towns were not considered for the pilot study) the six most common counties of residence were: Dawson - 37.5 percent, Rosebud - 12.5 percent, Richland - 10.7 percent, Yellowstone - 8.9 percent, and Sheridan and Custer - 7.1 percent each.

d) If "no" which town, county and state? Of 15 valid responses percentages were: North Dakota - 53.3 percent, Wyoming - 33.3 percent, Washington - 6.7 percent and Canada - 6.7 percent.

Question 14. Into which income category does your household fit? Of 78 valid responses, 5.1 percent indicated $4,999, 9.0 percent from $5,000 to $7,999, 32.1 percent from $8,000 to $11,999, 26.9 percent from $12,000 to $15,000 and 26.0 percent over $16,000.

Question 15. What is: a) your occupation, and b) if married, your spouse's occupation?

Table 3. Occupational categories of interviewees and spouse.

Occupational Category	Interviewee Occupation Percent of 85 Valid Observations	Spouse Occupation Percent of 46 Valid Observations
Professional	9.4	15.4
Student	5.9	4.3
Housewife	4.7	54.3
Self employed white collar	2.4	6.5
Self employed blue collar	2.4	0
Employed white collar	10.6	6.5
Employed blue collar	49.4	8.7
Agriculture	10.6	4.3
Retired	4.7	0

Thus, the most common occupation (49.4 percent) among those interviewed as a type of blue collar work in which the interviewee had no ownership of his employer's company or holdings. The most common occupation for the spouse was housewife (53.4 percent).

Question 16. a) Are insects a problem to you in this area? Of 80 valid observations, 31.3 percent replied yes.

b) If "yes", have they reduced the time you spend enjoying your favorite activities? Of 30 valid observations 36.7 percent responded "yes".

c) Would you return to this area if the insect problem remains the same? Of 88 valid responses, 71.6 percent indicated they would return.

d) Would you return to this area if the insect population was reduced by at least one-fourth? Of 88 valid responses, 60.2 percent indicated they would return.

Question 17. a) Are you aware of the location of public (Bureau of Land Management) lands near (50 miles upstream and 50 miles downstream) this area? Of 78 valid observations, 34.6 percent replied "yes", but 65.4 percent replied "no".

b) Are you aware of the location of public lands near your home if this area is not near your home (50 miles in any direction)? Of 70 valid responses, 61.4 percent responded "yes".

c) Are you aware that literature is available to any Bureau of Land Management office providing information and location of these areas, free of charge? Of 76 valid responses, 64.5 percent responded "yes).

d) Within the past year, have you used any of these areas adjacent to the Yellowstone River for recreational purposes? Of 75 valid responses 52 percent responded yes.

e) If "yes" for what main activity? Of 32 valid responses fishing was the most popular, 68.8 percent. Rock hunting and rest and relaxation each received 6.2 percent.

Question 18. What other kinds of recreation would you like to see at this particular site? Of 11 valid responses, activities and equipment for children were most asked for, 36.4 percent.

The second aspect of the pilot study entails use of cross tabulations (CT) to establish certain pertinent relationships. Only tabulations thought to be most important and valid are included here. Since detailed narratives cannot be justified with the given sample size, only the most obvious relationships within each cross tabulation are mentioned.

CT-1/ Of 74 valid responses, 58.1 percent indicated recreation on the Yellowstone River was the primary purpose for their trip, but were not on their vacation.

CT-2/ Of 75 valid responses, 65.4 percent indicated that no decrease in water quality had been noted and the enjoyment one derives from the site had not been affected.

CT-3/ Of 76 valid responses, 59.5 percent indicated no increase in litter had been noticed and the enjoyment potential of the site had not been affected.

CT-4/ Of 21 valid responses, 42.9 percent indicated that Montana residents traveled 50 miles or less (round trip) on a typical recreational outing.

CT-5/ Of 75 valid responses, 49.3 percent indicated insects were not a problem in the area and the site adequately met all recreational needs.

CT-6/ Of 62 valid responses, 66.1 percent indicated that the site was too crowded, but met the desired recreational needs adequately.

CT-7/ Of 73 valid responses, 34.2 percent and 42.5 percent, respectively, of the Montana residents indicated the increasing cost of gasoline had and had not reduced the distance they would drive on a typical recreational outing. Nonresidents indicated 5.5 percent and 17.8 percent, respectively. An interested note here is that if the price of gasoline was to rise to 75¢ a gallon, the additional cost of gasoline (from 40¢ a gallon), would amount to $35.00 (19.8 percent) of the total vacation cost assuming a family of four on a nine day, 1,500 mile round trip in a car averaging 15 miles/gallon (McCool et al, 1974). Thus, recreational use in terms of activities and places of visitation could change at some point in the future, depending generally upon the nation's economy.

CT-8/ Of 74 valid responses, 58.1 percent of all income categories thought the increasing cost of gasoline had not decreased the distance of travel for recreational outings.

CT-9/ Of 76 valid responses, 42.1 percent indicated a desire for more site development and reported that the increasing cost of gasoline had no effect upon the distance traveled for a recreational outing.

CT-10/ Of 78 valid responses, 34.3 percent of households surveyed indicated an income of $8,000 to $11,999. From total observations, 24.3 percent were Montana households and 10 percent were not.

CT-11/ Of 23 valid responses, 52.2 percent reported that fishing was the most preferred activity and that fishing was the main activity engaged in upon public land.

CT-12/ Of 60 valid responses, 61.7 percent indicated that insects were not a problem presently, but could prevent a return trip if numbers increased.

Sectional Questionnaire Tabulations

Variations in population and river gradient among sections influence variations in recreational activities and pursuits, which, in turn, should direct variations in recreational administration. Impacts of stream flow modification may be mostly local or sectional. Thus, a sectional analysis of situations, experiences and preferences is listed.

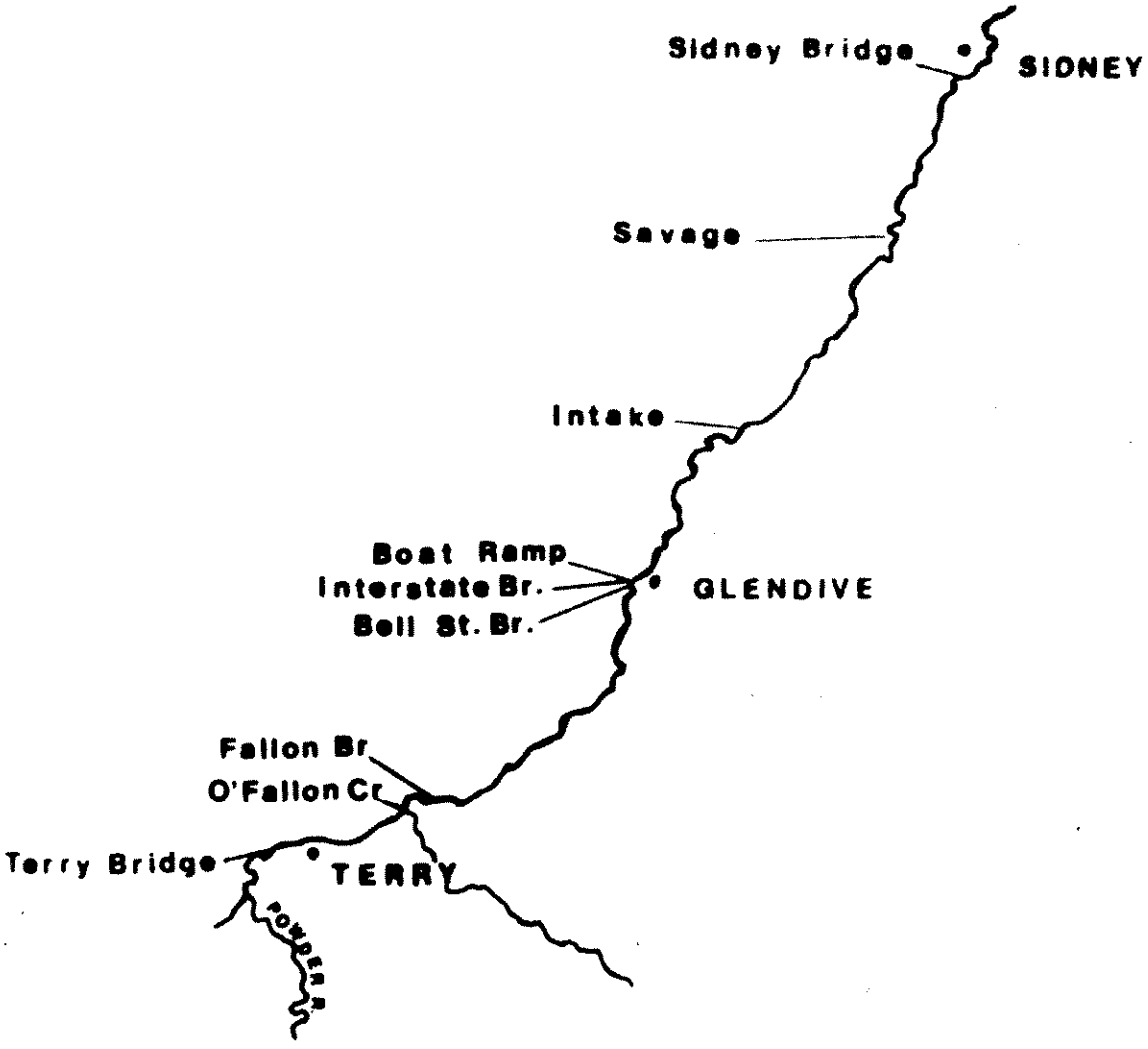


FIGURE 4

YELLOWSTONE RIVER SEC. 1

Section 1/. (Figure 4). Section one is the most easterly within the study area and stretches 149.5 river miles from the Montana-North Dakota state line to the mouth of the Powder River (which is not included). The elevation difference of the river is approximately 300 feet. The largest town within this section is Glendive, population 6,305, the second largest, Sidney, population 4,543 (1970 census). Generally speaking, popular recreational areas along the river occur within each section at nearly each small community along the river, due to some convenient access. A total of 29 questionnaires was collected within section 1 in 1975 and 24 in 1976. Intake, from personal observations, is the most popular recreational site of those surveyed within section one (figure 5).

The most outstanding characteristics of recreational situations, experience, and performance of people within section one are:

1) Sixty-eight and nine tenths percent in 1975 and 54.2 percent in 1976 were not on vacation (29 and 24 valid responses, respectively).

2) Sixty-seven and nine tenths percent in 1975 and 60.9 percent in 1976 characterized recreation on the Yellowstone as the main reason for their trip (28 and 23 valid responses, respectively).

3) Seventy-five percent in 1975 and 57.1 percent in 1976 indicated at least two visits to the site a summer (28 and 24 valid responses, respectively), 78.9 percent in 1975 and 70.0 percent in 1976 indicated one or no trips to the same area during the fall (18 and 10 valid responses, respectively), 100 percent in 1975 and 100 percent in 1976 indicated only one or no visits to the same area during the winter (7 and 4 valid responses, respectively) and 50 percent in 1975 and 53.8 percent in 1976 indicated one to two visits in the spring (12 and 13 valid responses, respectively).

4) Sixty-eight percent noted the water quality had remained the same, 20 percent noted a decrease, and 12 percent noted an increase (26 valid responses, 1975 only).

5) Fifty percent in 1975 and 47.1 percent in 1976 had noticed a decrease in noticeable litter (24 and 17 valid responses, respectively).

6) Sixty-one and five tenths percent indicated an increase in enjoyment since first association with Yellowstone River Recreation (26 valid responses, 1975 only).

7) Sixty-two and one tenths percent in 1975 and 45.8 percent in 1976 were day use only visitors (29 and 24 valid responses, respectively).

8) Fifty-nine and three tenths in 1975 and 50 percent in 1976 indicated fishing was the favored recreational activity (27 and 20 valid responses, respectively). In 1976, rock hounding was ranked second to fishing, 35.0 percent.

9) Thirty-three and three tenths percent in 1975 and 20.3 percent in 1976 indicated pike was the main fish sought, 27.8 percent in 1975 and 50.0 percent in 1976 replied paddlefish, and 27.8 percent in 1975 and 21.4 percent in 1976 noted catfish (27 and 17 valid responses, respectively). A note here is that paddlefishing within section one decreased from late spring through summer. A pilot study in 1975 revealed 84.1 percent of 63 valid responses listed paddlefish as the main fish sought during late spring.

10) In 1975 pike fishing and paddlefishing produced the most success, 40.0 percent and 26.7 percent of fisherman noting catches (15 valid responses). During 1976, paddlefishing and pike fishing success was equal, 37.5 percent, and catfishing rated third, 25 percent (8 valid responses).

11) Ratings of facilities were varied: 65.2 percent in 1975 and 73.9 percent in 1976 rated picnic facilities good or exceptional (23 valid responses each year), 59.1 in 1975 and 66.7 percent rated camping sites and rest rooms good or exceptional (22 and 21 valid responses, respectively), 73.7 percent in 1975 and 92.3 percent in 1976 rated equipment for children's activities fair or poor (19 and 13 valid responses, respectively), 57.1 percent in 1975 and 94.1 percent in 1976 rated weed mowing good or exceptional (21 and 20 valid responses, respectively) and 53.8 percent in 1975 and 70.0 percent in 1976 rated access roads good or exceptional (26 valid and 20 responses, respectively).

12) Of 25 valid responses in 1975 and 11 valid responses in 1976, 60 percent and 90.9 percent, respectively, indicated they liked an alternative site along the Yellowstone as well as the site they were currently enjoying.

13) Seventy-five and nine tenths percent in 1975 and 58.3 percent in 1976 were Montana residents (29 and 24 valid responses, respectively).

14) In 1975 Glendive was the home of 59.1 percent of recreationists within section one, followed by Sidney 13.6 percent, and Wibaux 13.6 percent (22 valid responses). In 1976, 71.4 percent were from Glendive, 14.3 percent from Billings and 7.1 percent from Sidney (14 valid responses).

15) Of 28 valid responses in 1975, $8,000-$11,999 was the most common annual household income category, 32.1 percent; followed by $12,000-$15,999, 25.0 percent; under $4,999, 17.9 percent; over $16,000, 14.3 percent; and $5,000-$7,999, 10.7 percent. The 1976 data reveal 45.5 percent in the $12,000-$15,999 category, 27.3 percent within $8,000-$11,999; 13.6 percent within $5,000-$7,999; 9.1 percent under $4,999 and 4.5 percent over $16,000 (22 valid responses).

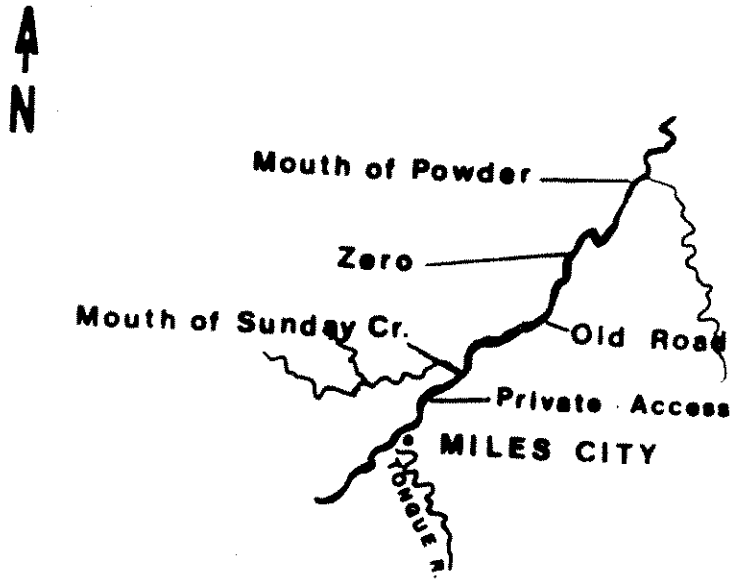
16) Sixty-nine percent of recreationists in 1975 and 69.7 percent in 1976 thought the area was just right, 13.8 percent in 1975 and 17.4 percent in 1976 noted it was too crowded and 17.2 percent in 1975 and 13.0 percent in 1976 thought the area was not used enough (29 valid responses, both years).

17) Fifty-five and six tenths percent in 1975 and 78.3 percent in 1976 thought the site should have more development (29 and 23 valid responses, respectively).

18) Seventy and two tenths percent in 1975 and 61.1 percent in 1976 would like to see at least one more site within 30 miles of their present recreational site (24 and 18 valid responses, respectively).

19) Only 39.3 percent of recreationists in 1975 and 42.9 percent in 1976 knew the location of public lands near their recreational site (28 and 21 valid responses, respectively).

Section 2/ (Figure 5). From the mouth of the Powder River, which is included, to the mouth of the Tongue River which is not, 35.5 river miles are incorporated. Miles City is the only notable town along the river within this section. Access is rather limited within section two, the heaviest use being received by those areas shown in figure 5. Elevation drop is approximately 250 feet. A total of 18 and 13 questionnaires were collected in 1975 and 1976, respectively, within section 2. Due to the small number of questionnaires obtained, results will be somewhat brief. The flood dike along the Yellowstone near Miles City, from personal observation, was the most popular recreation place within the study section. There are no developed recreational areas within section 2.



~~FIGURE 3~~
~~YELLOWSTONE RIVER SEC. 2~~

Figure 6.
Yellowstone River section 2

Outstanding characteristics and preferences of section 2 recreationists are:

1) Seventy-two and two tenths percent in 1975 and 66.7 percent in 1976 were not on vacation (17 and 12 valid responses, respectively).

2) Sixty-six and seven tenths percent in 1975 and 58.3 percent in 1976 indicated recreation on the Yellowstone was the primary purpose of their trip (17 and 12 valid responses, respectively).

3) Thirty-five and three tenths percent in 1975 and 15.4 percent in 1976 had not previously been to the occupied recreation site during the summer (17 and 13 valid responses, respectively). The undeveloped local accesses within section two seem to be visited by mostly a group of local residents due to convenience and proximity to home.

4) Seventy-one and four tenths percent in 1975 and 88.9 percent in 1976 were day use only visitors (14 and 6 valid responses, respectively).

5) Thirty-eight and eight tenths percent in 1975 noted they planned to engage in river floating or motorized boating (18 valid responses). No response was received in 1976.

6) Thirty-eight and eight tenths percent in 1975 and 30.8 percent in 1976 indicated they planned to participate in rock hounding (18 and 12 valid responses, respectively). Agate hunting is a popular recreational activity along the river within, but not limited to, sections one, two, and three. In 1975 the Miles City Agate Club had approximately 60 members, 14 of which indicated 49 total visits a year between the mouth of Big Horn River and Miles City and Terry. The trips within the mouth of the Bighorn-Miles City section averaged six hours per day and the Miles City to Terry section averaged five hours per day. Boats or rafts were used on all trips, with the exception of three interviewees, who hunted the Miles City to Terry section.

7) Fifty-five and five tenths percent in 1975 and 69.2 percent in 1976 noted that fishing had been or would be engaged in (18 and 13 valid responses, respectively).

8) Fishing was the favorite activity for 50.0 percent of surveyed recreationists in 1975 and 83.3 percent in 1976 (12 valid responses each year).

9) Catfish was the most popular species caught by 50 percent of the fishermen in 1975 and 66.7 percent in 1976 (9 valid responses each year).

10) Attitudes toward facilities were poor in all cases, due to the undeveloped nature of all sites. One exception, access roads, were rated good or fair by 75.0 percent of recreationists in 1976 (12 valid responses).

11) Eighty-seven and seven tenths in 1975 and 92.3 percent in 1976 were Montana residents (18 and 13 valid responses, respectively).

12) Miles City and Terry residents were most prevalent within the section, 80 percent in 1975 and 88.6 percent in 1976 (18 and 13 valid responses, respectively).

13) Eighty-seven and six tenths percent in 1975 and 83.3 percent in 1976 thought the area was just right (18 and 13 valid responses, respectively). In 1976, 53.8 percent indicated they would not know where they would go if their present site was not available (13 valid responses).

14) Sixty-six and seven tenths percent thought their recreational site should be more developed (18 valid responses). Only 50 percent replied the same in 1976 however (10 valid responses).

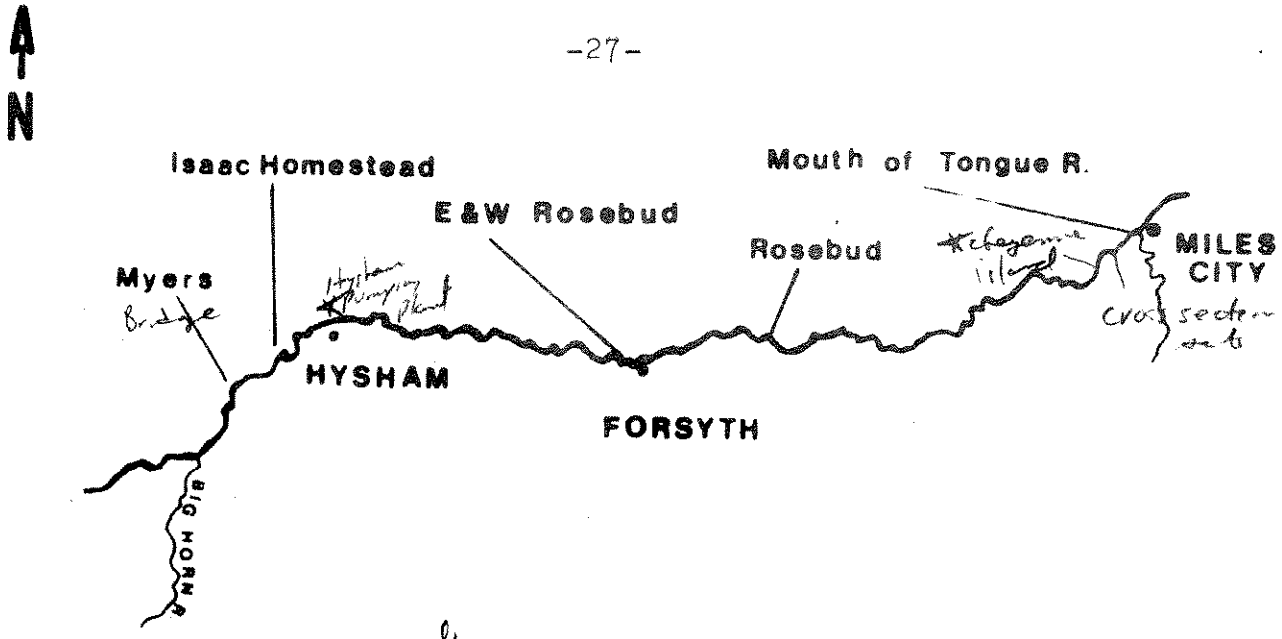
15) Eighty-one and three tenths percent in 1975 and 66.7 percent in 1976 would like to see an additional recreational site within 30 miles upstream or downstream from their respective site (17 and 6 valid responses, respectively).

16) Only 35.7 percent in 1975 and 46.2 percent in 1976 knew of the public land along the river near their recreational sites (18 and 13 valid responses, respectively).

17) Fifty and one tenths percent in 1975 and 38.5 percent in 1976 indicated that from two to nine days annually were spent at other recreational sites along the Yellowstone (18 and 13 valid responses, respectively).

Section 3/. (Figure 6). From the mouth of the Tongue River, which is included in section 3, to the mouth of the Bighorn River, which is not, 110.6 river miles are incorporated. Elevation drop is approximately 350 feet. The largest town within the section is Forsyth, population 2,800 (1970 census). East Rosebud Fishing Access, the most popular recreational site within this section, is located at Forsyth. A total of 51 questionnaires were collected within section 3 in 1975 and 1976. Major preferences and characteristics of section 3 recreationists are:

1) Eighty percent in 1975 and 60 percent in 1976 were not on vacation (46 and 75 valid responses, respectively).



* 1976 visitation sites only

~~FIGURE 4~~

~~YELLOWSTONE RIVER SEC. 3~~

Figure 6. Yellowstone River section 3

2) Forty-one and three tenths percent in 1975 and 55.6 percent in 1976 indicated recreation on the Yellowstone was the primary purpose of their trip (46 and 45 valid responses, respectively). Of the 35 valid responses in 1975 and 53 in 1976 concerning other reasons for a trip, sightseeing and rest and relaxation accounted for 54.3 and 39.8 percent, respectively.

3) Forty-three and five tenths percent in 1975 and 40.8 percent in 1976 indicated visitation to their present recreational site of 8 times a summer (48 and 49 valid responses, respectively). Twenty-four percent in 1975 and 38.0 percent in 1976 indicated over eight visits a spring (50 valid responses each year). Eighteen percent in 1975 and 36.4 percent in 1976 indicated over eight fall visits (50 and 33 valid responses, respectively). Twelve percent in 1975 and 37.0 percent in 1976 indicated over eight visits a winter (42 and 27 valid responses, respectively). Largest categories were 1-2 visits a year for spring, 44 percent, fall, 51.5 percent, and winter, 63.0 percent, thus indicating summer as the highest use season.

4) Sixty-four and seven tenths percent in 1975 noted water quality had remained the same (34 valid responses).

5) Fifty-nine and four tenths percent in 1975 and 76.3 percent in 1976 indicated that litter had remained the same or decreased (32 and 38 valid responses, respectively).

6) Ninety-four and seven tenths percent in 1975 replied that their enjoyment of the river had remained the same or increased (36 valid responses).

7) Fifty-two and five tenths percent in 1975 and 40.3 percent in 1976 noted length of stay as day use only (40 and 67 valid responses, respectively).

8) Seventy-seven and one tenths percent in 1975 and 57.6 percent in 1976 indicated that fishing was the favorite recreational activity, followed by rest and relaxation, 11.4 percent in 1975 and rock hunting, 15.2 percent in 1976 (35 and 33 valid responses, respectively).

9) Forty and six tenths percent in 1975 and 51.7 percent in 1976 listed catfish as the most popular species sought, followed by pike, sauger and walleye combined, 43.7 percent in 1975 and 34.5 percent in 1976 (32 and 29 valid responses, respectively). From personal observations fisherman casually interchanged pike, sauger and walleye terminology, despite the particular species caught. These species were combined to reduce error.

10) From 23 valid responses in 1975 pertaining to species caught, 47.8 percent listed pike, sauger and walleye and 39.1 percent listed catfish. Sturgeon, ling, goldeye, suckers, and carp were also listed. From personal observation, goldeye, suckers and carp were caught extensively, but since all are considered trash fish, were not listed by fisherman. In 1976, catfish rated highest, 55.0 percent followed by pike, 30.0 percent (20 valid responses).

11) Ratings of facilities within acceptable categories, i.e., exceptional, good or fair were: picnic facilities, 90.5 percent in 1975 and 94.3 percent in 1976 (42 and 35 valid responses, respectively); rest rooms, 70.6 percent in 1975 and 60.7 percent in 1976 (34 and 28 valid responses, respectively); camping sites, 85.3 percent in 1975 and 87.5 percent in 1976 (34 and 32 valid responses, respectively); children's equipment, 43.3 percent in 1975 and 64 percent in 1976 (30 and 25 valid responses, respectively); weed mowing, 39.3 percent in 1975 and 75 percent in 1976 (28 and 39 valid responses, respectively); and access roads, 85 percent in 1975 and 86.8 percent in 1976 (28 and 38 valid responses, respectively). The developed nature of most sites within section 3 accounts for the high percentages.

12) Of 29 valid responses in 1975 and 18 valid responses in 1976, 69 percent and 72.2 percent respectively, indicated they like an alternative site along the Yellowstone as well as the site they were currently enjoying.

13) Eighty-seven and two tenths percent in 1975 and 83.0 percent in 1976 were Montana residents (47 valid responses each year).

14) Forsyth was the home of the largest percentage of recreationists in 1975, 47.5 percent, followed by Billings, 20.0 percent, and Miles City, 10.0 percent (40 valid responses). In 1976, Miles City ranked first, 44.7 percent, followed by Forsyth 39.5 percent, and Billings, 7.9 percent (38 valid responses).

15) Of 43 valid responses in 1975, income categories and percentages were as follows: under $4,999, 16.3 percent; $5,000-$7,999, 11.6 percent; $8,000-$11,999, 30.2 percent; $12,000-$15,999, 23.3 percent and over $16,000, 18.6 percent. The same categories, in order, for 1976 were 19.0 percent, 19.0 percent, 14.3 percent, 19.0 percent, 28.6 percent (42 valid responses).

16) Seventy-nine and six tenths percent in 1975 and 76.2 percent in 1976 noted the area was just right and 14.3 percent in 1975 and 11.9 percent in 1976 noted the area was too crowded (49 and 42 valid responses, respectively).

17) Sixty-four and six tenths percent in 1975 and 58.5 percent in 1976 thought there should be more development at their particular site (48 and 41 valid responses, respectively).

18) Of 45 valid responses in 1975 and 32 valid responses in 1976, 84.4 percent and 81.3 percent respectively would like to see another recreational site no more than 30 miles upstream or downstream from their present site.

19) Of 46 valid responses in 1975 and 43 in 1976, 45.7 and 27.9 percent, respectively, listed their occupation as employed blue collar workers, this figure supported by the rapidly developing coal and energy related parameters within section 3. The next largest category was retired, 19.6 percent in 1975 and 23.3 percent in 1976.

20) Of 45 valid responses in 1975, 57.8 percent noted that insects had reduced the time spent enjoying various recreational activities. In 1976, of 65 valid responses, only 32.3 percent noted reduced time. The amount of standing water in 1976 was less then 1975, probably providing less opportunity for mosquito breeding.

21) Of 47 valid responses in 1975 and 45 valid responses in 1976, 34.0 and 40.0 percent respectively knew of public land near their respective recreational sites.

22) Of 48 valid responses in 1975 and 74 in 1976, 41.7 percent noted that no other sites on the Yellowstone were visited annually. Other major categories were between 10 and 15 days, 16.7 and 12.2 percent, and over 20 days annually, 16.7 percent and 18.9 percent, respectively.

Section 4/. (figure 7). From the mouth of the Bighorn River, which is included in section 4, to the mouth of the Clark's Fork of the Yellowstone, which is not, 83.6 river miles are included. Elevation change is approximately 500 feet and there is a change from warm water to cold water fishing. The largest town within section 4 is Billings, population 61,581 (1970 census). Areas of visitation are shown in figure 7. The most popular area surveyed within section 4 in 1975 was the gravel pits, located on the north bank of the Yellowstone at Billings. This privately owned land is immediately adjacent to the Yellowstone and substantial recreational development is planned by private individuals and the city of Billings. Another privately owned recreational area occurs at Pompey's Pillar located approximately 35 miles east of Billings along the Yellowstone River. Sight-

seeing is the major attraction at this area, open from June 1 to September 1 each year. Attendance for 1975 was 6,904 adults and 2,146 children. Each person is charged a minimal fee to view Captain William Clark's name engraved upon the pillar. This specific area was not included within the study. In 1975 of the 51 questionnaires collected in section 4, 28 were obtained at the gravel pits. During 1976, however, the gravel pits were closed for recreation, so two new visitation sites, Two Moon Park and Coulson Park were added. In addition, Manning Diversion on the Bighorn River was also closed in 1976 due to a bridge that washed out.

Outstanding preferences and characteristics of surveyed section 4 recreationists were:

1) Ninety and two tenths percent in 1975 and 68.4 percent in 1976 were not on vacation (51 and 38 valid responses, respectively).

2) Fifty-seven and four tenths percent in 1975 and 61.5 percent in 1976 indicated recreation on the Yellowstone was the primary purpose of their trip (47 and 26 valid responses, respectively). Of 26 valid responses in 1975 and 23 valid responses in 1976 concerning other reasons for their trip, 53.8 and 43.5 percent reported rest and relaxation, respectively.

3) Forty percent of those surveyed in 1975 and 40.6 percent in 1976 indicated visitation of their present recreational site over eight times each summer (45 and 32 valid responses, respectively). Thirty-two and two tenths percent in 1975 and 38.1 percent in 1976 indicated over eight visits each spring (32 and 21 valid responses, respectively), and 25.0 percent reported over eight visits each winter (10 and 16 valid responses, respectively). A note is made here that valid responses for 1975 and 1976 decreased through each seasonal question, indicating a lack of interest to a particular season and/or recreational activity during that season. Summer response was highest and winter was least.

4) In 1975, eighty-five percent noted water quality had remained the same or had improved since beginning recreation on the Yellowstone (40 valid responses).

5) Fifty-one and four tenths percent of 37 valid responses noted an increase in litter in 1975 but in 1976, 58.1 percent replied the problem had remained the same.

6) In 1975, ninety-four and six tenths percent of those surveyed indicated their enjoyment of the river had increased or at least remained the same (37 valid responses).

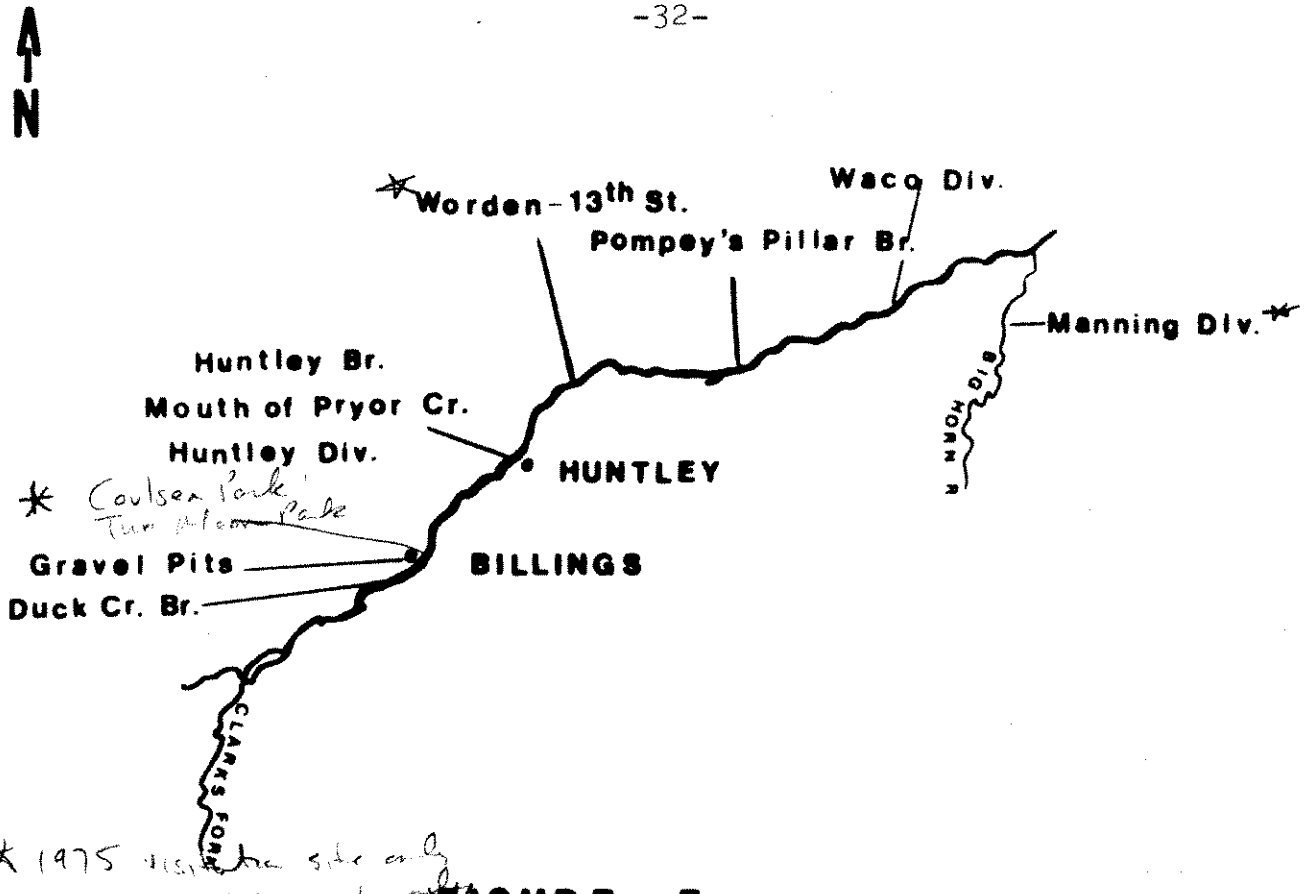


FIGURE 5

YELLOWSTONE RIVER SEC. 4

Figure 7. Yellowstone River section 4

7) Seventy-six and one tenths percent of 46 valid responses in 1975 and 63.2 percent of 38 responses in 1976 indicated length of stay as day use only.

8) Forty-two and nine tenths percent in 1975 and 25.0 percent in 1976 indicated fishing was the favorite recreational activity, followed by swimming in 1975, 23.1 percent and rest and relaxation, 25.0 percent, in 1976 (42 and 24 valid responses, respectively). From personal observation in 1975, swimming was the most popular activity at the gravel pits, thus accounting for a relatively high sectional percentage (23.1 percent). In 1976, due to closure of the gravel pits, swimming rated third in popularity (16.7 percent).

9) Thirty-nine percent in 1975 indicated pike, walleye, sauger was the most popular species sought, followed by suckers and carp, 17.4 percent, and catfish, 13.0 percent (28 valid responses). In 1976, trout rated first, 41.7 percent; followed by catfish 16.7 percent, and pike-sauger 16.6 percent (12 valid responses). The news media has increased public attention to trout fishing potential, possibly explaining the changes in preference.

10) Ratings of facilities within acceptable categories i.e. exceptional, good, or fair were: picnic facilities, 45.2 percent in 1975 and 50.0 percent in 1976 (31 and 28 valid responses, respectively); rest rooms, 16.7 percent in 1975 and 26.1 percent in 1976 (30 and 15 valid responses, respectively); camping sites, 59.4 percent in 1975 and 63.6 percent in 1976 (32 and 22 valid responses, respectively); children's activities, 14.3 percent in 1975 and 23.8 percent in 1976 (28 and 21 valid responses, respectively); weed mowing, 19.4 percent in 1975 and 28.6 percent in 1976 (31 and 21 valid responses, respectively); and access roads, 66.7 percent in 1975 and 76.0 percent in 1976 (39 and 25 valid responses, respectively).

11) Of 35 valid responses, 60 percent in 1975 and 71.4 percent in 1976 indicated they liked an alternative site along the Yellowstone as well as the site they were currently enjoying.

12) Ninety-three and eight tenths percent in 1975 and 86.7 percent in 1976 were Montana residents (48 and 30 valid responses, respectively).

13) Eighty-six and three tenths percent in 1975 and 96.0 percent in 1976 of those surveyed resided in Billings (51 and 25 valid responses, respectively).

14) Of 45 valid responses in 1975 and 29 valid responses in 1976, income categories and percentages were respectively as follows: under $4,999, 20 and 17.2 percent, respectively $5,000-$7,999, 17.8 and 10.3 percent; $8,000-$11,999, 13.3 and 24.1 percent; $12,000-$15,999, 31.1 and 31.1 percent, and over $16,000, 17.8 and 17.2 percent.

15) Of 48 valid responses in 1975 and 26 in 1976, 27.1 and 11.5 percent respectively, thought the area was too crowded, 58.3 and 69.2 percent thought the area was just right, and 14.6 and 19.2 percent thought the area was not used enough.

16) Of 46 valid responses in 1975 and 23 in 1976, 69.6 and 56.5 percent respectively, thought there should be more development at their particular site.

17) Of 42 valid responses in 1975 and 20 valid responses in 1976, 88.1 and 80.0 percent respectively would like to see another recreational site no more than 30 miles upstream or downstream from their present site.

18) Of 41 valid responses in 1975, 41.5 percent listed their occupation as employed blue collar workers; students, 17.1 percent, and self employed blue collar workers 14.6 percent. Of 26 valid responses in 1976, professional rated first, 30.8 percent; student second, 23.1 percent; employed white collar third, 15.4 percent; and employed blue collar fourth, 11.5 percent.

19) Of 47 valid responses in 1975 and 33 valid responses in 1976, 51.1 and 54.5 percent respectively, noted that insects had reduced the recreational time spent enjoying various activities.

20) Of 48 valid responses in 1975 and 31 valid responses in 1976, 48.9 and 32.3 percent respectively knew of public land near their occupied recreational sites.

21) Of 50 valid responses in 1975 and 35 valid responses in 1976, 22.0 and 14.3 percent respectively noted that over 20 days annually were spent at other sites along the Yellowstone. Following categories were 4-5 days in 1975, 18.0 percent, in 1976, 11.4 percent; 6-9 days in 1975, 18.0 percent, 1976, 8.6 percent; 10-15 days in 1975, 16.0 percent, in 1976, 8.6 percent; and 2-3 days in 1975, 12.0 percent, 1976, 11.4 percent. An interesting note here is that in 1975 only 6.0 percent responded no days at all but in 1976, 34.3 percent replied no days. Loss of the gravel pits for recreation might justify the data.

Section 5/. (See Figure 8). From the mouth of the Clark's Fork River, which is included in section 5, west to the mouth of the Boulder River at Big Timber, 76.8 river miles are included. Most notably, within this section are access points at the town of Laurel, Itch-Kep-Pe at Columbus (Fish and Game), Indian Fort at Reed Point (Fish and Game), Bratten Fishing Access (Fish and Game), and the town of Big Timber. Yellowstone River elevation drop within section 5 is approximately 825 feet, signifying a definite change in biological parameter from sections one, two, and three.

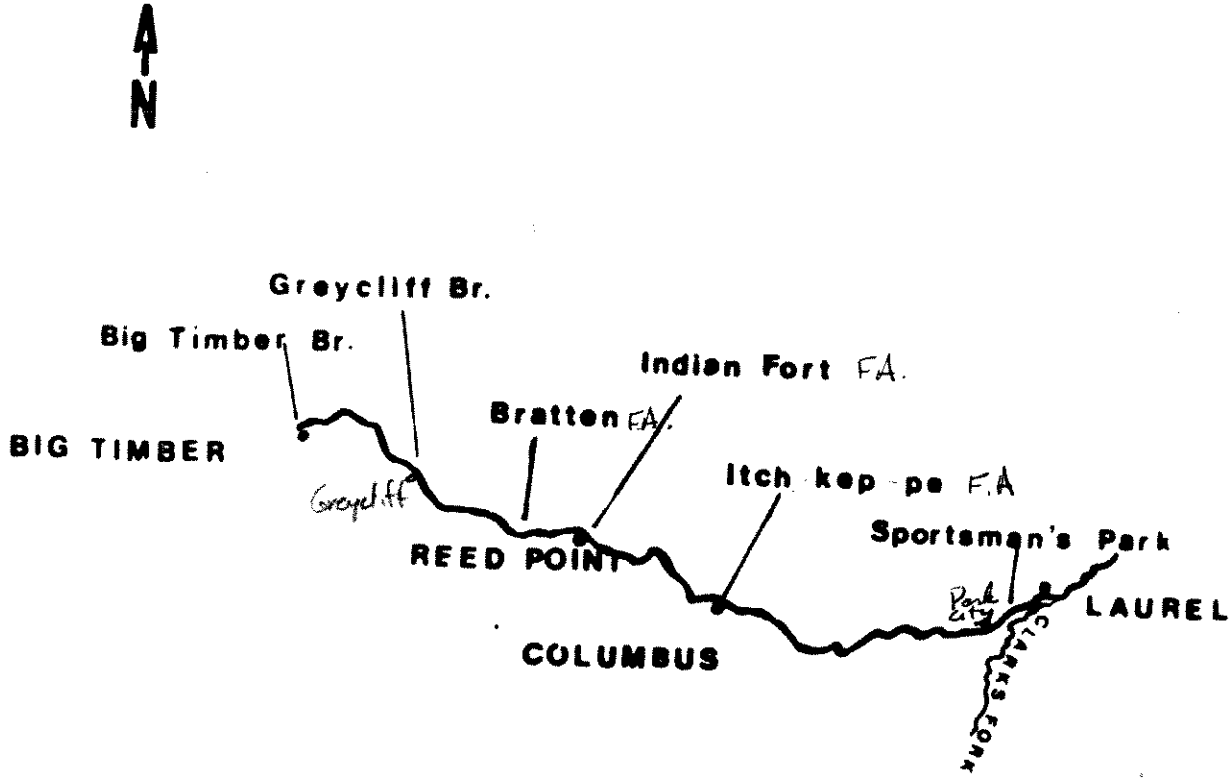
The town of Laurel, at the eastern most edge of section 5 is largest, population 4,454. Reedpoint, population 133, Columbus, population 1,173, and Big Timber, population 1,592 (1970 census) also lie within the section. The most popular recreational area within section 5 is Itch-Kep-Pe at Columbus. Sixty-two questionnaires were completed within the section in 1975 and 100 in 1976. From personal observation, recreational use seems more dispersed than in other sections, due to the absence of any relatively large towns and the convenient access at several sites.

Outstanding preferences and characteristics of surveyed Region 5 recreationists were:

1) Sixty and three tenths in 1975 and 69.7 percent in 1976 were not on vacation (63 and 99 valid responses, respectively).

2) Of 60 and 89 valid responses in 1975 and 1976, respectively, 50 and 55 percent indicated recreation on the Yellowstone was the primary purpose of their trip. Of 48 and 66 valid responses in 1975 and 1976 respectively, concerning other reasons for their trip, 66.7 and 59.1 percent reported either rest and relaxation or sightseeing. Twenty-nine and two tenths percent in 1975 and 27.2 percent in 1976 noted business or visiting relatives.

3) Concerning visitation to a respective site each summer, 28.6 percent in 1975 and 19.8 percent in 1976 responded they had not been to the site before. Respectively, 17.5 and 15.6 percent replied once, 15.9 and 22.9 percent responded 2-3 times, 11.1 and 10.4 percent replied 4-6 times, and 23.8 and 25.0 percent responded 8 times or more (63 and 96 valid responses, respectively). During spring 33.3 percent in 1975 and 53.7 percent in 1976 replied 1-2 times, 40.0 and 22.2 percent replied 3-6 times, and 26.7 and 24.1 percent replied more than 7 times (30 and 54 valid responses, respectively). During fall, 25.0 in 1975 and 56.8 percent in 1976 replied 1-2 times, 33.3 and 15.9 percent replied 3-6 times, 41.7 and 27.2 percent responded more than 7 times (24 and 44 valid responses, respectively). Winter response was invalid



~~FIGURE 6~~

~~YELLOWSTONE RIVER SEC. 5~~

Figure 8. Yellowstone River section 5.

in 1975, probably due to lack of interest from those surveyed. In 1976, 66.7 percent of 27 valid responses indicated 1-2 visits a winter.

4) Ninety-five percent of those surveyed in 1975 noted water quality had remained the same or improved since first recreating on the Yellowstone (40 valid responses).

5) Regarding litter, 33.3 percent in 1975 and 25 percent in 1976 noted an increase (39 and 84 valid responses, respectively).

6) Ninety-two and five tenths percent of those surveyed in 1975 indicated their enjoyment of the river had increased or at least remained the same (40 valid responses).

7) Of 60 valid responses in 1975 and 95 in 1976, 56.7 and 54.7 percent, respectively, indicated their length of stay as day use only.

8) Fifty-five and eight tenths percent in 1975 and 55.7 percent in 1976 indicated fishing was their favorite recreational activity, followed by rest and relaxation, 25.6 and 11.4 percent (43 and 79 valid responses, respectively).

9) Ninety-seven and one tenths percent in 1975 and 95.0 percent in 1976 noted that trout was the most popular species sought (34 and 60 valid responses, respectively).

10) Ratings of facilities within acceptable categories i.e. exceptional, good, or fair were: picnic facilities, 86.7 percent in 1975 and 89.3 percent in 1976 (45 valid responses each year); rest rooms, 64.4 and 72.7 percent (45 and 77 valid responses, respectively); camping sites, 87.5 and 98.7 percent (48 and 79 valid responses, respectively); children's activities, 38.5 and 46.6 percent (26 and 79 valid responses, respectively); weed mowing, 64.3 and 51.4 percent (42 and 74 valid responses, respectively) and access roads, 91.8 and 84.5 percent (49 and 84 valid responses, respectively).

11) Of 42 and 64 valid responses in 1975 and 1976, respectively 78.6 and 82.4 percent indicated they liked an alternative recreational site along the Yellowstone as well as the one they were currently enjoying.

12) Sixty-nine and eight tenths percent in 1975 and 75.3 percent in 1976 were Montana residents (63 and 97 valid responses, respectively).

13) Sixty-one and four tenths percent in 1975 and 63.4 percent in 1976 of those Montana residents surveyed resided in Billings, and 25.0 and 23.9 percent in Columbus (62 and 71 valid responses, respectively).

14) Of 47 valid responses in 1975, the largest household income category was $12,000-$15,999, 31.9 percent; followed by over $16,000, 25.5 percent; $8,000-$11,999, 23.4 percent and $5,000-$7,999, 14.9 percent. In 1976, the largest category of 91 valid responses was over $16,000, 31.9 percent; $8,000-$11,999, 24.2 percent; $12,000-$15,999, 23.1 percent; $5,000-$7,999, 14.3 percent; and under $4,999, 6.6 percent.

15) Concerning crowding, 78.3 percent in 1975 and 87.1 percent in 1976 rated the area just right and 21.7 and 8.6 percent, respectively, though the area was not used enough (60 and 93 valid responses, respectively).

16) Of 58 valid responses in 1975 and 88 in 1976, 56.9 and 40.9 percent, respectively, thought there should be more development at their particular site.

17) Of 46 and 68 valid responses in 1975 and 1976, 82.6 and 82.4 percent, respectively, would like to see another recreational site within 30 miles, upstream or downstream.

18) Of 59 valid responses in 1975 and 94 in 1976, 30.5 percent and 23.4 percent, respectively, listed their occupation a blue collar worker category, followed by employed white collar in 1975, 18.6 percent and professional, 16.0 percent in 1976. Retired obtained 15.3 percent in 1975 and 13.8 percent in 1976. Professional and housewife categories were 10.2 percent each in 1975 and retired was 13.8 percent in 1976.

19) Of 56 valid responses in 1975 and 86 in 1976, 41.1 and 38.4 percent respectively, noted that insects had reduced recreational time spent enjoying various activities.

20) Forty-one and four tenths in 1975 and 35.9 percent in 1976 knew of public land near their respective recreational sites (58 and 92 responses, respectively).

21) Of 57 valid responses in 1975, 15.8 percent responded that no other days annually were spent at other sites along the Yellowstone, followed by 2-3 days, 22.8 percent; one day, 14.0 percent; 10-15 days and over 20 days, 12.3 percent each, and 6-9 days, 10.5 percent In 1976, of 96 valid responses, over 20 days rated first,

21.9 percent, followed by no days, 18.8 percent; 2-3 days, 18.8 percent; 10-15 days, 12.5 percent; 6-9 days, 11.5 percent; and 4-5 days, 10.4 percent.

Questionnaire Cross Tabulations

Cross tabulations (CT) for total 1975 and 1976 questionnaire response (Appendix) are presented here to emphasize pertinent relationships, provide a check system for total analysis and add validity to response by considering only those interviewees that responded to both questions. Two specific questions from the questionnaire were cross tabulated.

CT-1/ (Q. 1 and 2). Of 197 valid observations, 43.1 percent replied that they were not on vacation and recreation was the primary purpose for their trip. Another 31 percent replied they were not on vacation and recreation on the Yellowstone was not the primary purpose for their trip. Of the 24.9 percent who were on vacation, 14.2 percent replied that recreation on the Yellowstone was the primary purpose and 10.7 percent replied that it was not.

CT-2/. (Q. 4a and 4c). Of 137 valid observations, 11.7 percent replied that since they started using the Yellowstone they had noticed better water quality and their enjoyment of the river had increased. Of the 67.2 percent who replied water quality had remained the same, 32.8 percent replied their enjoyment had increased and 32.1 percent replied their enjoyment had stayed the same.

CT-3/ (Q. 4b and 4c). Of 129 valid responses concerning litter and enjoyment of the river, 15.5 percent reported increased noticable litter and increased enjoyment, 19.4 percent reported the same amount of litter and increased enjoyment, 16.3 percent reported decreased noticable litter and increased enjoyment. Replies from 15.5 percent noted increased litter and the same general enjoyment, 17.1 percent replied the same to both questions, and 10.9 percent replied decreased noticable litter but enjoyment had remained the same. Thus, 94.7 percent reported that their enjoyment of the river had at least stayed the same regardless of the litter situation. From personal observations, however, no extreme amounts of litter were encountered.

CT-4/ (Q 16b and 16c). Of 188 valid responses, 30.4 percent indicated this year's recreational trip covered a shorter distance than previous years' typical trip, and 62.3 percent indicated trips within the same mileage categories.

CT-5/ (Q. 5 and 16c). Of 175 valid responses, 61.7 percent responded length of stay was day use only. Sixteen percent of this total responded this years' typical recreational trip covered from 0-50 miles, 20.6 percent responded from 50-250 miles, 10.3 percent responded from 250-450 miles, and 14.9 percent responded over 450 miles.

CT-6/ (Q. 13 and 14). Of 194 valid responses, 39.7 percent indicated that the area they were enjoying was just right (concerning crowding) and would like to see more site development. Twelve and nine tenths percent indicated the area was not used enough but should have more development, and 31.4 percent thought the area was just right and wanted no more development.

CT-7/ (Q. 11 and 16a). Of 197 valid responses, the 80.7 percent who were Montana residents, 45.2 percent noted a decrease in the distance they traveled to a recreational area due to the increasing cost of gasoline and 35.5 percent replied no effect.

CT-8/ (Q. 12 and 16a). Of 171 valid responses, 53.8 percent of all income categories indicated that the increasing cost of gasoline had reduced the distance traveled to a recreational area. Only the higher income category, above $16,000 annually, indicated there was no significance.

CT-9/ (Q. 14 and 16a). Of 193 valid responses, 35.8 percent of the 12 people who indicated there should be more development at their present recreational site replied that the cost of gasoline had decreased their recreational mileage, whereas 26.9 percent replied that it had not. Of the 72 people who indicated they wanted no further development for the present site, 16.6 percent replied that the increasing cost of gasoline had decreased their recreational mileage and 20.2 percent indicated it had not.

CT-10/ (Q. 11 and 12). Of 141 valid responses, Montana's residents' income categories were: under $5,000, 15.6 percent; $6,000-$7,999, 0.5 percent; $8,000-$11,999, 29.1 percent; $12,000-$15,999, 28.4 percent; and over $16,000, 16.3 percent.

CT-11/ (Q. 22a and 22c). Of 182 valid responses, the 33.0 percent that replied they knew of public land near (50 miles upstream or downstream) their present site also knew they could obtain information on these lands free of charge. Thirty and eight tenths percent did not know the location of proximate public land nor the free information available concerning these lands.

CT-12/ (Q. 15 and 22a). Of 164 valid responses, 35.3 percent of all respondents indicated they knew of the public land along the river near their respective recreation site but would like to see another site within 30 miles upstream or downstream. Forty-nine and four tenths percent indicated no knowledge of public lands near their recreational area but would like to see another recreational site within 30 miles, upstream or downstream.

CT-13/ (Q. 21a and 21c). Of 185 valid responses, 49.2 percent indicated that insects were a problem in their area but would return if the problem persisted. Fourteen and six tenths percent indicated they would not return.

CT-14/ (Q. 21b and 21d). Of 182 valid responses, 29.7 percent and 12.1 percent indicated that insects had reduced recreational time and would not return to the area, respectively. Fifty-four and nine tenths percent indicated insects had not reduced recreational time and would return to the area.

CT-15/ (Q. 5 and 6b). Of 144 valid responses, 36.1 percent listed their favorite activity as fishing and their length of stay as day use only.

Observed Use

There are two aspects of observed use. Foremost is the use and activities observed during the summer study periods of 1975 and 1976. These randomly collected data were used to evaluate flow impacts.

The second major aspect of data gathering entailed recreational visitation frequencies along the Yellowstone River. Evaluation of use was accomplished through automobile and airplane trips along the Yellowstone River as well as recreational use observations made by personnel of the Montana Department of Fish and Game while working on the river. For each trip, the date and the section of river traveled was noted. Thus, one may document where people do and do not use the river. A note is made here that observations from automobiles cannot encompass all portions of the river due to limited accessibility but observations from the air are complete. The observations were made from March 1 to June 17, 1975 and from August 8 to December 5, 1975.

The summer sectional analysis of 1975 and 1976 is presented here. Questionnaire dispersement entailed only a subsample of the total observed number of recreationists. Tables 4 and 5 list the various recreational activities available within the study area and categorize the number and percentage of

people participating in each activity for 1975 and 1976. Rest and relaxation was the most popular activity, 26.3 percent, followed by fishing, 20.8 percent. The number of people per vehicle was found to be 2.31. The total number of people observed was 1287.

The 1976 data (table 5) reveal that fishing was the most frequently pursued activity, 34.9 percent, followed by rest and relaxation 21.2 percent. The number of persons per vehicle was 3.11, substantially higher than 2.30 for 1975. Certain areas close to or within towns along the Yellowstone River, such as East Rosebud Recreation Area at Forsyth, are within walking or bicycling distance for many recreationists. Since access was hindered by residual water more in 1975 than 1976, the difference can probably be explained.

Tables 6 and 7 depict the percentages of people observed engaged in various recreational activities within each section in 1975 and 1976, respectively. Thus, in section four, 23.1 percent in 1975 and 36.7 percent in 1976 of the people observed were engaged in swimming. Sectional differences became apparent; for example, for 1975 and 1976, swimming was much more popular in section four then other sections. Also included in tables 6 and 7 is the percentage of people observed within each section. Section four, including Billings, had the highest percentage (28.2) in 1975, and section five had the highest percentage (36.1) in 1976. A note may be made, however, that in 1976, 63.4 percent of the people surveyed in section five were from Billings.

In tables 8 and 9, the percentages of recreational activities with respect to sections were calculated. For example, of all the swimming observed during the study period in 1975, 97.7 percent occurred in section four. In 1976, only 56.8 percent occurred in section four, but 30.1 percent occurred in section five. In addition, the fact that section five has the largest number of developed sites probably accounts for the largest percentages of picnicking.

The next aspect entails recreational visitation frequencies within these defined Yellowstone River sections (total observed use charts in appendix). The spring 1975 data are presented here in tables 10 through 14 with reference to section.

Ling fishing has become an extremely popular late winter-early spring recreational activity at the East Rosebud Fishing Access site (section 3) on the Yellowstone River. From a selected sub-sample (Haddix 1975) 36 fishermen fished 98.25 hours from February 19 to March 19, 1975. There were 251 burbot taken, which resulted in a 2.56 average catch per angler hour. From March 1 to June 17, 1975, there were 82 fishermen

Table 4. Recreational activities of total observed use in 1975 and 1976.

Activity	Number of People	Percent of Total
Swimming	86	6.7
Picnicking	93	7.2
Rest and Relaxation	339	26.3
Boating-Floating	188	14.6
Horseback Riding	5	.4
Bicycling	13	1.0
Motor Biking	29	2.3
Driving for Pleasure	36	2.8
Playing Outdoor Games	56	4.4
Rock Hounding	32	2.5
Sightseeing	136	10.6
Walking for Pleasure	6	.5
Waterskiing	0	0
Bird Watching	0	0
Fishing	268	20.8

Total number of people observed	1287
Total number of vehicles observed	558
Total number people per number vehicles	2.31

Percentage of cars in each section: Section 1 - 10 percent

Section 2 - 14.7 percent

Section 3 - 16.7 percent

Section 4 - 28.1 percent

Section 5 - 30.5 percent

Table 5. Recreational activities of total observed use in 1976.

Activity	Number of People	Percent of Total
Swimming	146	11.4
Picnicking	115	9.0
Rest and Relaxation	272	21.2
Boating-Floating	136	10.6
Horseback Riding	2	.1
Bicycling	8	.6
Motor Biking	17	1.3
Driving for Pleasure	8	.6
Playing Outdoor Games	65	5.1
Rock Hounding	49	3.8
Sightseeing	12	.9
Walking for Pleasure	1	.1
Waterskiing	0	0
Bird Watching	2	.1
Fishing	447	34.9

Total number of people observed	1280
Total number of vehicles observed	411
Total number people per number vehicles	3.11

Percentage of cars in each section : Section 1 - 9.7 percent
Section 2 - 4.9 percent
Section 3 - 30.7 percent
Section 4 - 21.7 percent
Section 5 - 33.1 percent

Table 6. Percentages of activities within each section in 1975.

Activity	Section 1	Section 2	Section 3	Section 4	Section 5
Swimming	0	0	0	23.1	.6
Picnicking	0	0	8.5	1.1	21.9
Rest and Relaxation	17.1	55.7	17.3	16.8	23.8
Boating	17.1	33.2	12.4	8.0	8.0
Horseback Riding	0	0	.5	0	1.2
Bicycling	0	0	.5	2.2	1.2
Motor Biking	4.3	1.2	1.0	3.0	2.1
Driving for Pleasure	0	0	5.9	5.5	1.2
Playing Outdoor Games	4.3	0	5.4	1.4	10.3
Rock Hounding	11.4	3.2	0	0	2.4
Sightseeing	5.0	0	16.3	18.5	8.8
Walking for Pleasure	0	0	1.0	.3	.9
Waterskiing	0	0	0	0	0
Birdwatching	0	0	0	0	0
Fishing	40.8	6.7	31.2	20.1	17.6

Percentage of People in each Section:
Section 1 - 10.9 percent (140)
Section 2 - 19.7 percent (253)
Section 3 - 15.7 percent (202)
Section 4 - 28.2 percent (363)
Section 5 - 25.6 percent (329)

Total = 100 percent = 1287 People

Table 7. Percentages of activities within each section in 1976.

Activity	Section 1	Section 2	Section 3	Section 4	Section 5
Swimming	0	0	5.1	36.7	9.5
Picnicking	2.9	0	4.8	11.1	14.7
Rest and Relaxation	17.3	20.3	24.9	15.5	22.5
Boating	9.4	11.4	4.8	1.3	20.1
Horseback Riding	0	0	0	.9	0
Bicycling	0	0	0	3.5	0
Motor Biking	.1	0	.5	4.0	1.1
Driving for Pleasure	0	0	.5	.9	.9
Playing Outdoor Games	5.7	6.3	6.4	4.0	4.1
Rock Hounding	25.3	6.3	.5	.9	1.1
Sightseeing	0	0	.5	4.4	0
Walking for Pleasure	0	0	0	0	.2
Waterskiing	0	0	0	0	0
Birdwatching	0	0	.5	0	0
Fishing	38.8	55.7	51.3	16.8	25.8

Percentage of People in each Section:

Section 1 - 10.9 percent (139)

Section 2 - 6.2 percent (79)

Section 3 - 29.2 percent (374)

Section 4 - 17.7 percent (226)

Section 5 - 36.1 percent (462)

Total = 100 persons = 1280

Table 8. Percentage of recreational activity popularity with respect to sections 1975.

Activity	Section 1	Section 2	Section 3	Section 4	Section 5
Swimming	0	0	0	97.7	2.3
Picnicking	0	0	18.3	4.3	77.4
Rest and Relaxation	7.1	41.6	10.3	18.0	23.0
Boating and Floating	12.8	44.7	13.3	15.4	13.8
Horseback Riding	0	0	20.0	0	80.0
Bicycling	0	0	7.7	61.5	30.8
Motor Biking	20.7	10.3	6.9	37.9	24.1
Driving for Pleasure	0	0	33.3	55.6	11.1
Playing Outdoor Games	10.7	0	19.6	8.9	60.7
Rock Hounding	50.0	25.0	0	0	25.0
Sightseeing	5.1	0	24.3	49.3	21.3
Walking for Pleasure	0	0	33.3	16.7	50.0
Waterskiing	0	0	0	0	0
Bird Watching	0	0	0	0	0
Fishing	21.3	6.3	23.5	27.2	21.6

Table 9. Percentages of recreational activity popularity with respect to sections 1976.

Activity	Section 1	Section 2	Section 3	Section 4	Section 5
Swimming	0	0	13.0	56.8	30.1
Picnicking	3.5	0	15.7	21.7	59.1
Rest and Relaxation	8.8	5.9	34.2	12.9	38.2
Boating and Floating	9.6	6.6	13.2	2.2	68.4
Horseback Riding	0	0	0	100.0	0
Bicycling	0	0	0	100.0	0
Motor Biking	5.9	0	11.8	52.9	29.4
Driving for Pleasure	0	0	25.0	25.0	50.0
Playing Outdoor Games	12.3	7.7	36.9	13.8	29.2
Rock Hounding	71.4	10.2	4.1	4.1	10.2
Sightseeing	0	0	16.7	83.3	0
Walking for Pleasure	0	0	0	0	100.0
Waterskiing	0	0	0	0	0
Bird Watching	0	0	100	0	0
Fishing	12.1	9.8	43.0	8.5	26.6

Table 10. Observed recreational use by activity in section 1, March 1 - June 17, 1975.

	Terry Bridge		Fallon Bridge	Glendive		Intake	Total
Fishermen	11 (10) [1]	11 (11)	0 (10)	32 (11)	0 (11)	1023 (9)	1077
Rock Pickers	0 (10)	2 (11)	0 (10)	0 (11)	2 (11)	0 (9)	4
Sightseers	0 (10)	0 (11)	0 (10)	0 (11)	0 (11)	2 (9)	2
Fish and Boating	0 (10)	0 (11)	0 (10)	0 (11)	3 (11)	0 (9)	3
Canoeists	0 (10)	0 (11)	0 (10)	0 (11)	3 (11)	0 (9)	3
Rest and Relaxation	0 (10)	0 (11)	0 (10)	3 (11)	0 (11)	53 (9)	56

[1] First number is total number of recreationists observed in particular activity; number in parenthesis is total observations made on site.

Table 11. Observed recreational use by activity in Section 2, March 1 - June 17, 1975.

	Mouth of Powder	Total
Fishermen	2 (12) [1]	2
Rock Pickers	2 (12)	2
Sightseers	3 (12)	3
Fish and Boating	0 (12)	0
Canoeists	0 (12)	0
Rest and Relaxation	0 (12)	0

[1] First number is total number of recreationists observed in particular activity; second number is total observations made on site.

Table 12. Observed recreational use by activity in Section 3, March 1 - June 17, 1975.

	Myers			East Rosebud		Mouth of Tongue			Total
Fisherman	2 (13) [1]	23 (13)	6 (13)	82 (18)	12 (18)	12 (18)	64 (30)	9 (15)	198
Rock Pickers	0 (13)	9 (13)	1 (13)	0 (18)	9 (18)	9 (18)	2 (30)	0 (15)	3
Sightseers	0 (13)	0 (13)	0 (13)	0 (18)	0 (18)	0 (18)	0 (30)	0 (15)	0
Fish and boating	0 (13)	0 (13)	0 (13)	0 (18)	0 (18)	0 (18)	0 (30)	0 (15)	0
Canoeists	0 (13)	0 (13)	0 (13)	0 (18)	0 (18)	0 (18)	0 (30)	0 (15)	
Rest and Relaxation	4 (13)	13 (13)	3 (13)	0 (18)	0 (18)	0 (18)	0 (30)	2 (15)	38

[1] First number is total number of recreationists observed in particular activity number in parenthesis is total observations made on site.

Table 13. Observed recreational use by activity in section 4, March 1 - June 17, 1975.

	Billings	Huntley	Pompey's Pillar	Custer		Total
Fishermen	0 (7)[1/]	8 (6)	0 (6)	0 (7)	0 (7)	8
Rick Pickers	0 (7)	0 (6)	0 (6)	0 (7)	0 (7)	0
Sightseers	0 (7)	0 (6)	0 (6)	0 (7)	0 (7)	0
Fish and Boating	0 (7)	0 (6)	0 (6)	0 (7)	0 (7)	0
Canoeists	0 (7)	0 (6)	0 (6)	0 (7)	0 (7)	0
Rest and Relaxation	0 (7)	2 (6)	0 (6)	0 (7)	10 (7)	12

[1/] First number is total number of recreationists observed in particular activity, number in parenthesis is total observations made on site.

Table 14. Observed recreational use by activity in section 5.

	Big Timber	Bratten	Reed Point	Itch-Ke-Pe	Laurel	Total
Fishermen	0 (2)[1/]	0 (2)	2 (2)	3 (2)	2 (3)	7
Rock Pickers	0 (2)	0 (2)	0 (2)	0 (2)	0 (3)	0
Sightseers	0 (2)	0 (2)	0 (2)	0 (2)	0 (3)	0
Fish and Boating	0 (2)	0 (2)	0 (2)	0 (2)	0 (3)	0
Canoeists	0 (2)	0 (2)	0 (2)	0 (2)	0 (3)	0
Rest and Relaxation	0 (2)	0 (2)	0 (2)	4 (2)	0 (3)	4

[1/] First number is total number of recreationists observed in particular activity; number in parenthesis is total observations made on site.

Figure 9 Sectional aerial census delineations

Section: 1A. North Dakota line to Seven Sisters Game Management Area

1B. Seven Sisters Game Management Area to Glendive

1C. Glendive to the mouth of the Powder River

2 . The mouth of the Powder River to the mouth of the Tongue River

3A. The mouth of the Tongue River to Forsyth

3B. Forsyth to the mouth of the Bighorn River

4A. The mouth of the Bighorn to Billings

4B. Billings to the mouth of the Clarks Forks

5 . The mouth of the Clarks Fork to Big Timber

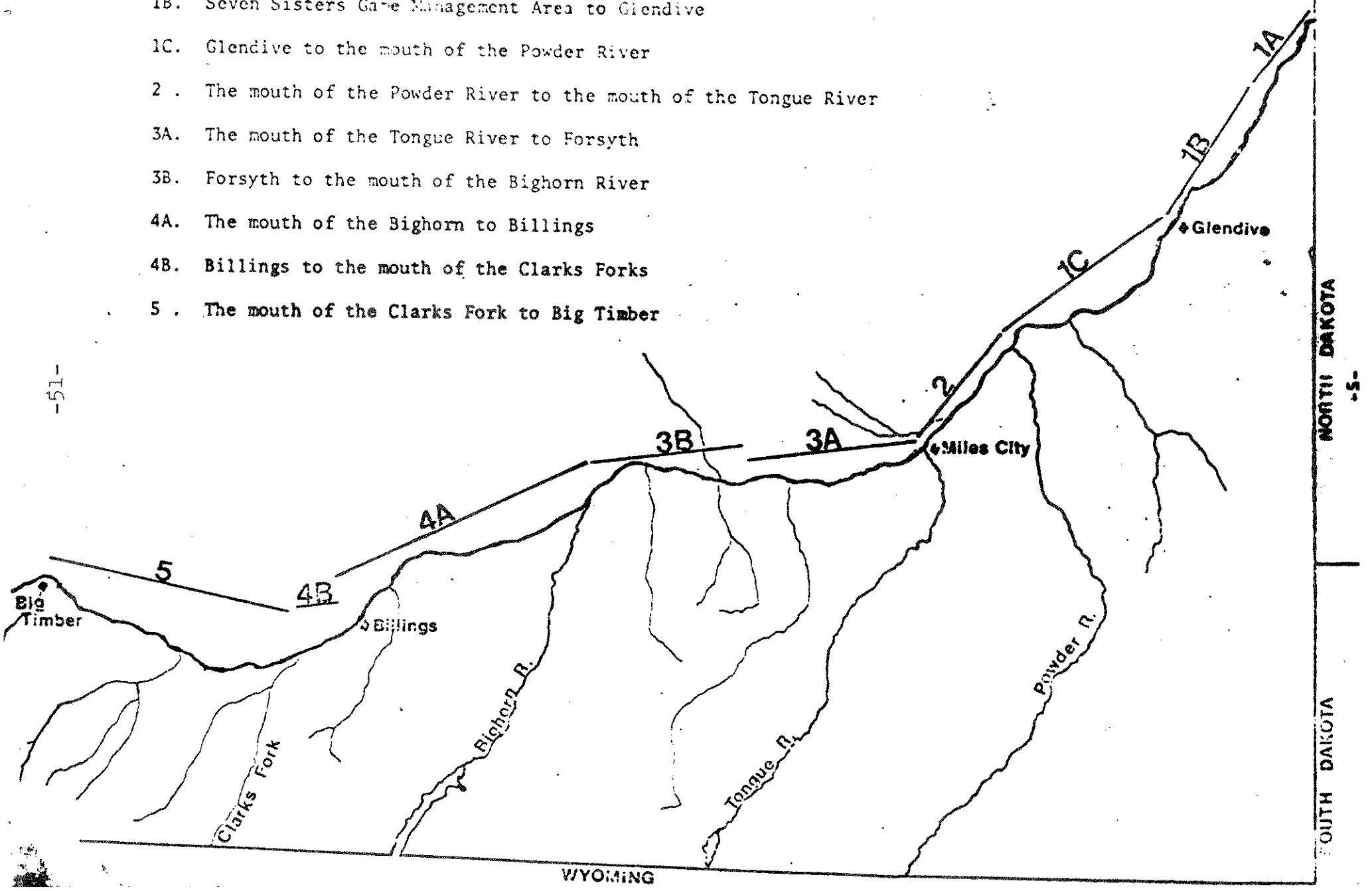


Table 15. Aerial observations of recreational activities, August 8 - December 5, 1975.

SECTION	NUMBER OF RECREATIONISTS: FISHING	BIG GAME HUNTING OR BIRD HUNTING	WATERFOWL HUNTING	REST AND RELAXATION (UNIDENTIFIABLE)	AGATE HUNTING	TOTAL	NUMBER OBSERVATIONS	NUMBER PEOPLE PER OBSERVATIONS	BOATS	NUMBER PERSONS PER BOAT 1/
1A	3	17	3	2	6	31	11	2.82	3	10.3
1B	17	40	3	0	35	95	10	9.50	10	9.5
1C	5	43	4	2	25	79	9	7.22	5	15.8
2	12	22	3	0	14	51	11	3.18	3	17.0
3A	28	40	8	14	19	109	14	7.79	12	9.9
3B	6	18	8	12	2	46	14	3.28	3	15.3
4A	30	20	14	8	13	85	15	5.66	6	14.2
4B	8	1	0	0	0	9	5	1.80	1	9.0
5	2	0	0	0	0	2	3	.66	0	0
Total	111	201	43	38	114	507	82		43	

1/ Ratios of total number of people observed to total number of boats observed. The greater the number, the smaller the relative amount of boating.

and 16 people resting and relaxing noted from 18 observations. Since most observations (13) were not made at night, when ling fishing success is at its best, these figures should be considered extremely low. The convenient access and high rate of fishing success greatly appeals to many people, mostly from Forsyth, Miles City and Colstrip.

In addition, from August 8 through December 5, 1975, 29 aerial flights were completed by various Region 7 Montana Department of Fish and Game personnel. The average length of these round-trip flights was 2.67 hours, and the average recreationist siting per flight was 17.3. The majority (27) of the flights were made on weekdays. The various distances and directions flown dictate a breakdown of each flight into small subsections; thus, each flight was counted as one observation of each of several sections of the river (figure 9). Recreational pursuits were broken down into five usually definable categories: fishing, big game or bird hunting, waterfowl hunting, rest and relaxation, and agate hunting (table 15). The number of boats was also recorded. Big game hunting and bird (mostly pheasant) hunting were combined due to the similar, indirect role of the Yellowstone River to these sports.

In 1975, hunting was the most frequently observed activity in all sections except 4A, 4B, and 5. The flight period included all of the 1975 big game and bird hunting season, which began October 19 and closed November 11. Agate hunting within these same sections was also very popular. Within sections 1, 2 and 3 the preponderance of low stream gradient and large flood plain creates an ideal white-tailed deer and pheasant habitat. In addition, the presence of many large islands increases the chance of success of hunters and rock hounds. Boats are used extensively in these activities, but boat launching opportunities are inadequate in section 2, probably explaining the data obtained there.

Waterfowl hunting data were limited to the flood plain; thus recreationists hunting in fields and along small tributaries were not observed. Waterfowl hunting success, however, is not determined only by the condition of the Yellowstone River itself, but also by other factors, such as the yearly climatic conditions of the region. Migratory waterfowl are more abundant during certain portions of the season than others.

Although no use studies were undertaken during the winter of 1975-1976, observations, communications, and common sense play a major role in evaluation. River ice drastically reduces recreational use, and, when coupled with inclement weather, the majority of determined outdoor recreationists

prefer to engage in various other forms of recreation such as snowmobiling, predator hunting and trapping, and farm pond ice fishing.

River ice began to accumulate in mid-December of 1975. The Yellowstone River within the study area usually is not completely ice-covered, but shoreline ice is dangerous and inhibits access to the river by recreationists.

Complete ice breakup usually occurs first on the upper most reaches of the study area, with large ice jams often occurring within the Glendive-Sidney segment of the Yellowstone. As the river clears, water-based recreation follows. Fishing pressure and angler success increases with the spawning runs of various species, which, depending upon weather condition can occur from late winter to mid-spring.

Car Counter Data

The 1976 study utilized car counters at six recreational areas within three of the five study sections. Sites surveyed were Intake Fishing Access (section 1), East Rosebud Recreation Area and Waco Diversion (section 3), and Indian Fort, Bratten and Itch-Kep-Pe Fishing Access sites (section 5). All sites are developed and owned by the Montana Department of Fish and Game, with the exception of Waco Diversion, which is privately owned.

Car counter data revealed certain sites were visited much more heavily than others. The mechanical error of the counters was calculated and corrected in table 16.

The total was derived by multiplying the total number of cars times people per car, the number obtained from the 1976 observed use data. The average daily use was obtained by dividing the total use by the number of days of sampling.

Error was introduced by interpolation due to periods of vandalism and mechanical failure. East Rosebud Recreation Area had the largest visitation, but, from personal observation and communication (Bivins 1976), young adults drive through the area frequently.

Intake Fishing Access ranked second in overall average daily use, but 72.5 percent of the use occurred from May 5, 1976 to May 31, 1976. This tremendous pressure is due to the paddlefishery found at Intake during May and early June. Daily use in May at Intake averaged 870 recreationist visits per day. This figure is bolstered by the 3-day Memorial Day weekend, the proximity of Glendive for supplies, a large number of trailers, and a substantial number of

Table 16. Site, date and car counter use tabulations, 1976.

Site	Date	Total Cars	Total Use K= 3.11	Number of Days	Avg. Daily Use (Total Use / Number Days)
Intake F.A.	5/ 5/76 to 9/6/76	10,069	31,314	124	25.3
East Rosebud R.A.	6/25/76 to 9/5/76	8,929	27,769	72	38.6
Waco Diversion	5/14/76 to 9/9/76	502	1,561	116	14.0
Indian Fort F.A.	7/ 8/76 to 9/8/76	1,383	4,301	62	69.0
Bratten F.A.	7/ 8/76 to 9/8/76	1,301	4,046	62	65.0
Itch-Ke-Pe F.A.	7/16/76 to 9/8/76	1,362	4,235	54	78.0

Table 17. Fisherman use at Intake during spring, 1975.

May	Number Fishermen	Total Hours Fished	Number Fish Caught
1st week*	59	143.20	0
2nd week	75	256.25	25
3rd week	42	162.00	29
4th week	62	287.00	26
June			
1st week	62	363.25	54
2nd week	81	315.50	112

* 1st week: May 1, 2, 3, 4; 2nd week: May 8, 9, 10, 11, 13, 14; 3rd week: May 15, 16, 17; 4th week: May 22, 23, 25, 29. June: 1st week: 1, 2, 3; 2nd week: June 11, 12.

sightseers (figure 10).

More extensive data have been compiled at the Intake Fishing Access within section 1, to emphasize the high recreational use there. Maximum numbers occurred on May 26 and May 28 of 1973 and 1974, respectively. Both dates fell on the Memorial Day weekends. The high concentrations of fishermen on the two Memorial Day weekends and the low daily fishing success known to have occurred on this holiday in 1974 (.0198 fish per hour), suggest angler concentrations are the result of custom and available time, not high fishing success. The estimated number of fisherman trips was 2,386 in 1975 and 3,363 for 1973 and 1974, respectively (May 1 to July 1) (Rehwinkel 1975). From May 1 to June 3 a counter rod registered 3,384 units depicting another use increase. In addition, table 17 depicts a sub-sampling technique (Elser 1975, unpublished data) used to determine representative total hours fished, number of fish caught, and residency. Glendive residents comprised the largest percentage of the population.

Table 16 depicts that recreational use at Itch-Kep-Pe, Indian Fort and Bratten ranked third, fourth, and fifth, respectively. With the exception of Yellowstone boat float in mid-July, visitation generally increased during the latter part of summer at these areas. Waco Diversion received the least use, probably due to the undeveloped and unpublicized nature of the site. In addition, a completed section of Interstate Highway now bypasses the Waco road turnoff.

Boat Registration and Use

Montana had seven counties with more than 1000 registered boats from May 1, 1975 to May 1, 1976: Missoula - 4,549; Flathead - 3,866; Cascade - 2,688; Yellowstone - 2,584; Lake - 1,744; Lewis and Clark - 1,597; and Lincoln - 1,093. Any vessel that is propelled by a motor at any time must be registered. Within the Old West Regional Commission Yellowstone study area, Yellowstone County had the by-far largest number of registered boats with 2,584.

Counties sampled and the number of registered boats are listed in table 18.

As shown in table 19, at least 15 percent of registered boaters within each of 15 counties were randomly selected for participation in a mail survey (questionnaire in appendix). Of 688 questionnaires mailed, 510 were returned or 74.1

percent. The highest percentage of response was from Rosebud County (93.1%) and the lowest was Prairie County (50%).

The number of responses column in table 19 differs from the percentage of questionnaires received because of incomplete answers to segments of the questionnaire, especially the one pertaining to annual boating days. This procedure reduced error. The average number of boat days per year was obtained by dividing the total boat days (average boat days x total number registered boats) per year by the number of responses for each county. The total man days of boating per year was then calculated by multiplying the total boat days per year by 2.23, the average figure of persons per boat observed during the 1976 Yellowstone Boat Float.

Yellowstone County had the largest number of total man days of boating annually, followed distantly by Dawson, Richland and Bighorn Counties. An interesting note is the two smallest figures, Wibaux (161 man days) and Carter (493 man days) Counties, represent 80 percent and 66.7 percent response respectively, from the total population who own registered boats.

Table 20 incorporates favorite activities and visitation sites of the sampled population of the respective counties. Within the activities segment, the "other" category included sunbathing, camping, rest and relaxation, picnicking, sightseeing, scuba diving, rescue work, trapping and scuba diving.

Within each county, fishing was the favorite activity, followed usually by water skiing. Agate hunting interest was highest within Custer, Dawson, and Richland Counties and hunting response was highest in Bighorn (11.7%), Stillwater (9.1%), Dawson (7.8%), Custer (7.4%), and Richland (7.4%) Counties.

Visitational preferences varied widely within counties but proximate bodies of water, especially reservoirs, seemed the largest factor of influencing recreational use. Substantial use of western lakes and reservoirs indicate willingness to travel. Substantiation of the initial cost of boating can also be considered (Moser 1958).

An important note is that non-motorized boating is not incorporated within this study. Rubber and wooden rafts and canoes are used extensively for all activities, especially sightseeing, fishing, and hunting. The most popular group float trip within the study area is the mid-July Yellowstone boat float from Livingston to Billings, during which pleasure boating is the primary activity. Another popular fishing float trip occurs from the afterbay of Yellowtail Dam 14 miles downstream to the Bighorn Fishing Access site. Recent Yellowtail Reservoir and Bighorn River data are listed in table 21.

Table 18. Number of registered boats in sampled counties.

County	Number of Registered Boats	County	Number of Registered Boats
Bighorn	265	Rosebud	188
Carbon	177	Stillwater	110
Carter	9	Sweetgrass	54
Custer	222	Treasure	23
Dawson	314	Wibaux	5
Fallon	67	Yellowstone	2,584
Powder River	28		
Prairie	27		
Richland	214		
Total			4,317

Table 19. Southcentral and southeastern Montana Boating mail survey, 1975.

County	Total Number Registered Boats	Number Questionnaires Mailed	Percent of Total	Number Questionnaires Received	Percent Response	Percent Response of Total Population	Sampled Total Boat Days Per Year	Number Responses	Average Boat Days Per Year	Total Boat Days Per Year
Big Horn	265	40	15.1	33	82.5	12.5	541	29	18.6	4929
Carbon	177	27	15.3	21	77.8	11.9	432	20	21.6	3823
Carter	9	9	100.0	6	66.7	66.7	148	6	24.6	221
Custer	222	36	16.2	28	77.8	12.6	484	26	18.6	4129
Dawson	314	48	15.3	37	77.1	11.8	852	37	23.0	7222
Fallon	67	11	16.4	6	54.5	8.9	56	5	11.2	750
Powder River	28	8	28.6	6	75.0	21.4	67	5	13.4	375
Prairie	37	6	16.2	3	50.0	8.1	41	3	13.7	507
Richland	214	33	15.4	25	75.8	11.7	746	24	31.1	6655
Rosebud	188	29	15.4	27	93.1	14.4	547	24	2.28	4286
Stillwater	110	18	16.3	11	61.1	10.0	246	12	20.5	2255
Sweetgrass	54	10	18.5	7	70.0	13.0	199	9	22.1	1193
Treasure	23	7	30.4	5	71.4	21.7	92	5	18.4	423
Wibaux	5	5	100.0	4	80.0	80.0	58	4	14.5	72
Yellowstone	2584	401	15.5	292	72.8	11.3	5912	282	21.0	54,264
Totals	4317	688	15.9	510	74.1	11.8	10,421	491	21.22	93,920

Table 20. Activities and visitation sites.

	Favorite Activities (Percent)					Fort Peck	Yellowtail Res.	Tongue River Res.	Yellowstone River - Sec. 1 N. Dak. Line - Mouth Powder R.	Yellowstone River - Sec. 2 Mouth Powder - Mouth Tongue	Yellowstone River - Sec. 3 Mouth Tongue - Mouth Bighorn	Yellowstone River - Sec. 4 Mouth Bighorn-Mouth Clarks Fork	Yellowstone River - Sec. 5 Mouth Clark's Fork - Big Timber	Big Horn River	Tongue River	Powder River	Missouri River	Clark's Fork River	Stillwater River
	Fish.	Water Skiing	Hunt.	Agate Hunt.	Other														
Big Horn	61.8	17.6	11.7	-	8.8	-	47.1	5.7	-	1.9	-	-	-	33.9	5.7	-	-	-	-
Carbon	67.0	14.7	7.3	-	11.1	2.4	26.2	2.4	2.4	-	-	-	-	7.1	-	-	2.4	-	-
Carter	67.0	33.0	-	-	-	16.7	16.7	-	-	-	-	-	-	-	-	-	-	-	-
Custer	55.6	25.9	7.4	7.4	3.7	37.0	13.0	4.3	-	-	13.0	4.3	4.3	-	2.2	-	-	-	-
Dawson	60.5	21.0	7.8	5.2	7.8	44.1	1.7	1.7	-	-	-	1.7	25.4	1.7	-	-	1.7	-	-
Fallon	80.0	20.0	-	-	-	42.8	14.3	-	-	-	-	-	-	-	-	-	-	-	-
Powder R.	80.0	20.0	-	-	-	10.0	-	20.0	-	-	-	-	-	10.0	10.0	-	-	-	-
Prairie	50.0	25.0	-	-	25.0	22.2	-	-	-	-	-	33.3	11.1	-	-	-	11.1	-	-
Richland	48.2	18.5	7.4	22.2	3.7	31.2	2.1	-	-	-	-	4.2	25.0	4.2	-	-	12.5	-	-
Rosebud	60.0	26.7	6.7	3.3	3.3	11.9	26.2	21.4		2.4	14.3	-	-	7.1	2.4	-	-	-	-
Stillwater	54.5	-	9.1	-	36.4	3.7	22.2	-	-	-	-	3.7	25.9	11.1	3.7	3.7	11.1	-	-
Sweetgrass	69.2	30.8	-	-	-	12.5	12.5	18.8		-	-	-	-	-	-	-	12.5	-	-
Treasure	67.0	-	-	-	33.0	-	25.0	-	-	-	37.5	12.5	12.5	-	-	-	-	-	-
Wibaux	60.0	-	-	-	40.0	25.0	25.0	-	25.0	-	-	-	-	-	-	-	-	-	-
Yellowstone	60.0	23.0	-	3.0	9.0	3.1	26.5	3.5	3.9	2.2	1.0	.3	-	11.1	.5	0	2.9	.5	.2

Table 20 continued.

Cooney Res.	Spotted Eagle	Upper Yellowstone River	Deadmans and/or Martinsdale	Farm Ponds - *Small Res.	West Mt. Lakes or Rivers	Idaho	North Dakota	Wyoming	Canada
-	-	-	-	3.8	1.9	-	-	-	-
35.7	-	-	7.1	2.4	11.9	-	-	-	-
-	-	-	5.6	16.7	22.2	-	16.7	-	5.6
2.2	10.9	-	-	6.5	4.3	-	-	-	-
-	-	-	-	15.2	-	-	6.8	-	1.7
-	-	-	-	28.6	14.3	-	-	-	-
-	-	-	-	30.0	10.0	-	-	10.0	-
-	-	-	-	11.1	11.1	-	-	-	-
-	-	-	-	10.4	2.1	-	6.3	2.1	-
-	-	-	-	-	14.3	-	-	-	-
3.7	-	-	7.4	-	7.4	-	-	-	-
-	-	6.2	18.8	18.8	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	25.0	-	-
13.3	-	1.4	13.0	2.9	12.7	.2	.2	.3	.3

Due to questionnaire response, man days of boating at each site cannot be predicted accurately. The specific number of days spent at various sites was not included, but the ratio of percentages obtained are accurate, especially in counties with the largest sample sizes.

Boat Floats

A major water based recreational event along the Yellowstone is the annual three day, 126 mile, Yellowstone River boat float, which usually takes place the second weekend of July. The float begins in Livingston and terminates at Billings. Although 97 boats were registered at Livingston in 1975, a count at Columbus on July 12 revealed 60 boats carrying 239 people, seven canoes carrying 14 people and 3 kayaks carrying 5 people. An aerial count on July 13, from Columbus to Billings revealed 37 boats carrying 115 people, 7 canoes carrying 14 people and 3 kayaks carrying 5 people. An estimated 1,000 people took part in the float, either as participants or sightseers. The random nature of the visitation schedule dictated that only section 5 (July 12) be used for total observed use, 400 people.

An aerial census was taken of the 1976 Yellowstone River boat float, which occurred July 8, 9, and 10. From Reedpoint to Columbus, there were 275 boats engaged in river travel, the majority (223) of which were non-motorized rubber rafts. Eight kayaks, 21 canoes and 23 motorized rafts on boats were also observed. Six hundred and twelve people took part in the float as well as an estimated 600 sightseers. Two-hundred and fifty automobiles and trucks were noted and 40 campers, trailers or mobile homes were present. The number of people per vessel was 2.23 and the number of people per car was 4.85, a relatively high figure probably due to the fact that several groups often floated downstream to one car or truck for a ride upstream.

The 1976 boat float data were not incorporated in total observed use river discharge data because of the special nature of the event and for regressional comparison of 1975 to 1976 discharge-recreational use graphs. Annual events, sponsored by certain civic groups, can be cancelled at any time.

Another boat float takes place annually at Terry on July 4. In 1975, 13 crafts carrying 61 people, made the trip from the mouth of the Powder River to Terry, 11.9 river miles. Total observed use was 225 people. The Yellowstone and Terry boat float figures are actual counts and should be considered as minimum use figures. The Terry boat float is an example of a specific annual event held regardless of the Yellowstone River discharge.

In 1976, 12 rafts and five boats were observed on the Terry boat float. Forty-one people engaged in the float,

Table 21. Yellowtail and Bighorn River fishing and boating use.

	1970	1971	1972 1/	1973	1974 2/	1975 3/
Fishermen						
Afterbay	636	1836		4,212	6,239	6,874
River	2383	4786		12,513	5.058	10,495
Lake	2892	2117		10,356	12,339	29,489
Boats						
Afterbay	526	538		614	1,126	973
River	904	809		1,951	364	1,765
Lake	2912	3601		6,298	7,399	7,297

1/ Figures not available

2/ River closed

3/ Started counting boater fishermen plus boaters in June 1975

3/ River reopened

Table 22. Numbers of duck and goose hunters, days, and average hunters per day.

Year	Number of Duck Hunters	Number of Duck Days	NDH / NDD	Number of Goose Hunters	Number of Goose Days	NGH / NGD
1971	3180	90	35.3	1439	90	16.0
1972	3758	90	41.8	2182	90	24.2
1973	3596	76	47.3	2107	93	22.7
1974	2965	64	46.3	1953	93	21.0

averaging three to a vessel, and 300 spectators were present.

Recent Waterfowl Hunting

Irregular waterfowl hunting pressure is seen from the 1971 through 1974 Montana Department of Fish and Game waterfowl hunting questionnaire data (table 22). Subsamples of hunting pressure were obtained within each of 15 counties in the study area, and the numbers of duck and goose hunters per day were calculated. The number of possible duck and goose hunting days was also listed and divided into the number of duck and goose hunters, respectively, to obtain an average use factor. Counties surveyed were Bighorn, Carbon, Carter, Custer, Dawson, Fallon, Powder River, Prairie, Richland, Rosebud, Stillwater, Sweetgrass, Treasure, Yellowstone and Wibaux.

The number of duck hunters per day was greatest for ducks in 1973 and for geese in 1972. The combined mean flows (cfs) for the Yellowstone River at Sidney, Montana were largest in 1972 and 1973, but a relationship is difficult to surmise because migrant waterfowl numbers, which influence hunting pressure somewhat, are dependent upon climatic condition farther north in Canada.

Other notable factors which affect waterfowl hunting pressure are lengths of seasons, coincidence with other hunting seasons, federal regulations governing bag limits and shooting hours, the amount of leisure time within season (the 1974 season had 26 weekend or holiday days, while the 1972 season had only 20), weather conditions and state regulations. All of these factors may vary annually.

Tributary Recreational Use

The major tributaries of the Yellowstone River within the study area (figure 1) are the Powder, Tongue, and Bighorn Rivers. These tributaries offer varied recreational opportunities that, with the exception of the upper Bighorn River during spring and early summer, are not utilized.

The Powder River, free flowing in Montana, entertains a minimum of recreational use. A boat float occurred on July 4, 1976 from near Broadus to the Powderville Bridge in which there were 12 vessels used and 43 participants. Set line fishing was noted, but employees engaged in the Powder River Aquatic Ecology Project for Utah International, Incorporated, observed only two sunbathers during the summer of 1976 (Rehwinkel et. al 1976, personal communication). Field work was accomplished daily throughout late spring, summer, and in early fall. However, sauger (*Stizostedion canadense*), shovelnose sturgeon (*Scaphirhynchus platorynclus*) and channel catfish (*Ictalurus punctatus*) populations

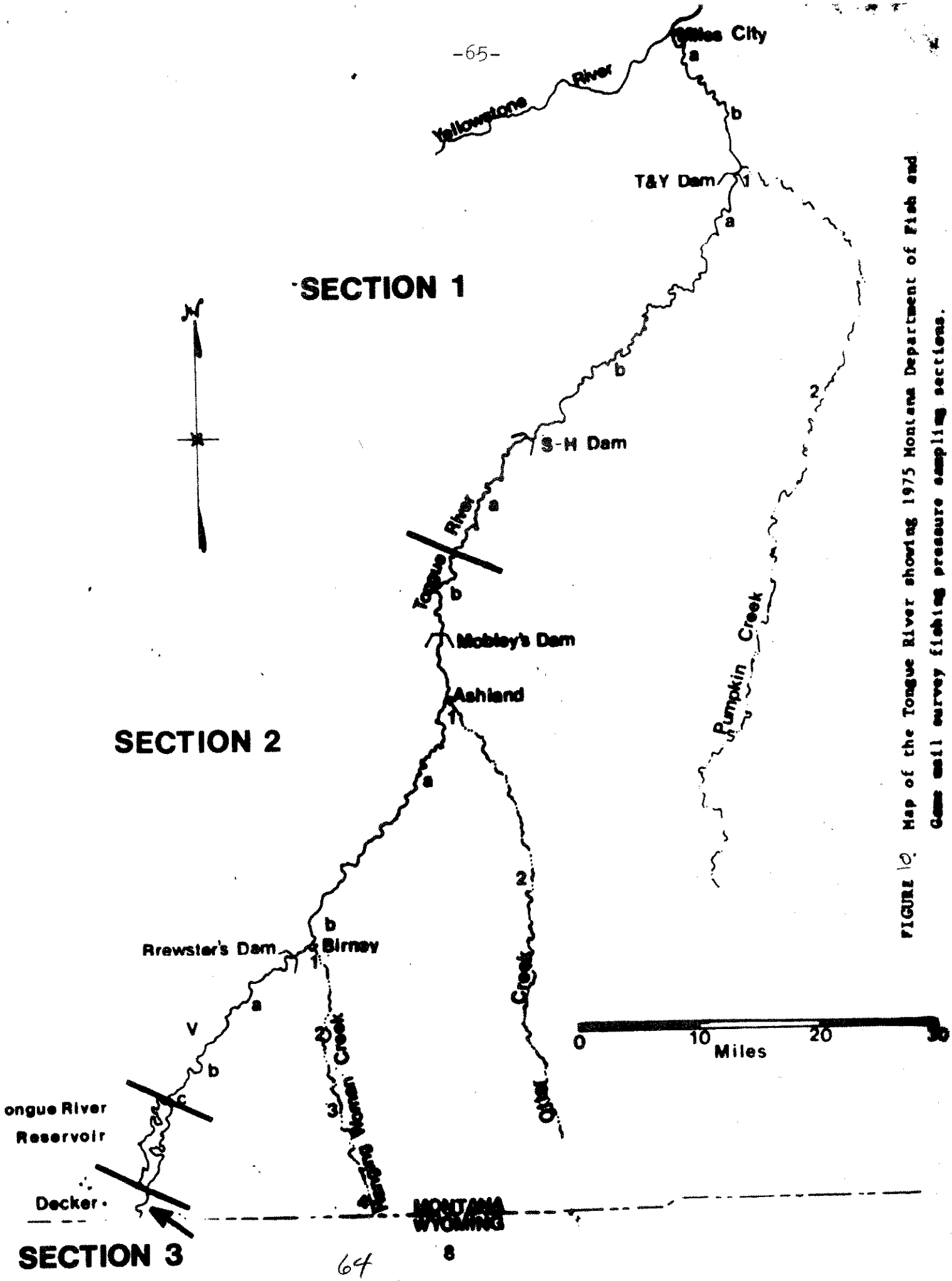


FIGURE 10. Map of the Tongue River showing 1975 Montana Department of Fish and Game mail survey fishing pressure sampling sections.

were found during the most recently documented capture period, April 5 to July 7, 1976 (Rehwinkel, et al. 1976), indicating an under utilized recreational potential related to fish migration.

The Tongue River (figure 10) receives considerably more recreational use then the Powder River. A 1975 Montana Department of Fish and Game mail survey is summarized in table 23.

Section one stretches from the mouth of the Tongue River to just below the bridge at Brandenburg, section 2 from that bridge to the Tongue River Dam, section 3 from the southern tip of the reservoir to the Montana-Wyoming border, and the Tongue River Reservoir is considered separately.

Non-resident use exceeds resident use on the Tongue River Reservoir probably due to greater populations in Wyoming within one day driving distances than in Montana. Approximately 17,000 total annual man days of waterbased recreation for the Tongue River and Reservoir.

The Bighorn River (figure 11) is a unique stream, providing the majority of trout fishing within the study area. Recently the Crow Indian tribe limited recreational use on the River by confining recreationists to the high water mark of the River as it flows through the Reservation. In 1971 and 1972 hunting access was allowed from the river if a Crow hunting permit was in possession. In 1973 and 1974, however, the Crows virtually closed the River to hunting and only a few hardy souls took a chance. In 1975 the situation improved tremendously.

During a study (Stevenson 1975) conducted in 1972 and 1973, the catch of brown, rainbow, and cutthroat trout ranged from 0.00 to 0.07, 0.26 to 0.67, and 0.00 to 0.05 fish per hour, respectively. The estimated total number of fisherman days were 37.4 per surface acre in the Afterbay below the dam (section A) and 3,720 and 630 per stream mile in section B and C below the Afterbay, respectively. The estimated total yield was 37,321 trout caught during 18,648 fisherman days for an average of 2.00 fish per fisherman day. The percent of rainbow trout in the yield decreased with downstream progression while the percent of brown and cutthroat trout increased. Although weekend holidays accounted for only 31.9 percent of the total days in the census period, they made up 58.1 percent of the fisherman days. Fisherman from Billings accounted for 80.6 percent of the residents. In section A and B bank fishing made up the greatest part of the fishing pressure with boat fishing providing the greatest proportion in section C due to limited access.

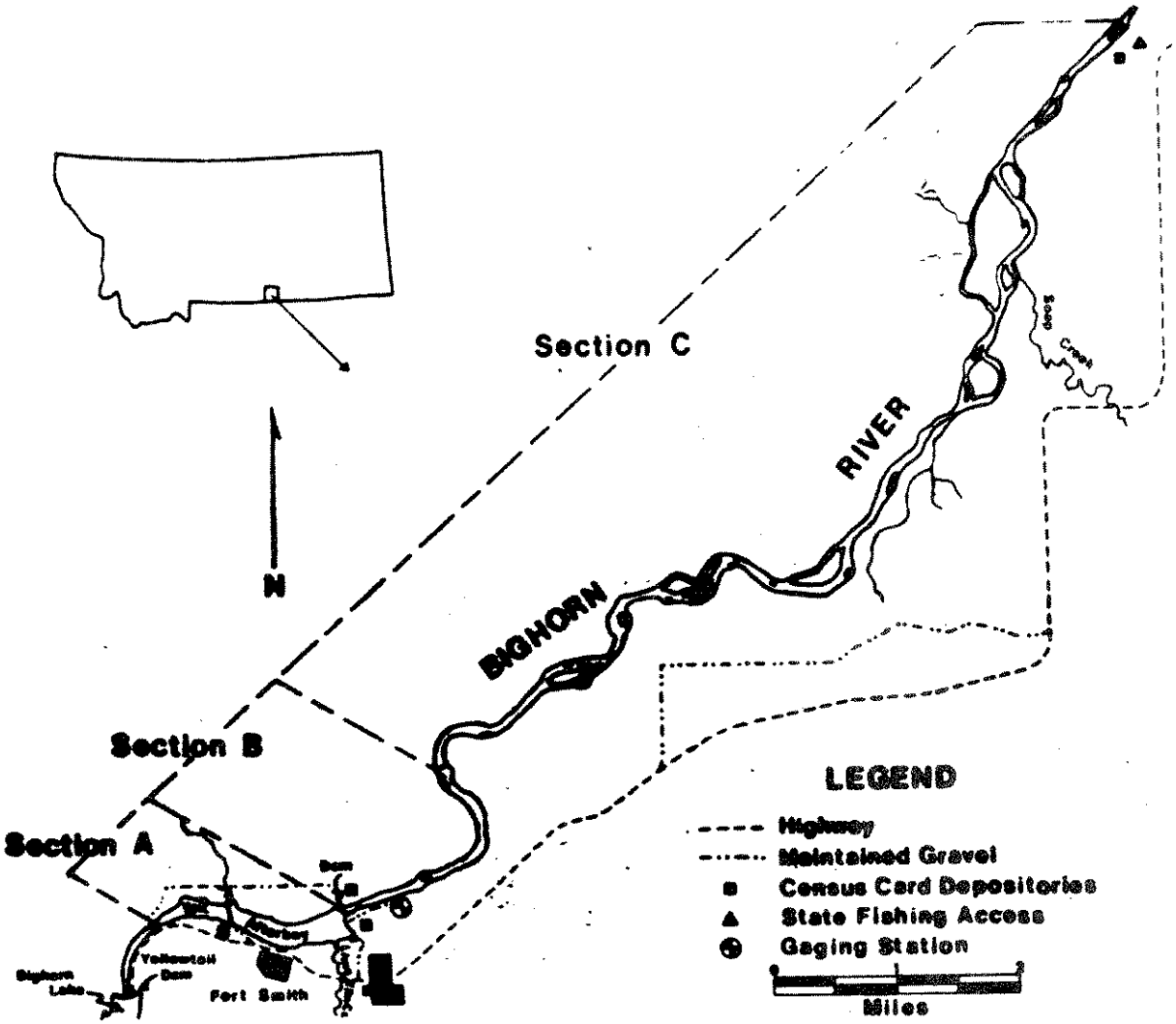


Figure 11. Map of study area showing location of study Sections A, B, and C. (Stevenson, 1975)

Potential Alternative and Additional Recreation Sites

Investigations of alternative potential sites have been based on need and feasibility. Summer survey results indicate that most people surveyed (82.6% in 1975 and 86.5% in 1976) would like to see another site within at least 30 miles of the one currently enjoyed. The nature of alternative sites may not allow all recreational interests to be pursued at each, but important access would be provided. Along the Yellowstone River, four areas have been investigated: 1) an area north of Rosebud, T6N, R42E, S16; 2) a state section near the mouth of Sunday Creek, T9N, R48E, S36; 3) a section near the mouth of the Powder River, T11N, R50E, S4; and 4) a large area of 14,000 acres near Intake, including part of all of sections 1, 2, 10, 11, 12, 13, 14, 20, 21, 22, 23, 24, 25, 26, 27, 28, and 33 in T18N, R57 and sections 7, 17, 18, 19, and 30 in T18N, R58E. In addition, other possible Yellowstone River access sites are the Howrey ranch adjacent to the Montana Fish and Game Isaac Homestead Game Management area near Hysham, the Elmer Winningham ranch 10 miles east of Miles City (figure 12), a small 4-5 acre tract just north of Terry off U.S. Highway 253, and a partially developed, privately owned, 2.6 acre tract within the city of Miles City (figure 12).

Currently, the Montana Department of Fish and Game has a 20 to 30 mile site planning scheme, but achievement of this goal is difficult. Legal problems, inflationary land prices and landowner willingness to sell are current road blocks.

Two major high priority zones exist on the Yellowstone River. The River segment from Isaac Homestead Game Management Area near Hysham to the Itch-Kep-Pe Fishing Access site at Columbus entails 126 river miles but no departmental developed recreational area has been acquired. There are several new developed or partially developed sites within this segment, containing the largest city in Montana, Billings, but more developed recreational sites are needed.

The other high priority area is the stretch of river from East Rosebud Recreation Area at Forsyth to the newly acquired (1976) boat ramp near Fallon, Montana. This 110.5 river mile stretch provides local and private access to the Yellowstone River in several places, but no developed sites exist that assuredly would be open to the public.

The previously mentioned privately owned, 2.6 acre area within the city of Miles City receives highest priority ranking due to the convenience, existing access, and future low cost of development due to the electricity, water, gravel fill, and boat ramp present. The location of the area would divide the 110.5 river mile stretch approximately in half (figure 13).

Figure 12. Winningham Ranch shoreline, providing valuable access near Miles City and a natural boat ramp.

Figure 13. Easterly view of proposed 2.6 acre Yellowstone River Fishing Access site within the city limits of Miles City.

Table 23. Tongue River recreational use data, 1975 from Montana Fish and Game mail survey.

	May 1 - September 30			October 1 - April 30		
	Resident	Non-resident	Total	Resident	Non-resident	Total
Section 1	4074	192	4266	926	244	1170
Section 2	894	98	992	0	0	0
Section 3	2644	2074	4718	0	0	0
Tongue River Reservoir	1955	3430	5385	313	351	664
Total	9567	5794	15,361	1239	595	1834

Table 24. Irrigation projections for the year 2000 (in acres).

	Present Irrigation	New Irrigation Potential		
		Low	Medium	High
Billings Area	84,449	6,471	12,941	19,412
Mid Yellowstone	52,387	8,410	16,819	25,229
Lower Yellowstone	74,723	12,557	25,113	37,670
Total	211,559	27,438	54,873	82,311

FLOW IMPACTS

CRITERIA

Scenarios

Three development scenarios are considered: high, medium, and low. Various combinations of water for energy, irrigation, reservoirs, and Montana Department of Fish and Game reservation of flows are incorporated.

The five sectional boundaries used in the 1975 and 1976 summer recreational surveys are identical to the sub-major drainage basin boundaries on the Yellowstone River provided by the Montana Department of Natural Resources and Conservation (figure 1). The three scenario locations are Billings, Miles City and Sidney. It is assumed that very little changes in water demand due to energy will occur west of Billings, an area which incorporates part of section 4 and all of section 5 of the recreational study.

The scenario and impacts presented here entail future irrigation demands only. Energy demands, reservoirs and reservation of flows are not included. Table 24 displays the irrigation projections for the Yellowstone Basin developed by the Montana Department of Natural Resources and Conservation in July 1976. All projections are straight-line equations from 1975 (no additional irrigation) to the year 2000. The high scenario is based on the financial feasibility of irrigation at January 1976 prices. Long term (30 year) historical cropping patterns were used to compute the payment capacity. Irrigation costs were calculated at 10 percent interest over a 10 year loan period. The low and medium scenarios were set at 1/2 and 2/3 of the high scenario and all figures were incorporated within the scenarios.

The 30 year water flows data from 1944 through 1973 were accumulated. The mean monthly flow and the flows that were exceeded 50 and 90 percent of the time were then calculated. For the purpose of most water-based recreation, the 50 percent flows were used for impact assessment. One exception is boating, in which the 90 percent values were necessary for navigability considerations.

The 1975 and 1976 summer observed use data were used for evaluation of flow impacts. Table 6 and 7 list the 1975 and 1976 data.

Table 25 shows the maximum possible projected water demand for the year 2000. The 50 percent and 90 percent flow demand were obtained by subtracting the sub-major drainage

Table 25. Monthly projected irrigational water use (cfs) to the year 2000 at three locations for three developmental levels. All zeros (0) indicate a demand of less than 50 cfs.

	Billings		Mid-Yellow		Low-Yellow		Billings		Mid-Yellow		Low-Yellow	
	Nat Fl	90%	Nat. Fl	90%	Nat Fl	90%	Nat Fl	50%	Nat Fl	90%	Nat Fl	50%
October												
High	2998	253	5726	323	5694	522	4369	253	8151	421	8228	656
Med.		252		231		429		252		326		558
Low		251		236		513		251		331		642
November												
High	3160	0	5413	200	5722	0	3691	0	6960	69	7419	283
Med.		0		257		0		0		0		240
Low		0		245		0		0				59
December												
High	2240		3717		4088		2999	0	5858	190	6052	233
Med.								0		129		194
Low								0		138		89
January												
High	1690		3348		3363		2571	0	5068	0	5501	321
Med.								0		71		262
Low								0		66		108
February												
High	2029		3873		4309		2683	0	5066	272	5716	235
Med.								0		336		178
Low								0		329		94
March												
High	2419		5019		5774		3539	0	7931	253	10,679	708
Med.								0		147		492
Low								0		143		277
April												
High	2880		5617		5803		4132	78	8025	2215		600
Med.								72		1632		294
Low								66		1481		77
May												
High	6694	1195	8792	2091	9570	2831	12,693	1195	18,138	2652	19,154	2827
Med.		1079		1510		2238		1079		1916		2207
Low		968		1359		1430		968		1716		1647
June												
High	19,110	1506	21,526	2650	20,461	2573	27,190	1506	37,556	4382	39,013	3176
Med.		1357		1914		1807		1357		3043		2339
Low		1208		1715		1540		1209		2648		1685
July												
High	8088	2288	9202	3534	8950	3750	15,230	2289	20,853	3870	20,913	4540
Med.		2000		3675		2778		2000		2805		3128
Low		1712		2279		2267		1712		2505		2599
August												
High	3553	1980	4622	3333	3996	2692	5420	1980	7698	2101	7502	3056
Med.		1759		2467		1994		1759		1523		1908
Low		1538		2168		1610		1538		1396		1493
September												
High	2893	1261	4251	1738	3670	1799	4163	1261	7196		7257	2562
Med.		1165		784		841		1165				1963
Low		1070		657		681		1070				1804

basin 50 percent and 90 percent outflows from the 50 percent and 90 percent natural flows, respectively. Only irrigational demands are considered in table 24 for the high, intermediate, and low scenarios at the three locations. These demands will affect impact modification numbers.

Table 25 indicates that the greatest overall and proportionate demand for irrigational water occurs during May, June, July, August, and September, especially July, August, and September.

Sectional impact matrices are presented as an average of 1975 and 1976 observed use preferences (table 26). Sectional rating preferences are based upon total number of people observed and activities engaged in as explained in the methods section. Two types of water years are incorporated. In 1975 runoff was floodstage on the Yellowstone, the peak at Miles City of 69,800 cfs coming on July 9. In 1976 the runoff was much lower and steadier. The peak at Miles City was 45,300 cfs on June 13.

Evaluation Criteria

Certain criteria are used for the impact modification numbers (IMN) for each section. Non-contact water-based recreation, such as picnicking, rock hounding, rest and relaxation, horseback riding, bicycling, motor biking, driving for pleasure, outdoor games, sightseeing, walking for pleasure, and birdwatching are considered separately and no changes can be foreseen (figure 14). Water contact activities include fishing, boating, water skiing and swimming (figures 15, 16, and 17). Access is considered separately.

Access is part of each recreational activity and increased water demand would increase available recreational access during periods of high runoff. In 1975 several Montana Fish and Game areas were flooded as late as mid-July, washing out bridges and making some roads impassible into mid-August (figure 17). There were no problems in 1976.

Rock hounding probably would be adversely (-1) affected by increased water demand. Even though more rock would be exposed for a few years, agate hunters would pick most good agates within a certain time period. If highest flows were not sufficient to induce the annual erosion, washing and exposure effect, long term quality agate hunting would decrease.

The effects of increased water demand on fishing are unknown in sections 2, 3, and 4. Within section 1, the biological phenomina that produces May and June paddlefishing is in some way related to high flows, turbidity or both. Thus, in

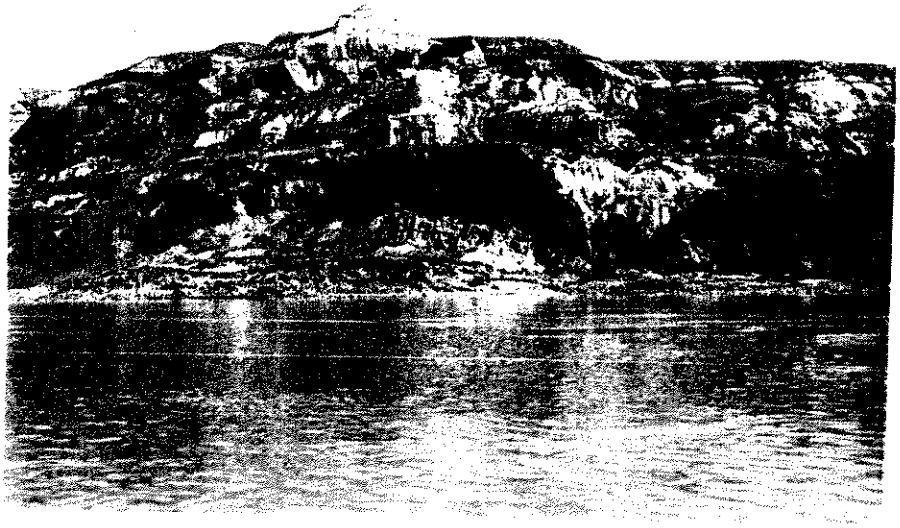


Figure 14. Sightseeing and picnicking along the Yellowstone River offer fine non-contact water based recreation.

Figure 15. Swimming in the Yellowstone River near Reedpoint, Montana, 1975.

Figure 16. Sauger fishing on the Yellowstone River near Forsyth, Montana, 1976.

Figure 17. Limited Yellowstone River access near Worden, Montana in 1975.

Table 26. Combined 1975 and 1976 observed recreational participation percentages within sections and sectional rating preferences (SRP).

	Sec. 1	SRP	Sec. 2	SRP	Sec. 3	SRP	Sec. 4	SRP	Sec. 5	SRP
Swimming	0	1	0	1	3.3	1	28.1	3	5.8	2
Picnicking	1.5	1	0	1	6.2	2	4.8	1	17.7	3
Rest and Relaxation	17.3	3	47.3	3	22.2	3	16.2	3	23.0	3
Boating	13.3	2	28.0	3	7.5	2	5.3	2	15.0	2
Horseback Riding	0.0	1	0.0	1	.3	1	.2	1	.5	1
Bicycling	0.0	1	0.0	1	.3	1	1.9	1	.5	1
Motor Biking	2.3	1	.9	1	.8	1	3.1	1	1.5	1
Driving for Pleasure	0.0	1	0.0	1	1.9	1	4.7	1	1.1	1
Playing Outdoor Games	5.0	1	1.5	1	6.1	1	3.6	1	6.7	1
Rock Hounding	18.2	3	3.9	1	.4	1	.2	1	1.6	1
Sightseeing	2.5	1	0.0	1	6.1	2	13.0	2	3.7	1
Walking for Pleasure	0.0	1	0.0	1	0.4	1	.2	1	.5	1
Waterskiing	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1
Bird Watching	0.0	1	0.0	1	.3	1	0.0	1	0.0	1
Fishing	39.9	3	18.4	3	44.2	3	18.7	3	22.4	3

Total 1975 and 1976 percentages of people observed in each section:

Section 1 - 10.9 percent (279)
Section 2 - 12.9 percent (332)
Section 3 - 22.4 percent (576)
Section 4 - 22.9 percent (589)
Section 5 - 30.9 percent (791)

Total 100.0 percent (2567)

Table 27. Impact assessment for section 1.

	Sectional Rating Preference	Impact Modification Numbers		
		High Scenario	Intermediate Scenario	Low Scenario
Swimming	1	0	0	0
Picnicking	1	0	0	0
Rest & Relaxation	3	0	0	0
Boating	2	-1	-1	0
Floating	1	0	0	0
Horseback Riding	1	0	0	0
Bicycling	1	0	0	0
Motor Biking	1	0	0	0
Driving for Pleasure	1	0	0	0
Playing Outdoor Games	1	0	0	0
Rock Hounding	3	-1	-1	-1
Sightseeing	1	0	0	0
Walking for Pleasure	1	0	0	0
Waterskiing	1	0	0	0
Birdwatching	1	0	0	0
Fishing	3	-1	-1	-1
Access	3	+1	+1	+1
Totals		-5	-5	-3

Table 28. Impact assessment for section 2.

Activity	Sectional Rating Preference	Impact Modification Numbers		
		High Scenario	Intermediate Scenario	Low Scenario
Swimming	1	0	0	0
Picnicking	1	0	0	0
Rest & Relaxation	3	0	0	0
Boating	3	-1	-1	-1
Floating	1	0	0	0
Horseback Riding	1	0	0	0
Bicycling	1	0	0	0
Motor Biking	1	0	0	0
Driving for Pleasure	1	0	0	0
Playing Outdoor Games	1	0	0	0
Rock Hounding	1	-1	-1	-1
Sightseeing	1	0	0	0
Walking for Pleasure	1	0	0	0
Waterskiing	1	-1	-1	-1
Birdwatching	1	0	0	0
Fishing	3	0	0	0
Access	3	+1	+1	+1
Totals		-2	-2	-2

Table 29. Impact assessment for section 3.

	Section Rating Preference	Impact Modification Numbers		
		High Scenario	Intermediate Scenario	Low Scenario
Swimming	1	0	0	0
Picnicking	2	0	0	0
Rest & Relaxation	3	0	0	0
Boating	2	-1	-1	-1
Floating	1	0	0	0
Horseback Riding	1	0	0	0
Bicycling	1	0	0	0
Motor Biking	1	0	0	0
Driving for Pleasure	1	0	0	0
Playing Outdoor Games	2	0	0	0
Rock Hounding	1	-1	-1	-1
Sightseeing	2	0	0	0
Walking for Pleasure	1	0	0	0
Waterskiing	1	0	0	0
Birdwatching	1	0	0	0
Fishing	3	0	0	0
Access	3	+1	+1	+1
Totals		0	0	0

Table 30. Impact assessment for section 4.

	Sectional Rating Preference	Impact Modification Numbers		
		High Scenario	Intermediate Scenario	Low Scenario
Swimming	3	-1	-1	-1
Picnicking	2	0	0	-
Rest & Relaxation	3	0	0	-
Boating	2	-1	-1	-1
Floating	3	0	0	0
Horseback Riding	1	0	0	0
Bicycling	1	0	0	0
Motor Biking	1	0	0	0
Driving for Pleasure	1	0	0	0
Playing Outdoor Games	1	0	0	0
Rock Hounding	1	-1	-1	-1
Sightseeing	2	0	0	0
Walking for Pleasure	1	0	0	0
Waterskiing	1	0	0	0
Birdwatching	1	0	0	0
Fishing	3	0	0	0
Access	3	+1	+1	+1
Totals		-3	-3	-3

Table 31. Impact assessment for section 5.

Activity	Sectional Rating Preference	Impact Modification Numbers		
		High Scenario	Intermediate Scenario	Low Scenario
Swimming	2	-1	-1	-1
Picnicking	3	0	0	0
Rest & Relaxation	3	0	0	0
Boating	2	-1	-1	-1
Floating	3	0	0	0
Horseback Riding	1	0	0	0
Bicycling	1	0	0	0
Motor Biking	1	0	0	0
Driving for Pleasure	1	0	0	0
Playing Outdoor Games	2	0	0	0
Rock Hounding	1	-1	-1	-1
Sightseeing	1	0	0	0
Walking for Pleasure	1	0	0	0
Waterskiing	1	0	0	0
Birdwatching	1	0	0	0
Fishing	3	+1	+1	+1
Access	3	+1	+1	+1
Totals		+1	+1	+1

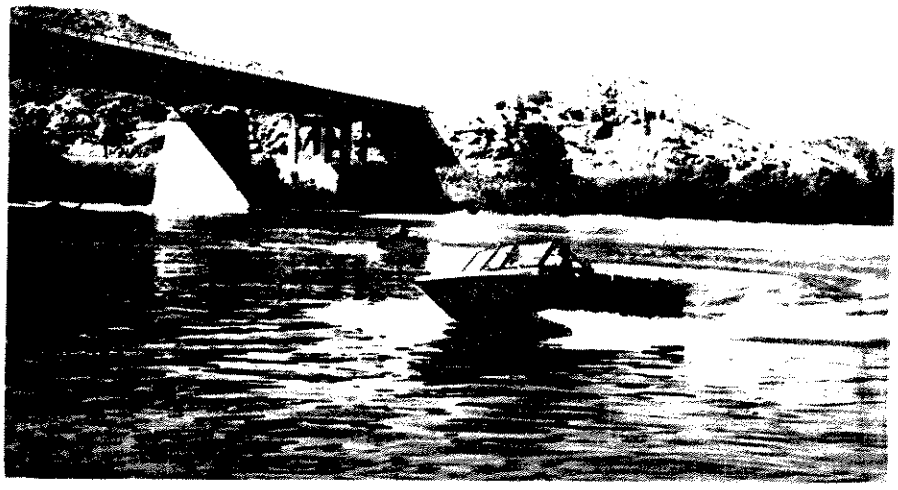


Figure 18. Motorized boating on the Yellowstone faces severe projected impact.

section one, a -1 IMN value is due to the uniqueness of the sport and the possible depredation of the fishery that could result. In section 5, good trout fishing, however, is found at lower flows and decreased turbidities. A +1 IMN rating is used in section 5 for increased water demand impacts. The other three sections are rated no effect.

Motorized boating (figure 18) is given a -1 IMN due to the loss of 20 inch water depth necessary for passage. During July and August, the most popular months for motorized boating, 90 percentile flows in the mid-Yellowstone are approximately 9,200 and 4,600 cfs, respectively. Increased water demands in July under the high to low scenario range from 3,500 to 2,300 cfs, respectively, and for August, from 3,300 to 2,200 cfs, respectively.

Figure 9 is a compilation of cross-sectional data taken in 1976 from four Yellowstone River sites near Miles City (figures 5 and 6). From gage height and cross-sectional results, the navigable width of each section was based on a 20-inch necessary depth and calculated. The effects of the high, intermediate and low scenarios on these cross sections and navigable widths are shown in figure 15. A 100 percent loss of navigable width in a section requires that sections be floated with motor vessel or portaged. The greatest percent of navigable width loss occur under the high scenario at the Kinsey and Fort Keogh cross-sections. Losses in excess of 15 percent occur at all locations under all scenarios in July and August. The smallest percent loss of navigable width occurs in July at the Hysham site.

Since passage is presently critical at the 90 percent natural flows for August and September, lower flows would virtually eliminate river travel past critical areas. Waterskiing, obviously coupled with boating, is only considered in sections one and two. Lower water levels would increase the present danger situation.

Activities within sections are the basis for IMN numbers. However, much more recreation was observed in some sections than others (tables 6 and 7). A single recreational experience was assumed equal to an experience in another section, even though the total use within sections may vary greatly. Thus, even though water demand could affect more man-days of recreation in areas of high use than in low use, the experience should be considered foremost. Recreational use patterns can vary greatly with the additions or deletion of access and/or recreational sites.

Tables 27-31 are designed to compare impacts within sections (see methods). Section one would be most adversely affected

(-5) under the high and intermediate scenarios. Section four would be adversely affected also, to the same extent as section one under the low scenario (-3). One must remember that although recreational pursuits may vary, impact assessment values are directed toward effects on the total recreational spectrum, and each total sectional spectrum is considered equal after the sectional rating preferences are used.

Section two would be adversely effected (2), due to motorized boating loss and associated activities. No impact is foreseen for section 3 and section 5 obtained the only positive impact notably due to projected improved fishing success.

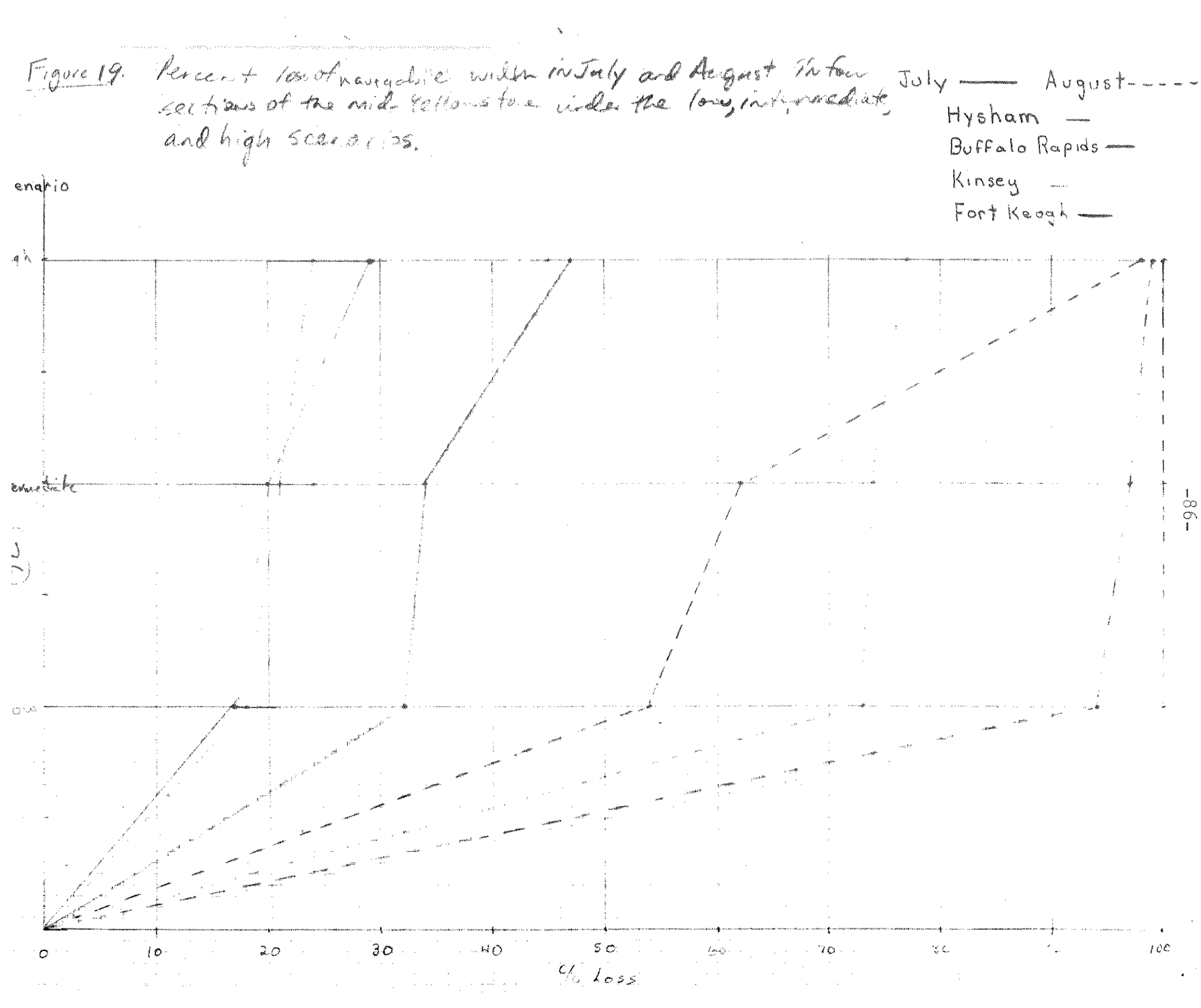
An important note is made, however, that after evaluating the various models which could be developed to predict numbers of people on the Yellowstone River as a function of river section, discharge, weather, day of week, temperature, turbidity, and the month of the season, certain relationships were found.

In 1976, discharge and the square of the discharge (to allow for nonlinearity) were not predicting factors, accounting for less than 10 percent of the variability in observed use and proving insignificant (P-.10).

The best 1976 prediction model is the model weekend vs weekdays, section (location), and turbidity levels, respectively. The best 1975 prediction model also utilized weekend vs weekdays and section (location), but discharge ranked third. Turbidity levels were not incorporated in 1975. An important point is that the bulk of the paddlefishing season was not within the summer study periods (figure 20). Turbidity generally decreases towards autumn. The paddlefish season, however, occurs during periods of higher turbidities.

Conclusions are based upon matrices results, in which site specific recreational activities and pursuits are incorporated. The matrices are the only indication of two summer study periods, one in 1975 and one in 1976. Paddlefishing is the only recreational activity within the matrix (section one) that occurs outside of the study period (May). It is the most unique and utilized recreational activity within the study section during a short time period. Hunting was considered an indirect activity and no measurable effect was foreseen. Use of a boat for hunting access was considered, but a small water demand during hunting dictated no projected significance, although increased irrigation could increase resident waterfowl and pheasant numbers and supply a greater recreational potential.

Figure 19. Percent loss of navigable width in July and August in four sections of the mid Yellowstone river under the low, intermediate and high scenarios.



Sectional impacts vary within sections. The projected increased water demand negatively affected section one the greatest, followed by section four and section two. No effects were projected for section three and a small positive effect foreseen in section five. The whole recreational spectrum is represented within these projections.

An important result indicated statistically that discharge, as a singular factor, did not prove significant (P. 10) in 1975 and 1976. Weekends vs weekday use and location ranked first and second, respectively, in the determination of observed recreational use patterns.

Figure 20. On Memorial Day, 1975 and 1976, large crowds were attracted to Intake Fishing Access for paddlefishing.

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Table 1-A. 1975 and 1976 observed use form.

DATE _____

SEC _____

WEATHER _____

TIME PERIOD _____

	SWIMMING	PICNICKERS	REST & RELAXATION	BOATING-FLOATING	HORSEBACK RIDING	BICYCLING	MOTOR BIKING	DRIVING FOR PLEASURE	PLAYING OUTDOOR GAMES	ROCK HOUNDING	SIGHTSEEING	WALKING FOR PLEASURE	WATER SKIING	BIRD WATCHING	FISHING	VEHICLES	H_2O LINE

X

PILOT STUDY QUESTIONNAIRE

THE following questionnaire has been designed to evaluate the present recreational use of the Yellowstone River and its tributaries. The Old West Regional Commission is funding a study concerning the effect coal and energy related water diversions from the Yellowstone River will have upon the present and future recreational opportunities.

AN accurate reply to the following questions would provide needed information on present recreational use patterns and would aid in fulfilling your future recreational needs. The information you provide is strictly confidential and will be used for no other reason than stated above. You may obtain the results of this summer's survey by writing the Montana Department of Fish and Game, Recreation and Parks Division, Miles City, Montana, as early as November, 1975.

Sincerely,

Max L. Erickson

Max L. Erickson
Recreational Specialist

THANK YOU VERY MUCH FOR YOUR TIME. ENJOY MONTANA.

1/ HAVE YOU NOTICED much deterioration in water quality or increase in litter since you started using the Yellowstone area for recreation?

Decrease in water quality? Yes____ No✓
Increase in litter? Yes____ No✓

Does it affect your enjoyment of the river? Yes____ No____

2/ LENGTH OF PRESENT STAY: (check one)

Day use only		4-5 nights	
One night	✓	6-8 nights	
Two nights		9-10 nights	
Three nights		more than 10 nights	

3/ PLEASE RECORD the access and/or waterway you are presently enjoying.

ISAAC [illegible] TO [illegible]

Date: 5/22/15

4/ ARE YOU PRESENTLY on your vacation? Yes____ No✓
Was recreation on the Yellowstone River and/or its tributaries the primary purpose of your trip? Yes____ No✓
If no, what is the main reason for your trip? [illegible] (OVERNIGHT)

5/ HOW OFTEN do you visit this particular site each year?
NOTE: Spring: March 20-June 20
Summer: June 21-Sept. 22
Fall: Sept. 23-Dec. 20
Winter: Dec. 21-March 19

first time ever	
once a spring	✓
2-3 times a spring	
4-6 times a spring	
6-8 times a spring	
more than 8 times a spring	

HOW MANY times do you visit this particular site during the
summer?____
fall? 1
winter?____

6/ YEARLY, HOW MANY days do you spend enjoying recreational activities at other sites on the Yellowstone River and/or its tributaries?

1		6-9	
2-3		10-15	✓
3-4		16-20	
4-5		More than 20 a year	

7/ Please mark (X) the activities you have engaged in or plan to engage in while in the immediate area, as well as the number of hours spent doing each.

		No. of Hours
Picnicking		
Swimming		3
Rest and relaxation, as such		
Boating - motorized		5
Boating - non-motorized river floating		
Horseback riding		
Bicycling		

(continued)

		No. of Hours
Motor biking		
Driving for pleasure		
Playing outdoor games		
Rock hounding		
Sightseeing	✓	2
Walking for pleasure	✓	2
Water skiing		
Bird watching		
Fishing		

(a) For which species in particular? ____

(b) Which species, if any, did you catch? ____

(c) How many of each species? ____

What is your FAVORITE activity or activities of this site? ____ [illegible]

8/ HOW DOES this particular site fulfill your recreational demands?

Completely ____ Not Adequately ____

Adequately ✓ Poorly ____

If "not adequately" or "poorly", why?

9/ WHERE WOULD you go to participate in the same activities if this site were not available? [illegible]

DO YOU like that site as well as this one? Yes ____ No ✓

10/ DO YOU think this site presently is: (check one)

Too crowded ____ Not used enough ____ Just right ✓

IF YOU think this area is too crowded, would you most prefer MORE sites available? Yes ____ No ____

IF "yes", within how many miles upstream or downstream would you like to see at least one more site? ____

SHOULD THIS site be more fully developed (more facilities, roads, etc.)? Yes ____ No ✓

11/ HAS THE INCREASING cost of gasoline decreased the distance you will travel to enjoy a recreational area? Yes ✓ No ____

IF "yes", typical previous years' recreational trip covered approximately [illegible] miles, while this year's trip covered only 150 miles round trip.

PER PERSON, how much will your trip cost per day? (Include only groceries, automobile gasoline and camping fees, if any). ____

12/ Please check the items of equipment you have with you.

boat____	car____	tent____
canoe____	pickup____	motor bike____
water skiis____	pickup camper____	bicycle____
fishing gear____	camping trailer____	hiking gear____
	motor home____	sleeping bag____

Other (list) ____

13/ FOR THIS QUESTION ONLY, you will be answering for your group. Please place an "X" to represent each person in your group, other than yourself, and an "O" to represent yourself.

AGE:	SEX: Male	Female
1-12		
13-18		
19-30		
31-50	X	X
50+		

ARE YOU and your group residents of Montana? Yes____ No____
IF YES, which town and county? ____
IF NO, which town, county and state? ____

14/ INDICATE WHICH broad income category your household fits into:

4,999 and under____	12,000-15,999____
5,000-7,999____	16,000-over____
8,000-11,999____	

15/ WHAT IS your occupation? ____
If you are married, what is your spouse's occupation? ____

16/ ARE INSECTS a problem to you in this area? Yes____ No____
If "yes", have they reduced the time you spend enjoying your favorite activities? Yes____ No____

Would you return to this area if the insect problem remains the same? Yes____ No____

Would you return to this area if the insect population was reduced by at least one-fourth? Yes____ No____

17/ ARE YOU AWARE of the location of public (Bureau of Land Management) lands near (50 miles upstream and 50 miles downstream) this area?
Yes_____ No ✓

Are you aware of the location of public lands near your home if this area is not near your home (50 miles in any direction)?
Yes ✓ No_____

Are you aware that literature is available at any Bureau of Land Management Office providing information and location of these areas, free of charge? Yes ✓ No_____

Within the past year, have you used any of these areas adjacent to the Yellowstone River for recreational purposes? Yes ✓ No_____

If "yes", for what main activity? [illegible]

18/ WHAT OTHER kinds of recreation would you like to see at this particular site? _____

_____

_____

COMMENTS CONCERNING ANYTHING ASSOCIATED WITH THIS QUESTIONNAIRE:

THANK YOU VERY MUCH

SUMMER QUESTIONNAIRE

The following questionaire has been developed to evaluate the present recreational use of the Yellowstone River and its tributaries. The Old West Regional Commission is funding a study concerning the effect of coal and energy related water diversions from the Yellowstone River upon the present and future recreational opportunities.

An accurate reply to the following questions will provide needed information on present recreational use patterns and will aid in fulfilling your future recreational needs. The information you provide is strictly confidential and will be used for no other reason than stated above. You may obtain the results of this summer's survey by writing the Montana Department of Fish and Game, Recreation and Parks Division, Miles City, Montana, as early as November, 1976.

Thank You Very Much For Your Time, ENJOY MONTANA

Sincerely, Max L. Erickson

Max L. Erickson, Recreational Specialist

1 Are you presently on your vacation? ( )Yes, ( )No.

2 Was recreation on the Yellowstone River and/or its tributaries the primary purpose of your trip?
( )Yes, ( )No.

If not, what is the main reason for your trip? ( )Visit relatives-friends, ( )Sightseeing,
( )Enjoyment, Rest, Relaxation, ( )Business or Work, ( )Other reasons.

3 How often do you visit this particular site each summer (June 21 - Sept 22) ?
( )Never before, ( )1 time, ( )2-3 times, ( )4-6 times, ( )7-8 times, ( )more than 8 times

How many times do you visit this particular site during the
Spring (March 20 - June 20) ? - ( )1-2 times, ( )3-6 times, ( )7-8, ( )more than 8 times
Fall (Sept 23 - Dec 20) ? - - - ( )1-2 times, ( )3-6 times, ( )7-8, ( )more than 8 times
Winter (Dec 21 - March 19) ? - - ( )1-2 times, ( )3-6 times, ( )7-8, ( )more than 8 times

4 Since you started using the Yellowstone for recreation, has the amount of litter
( )Increased ( )Stayed the same ( )Decreased ?

5 What is the length of your present stay? ( )Day use only, ( )1 night, ( )2 nights
( )3 nights, ( )4-5 nights, ( )6-8 nights, ( )9-10 nights, ( )more than 10 nights.

6 For each activity you have engaged in or plan to engage in while in this immediate area, indicate the number of hours per day spent in that way.

( )Picnicking	( )Horseback Riding	( )Bicycling	( )Playing Games
( )Swimming	( )Water Skiing	( )Motor Biking	( )Motor Boating
( )Rest,Relaxation	( )Sightseeing	( )Walking,Hiking	( )River Floating
( )Bird Watching	( )Rock Hunting	( )Pleasure Driving	( )Fishing

Which of these is your favorite activity _____

7 If you fished in this area, for which species? _____
Which species did you catch, and how many? _____,) _____,)

8 Rate each of the following at this location.

	Exceptional	Good	Fair	Poor
Picnick Facilities - - - - - - -	( )	( )	( )	( )
Rest rooms - - - - - - - - - -	( )	( )	( )	( )
Camping sites - - - - - - - - -	( )	( )	( )	( )
Childrens activities, equip. - -	( )	( )	( )	( )
Weed mowing - - - - - - - - - -	( )	( )	( )	( )
Access Roads - - - - - - - - -	( )	( )	( )	( )

9 Where would you go for the same activities if this site was not available? ( )Don't know,
Specify: _____.

10 Do you like that site as well as this one? ( )Yes, ( )No.

11 What is your state of residence? _____, County or town _____.

12 Check the broad income category your combined household fits into:
( )Under 5000, ( )5000-7999, ( )8000-11999, ( )12000-15999, ( )16000 and over.

OVER PLEASE

13 Do you think this site presently is: ( )Too crowded, ( )Just right, ( )Not used enough.

14 Should this site be more fully developed (more facilities, roads, etc.)? ( )Yes, ( )No.

15 Do you want more recreation sites along the Yellowstone River? ( )Yes, ( )No.
If you answered YES, within how many miles from this site?
( )0-5miles, ( )5-15miles, ( )15-30miles, ( )Over 30 miles.

16 Has the increasing cost of gasoline decreased the distance you travel to a recreational area?
( )Yes, ( )No.

Check the miles covered in a typical previous years' recreation trip.
( )0 - 50 miles, ( )50 - 250 miles, ( )250 - 450 miles, ( )over 450 miles.

Check the miles covered in a typical recreation trip this year.
( )0 - 50 miles, ( )50 - 250 miles, ( )250 - 450 miles, ( )over 450 miles.

17 Check your occupation
( )Self employed White collar ( )Professional, Technical
( )Self employed Blue collar ( )Student
( )Employed White collar ( )Housewife
( )Employed Blue collar ( )Agriculture, Ranching
( )Unemployed ( )Retired

What is your spouse's occupation?_____

18 Check your sex, ( )Female, ( )Male.
Check your age, ( )1-12 yrs, ( )13-18 yrs, ( )19-30 yrs, ( )31-50 yrs, ( )over 50 yrs.

19 Enter the number of other persons in each category from your group.
Females - ( )1-12 yrs, ( )13-18 yrs, ( )19-30 yrs, ( )31-50 yrs, ( )over 50 years.
Males - - ( )1-12 yrs, ( )13-18 yrs, ( )19-30 yrs, ( )31-50 yrs, ( )over 50 years.

20 Are insects a problem to you in this area? ( )Yes, ( )No.
Have they reduced the time you spend enjoying your favorite activities? ( )Yes, ( )No.
Would you return to this area if the insect problem remains the same? ( )Yes, ( )No.

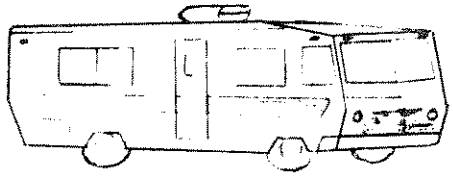
21 Are you aware of the location of public (Bureau of Land Management) lands along the river near (50 miles upstream or downstream) this area? ( )Yes, ( )No.

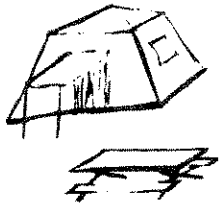
Are you aware of the location of public lands near your home if this area is not near your home (50 miles in any direction)? ( )Yes, ( )No.

Do you know that literature is available at any Bureau of Land Management Office providing information and the location of these areas, free of charge? ( )Yes, ( )No.

22 Within the past year, which of the following activities have you participated in on these public lands adjacent to the Yellowstone River?
( ) None, ( )Fishing, ( )Boating, ( )Picnicking,
( ) Camping, ( )Hunting, ( )Other,specify _____

23 Yearly, how many days do you spend at other sites on the Yellowstone River and its tributaries?
( )none, ( )1 day, ( )2-3 days, ( )4-5 days, ( )6-9, ( )10-15, ( )16-20, ( )over 20.





TOTAL SUMMER QUESTIONNAIRE SUMMATIONS, 1975 and 1976

In 1975 and 1976, there were 212 and 257 questionnaires completed, respectively. Each response represents a group of recreationists. Less than 10 percent of the valid responses was deemed not valid for questions one through six. All totals may not equal 100 percent due to rounding.

Question 1. Are you presently on your vacation?

1975 - 210 valid responses	1976 - 250 valid responses
Yes - 24.3 percent	Yes - 36.0 percent
No - 75.7 percent	No - 64.0 percent

Question 2. a) Was recreation on the Yellowstone River and/or its tributaries the primary purpose of your trip?

1975 - 198 valid responses	1976 - 184 valid responses
Yes - 54.0 percent	Yes - 56.5 percent
No - 46.0 percent	No - 43.5 percent

b) If not, what is the main reason for your trip?

1975 - 129 valid responses

Rest and relaxation - 42.6 percent
Visiting relatives and/or friends - 12.4 percent
Sightseeing - 12.4 percent
Business - 12.4 percent

1976 - 167 valid responses

Rest and relaxation - 41.9 percent
Visiting relatives and/or friends - 41.9 percent

The combined 55 percent depicting sightseeing and rest and relaxation did not consider those activities recreation, per se.

Question 3. a) How often do you visit this particular site each summer?

1975 - 199 valid responses	1976 - 200 valid responses
Eight times or over - 29.6 percent	26.0 percent
Never before - 22.6 percent	27.0 percent
Four to six times - 10.6 percent	11.0 percent
Two to three times	19.0 percent

b) How many times do you visit this particular site during the: 1) spring, 2) fall, 3) winter?

	1975 - 122 valid responses	1976 - 200 valid responses
1)	One to two times - 37.7 percent	53.0 percent
	Three to six times - 27.9 percent	15.2 percent
	More than eight times - 27.0 percent	25.2 percent
	1975 - 100 valid responses	**1976 - 109 valid responses**
2)	One to two times - 30.0 percent	56.9 percent
	Three to six times - 31.0 percent	13.8 percent
	Seven to eight times - 12.0 percent	-
	More than eight times - 27.0 percent	24.8 percent
	1975 - 53 valid responses	**1976 - 70 valid responses**
3)	One to two times - 49.1 percent	65.7 percent
	Three to six times - 15.1 percent	-
	More than eight times - 26.4 percent	30.0 percent

A note may be made that the largest amount of missing seasonal observations for 1975 and 1976 occurred during the winter portion (159, 187) while the smallest amount (13, 57) occurred within the summer portion. Since there was no category denoting no use, one may surmise that these data reflect seasonal use patterns, summer having the greatest and winter the least.

Question 4. Have you noticed a change in: a) water quality, or b) in quantity of litter since you started using the Yellowstone area for recreation? Has your enjoyment of the river increased, decreased or stayed the same?

1975 only - 155 valid responses

a) Water quality had increased - 23.2 percent
About the same - 64.5 percent
Water quality had decreased - 12.3 percent

From personal communication, water quality, to the interviewees, was defined as the color of the water. Blue, clear water would be good water quality, as opposed to murky, brown water.

1975 - 142 valid responses

b) Increase of litter - 35.9 percent
Problem was the same - 37.3 percent
Litter had decreased - 26.8 percent

1976 - 170 valid responses

b) Increase of litter - 29.4 percent
Problem was the same - 48.2 percent
Litter had decreased - 22.4 percent

1975 - 154 valid responses

c) Enjoyment of river had increased - 50.6 percent
Remained the same - 44.2 percent

Question 5. What is the length of your present stay?

1975 - 189 valid responses	1976 - 236 valid responses
Day use - 62.4 percent	47.0 percent
One night - 10.1 percent	12.3 percent
Over ten nights - 12.2 percent	13.1 percent

From personal communication, non-residents and vacationers occupied the majority of the latter 12.2 and 13.1 percent, and responded not necessarily with their present location in mind, but with respect to their total duration of trip.

Question 6. a) For each activity you have engaged in or plan to engage in while in this immediate area, indicate the number of hours per day spent. (Table 1 and 2A). b) Which of these are your favorite activites? (Table 3-A).

Question 7. a) If you fished in this area, for which species (Table 4-A).
b) Which species did you catch, and how many? (Table 5-A).

The actual number of fish caught by the 16.9 (1975) and 42.0 (1976) percent of successful fisherman varied. Without regard to species, 80.6 (31 valid responses) and 70.9 (55 valid responses) percent caught from one to six fish, (31 valid responses in 1975 and 1976, respectively).

Question 8. Rate each of the following criteria at this location (Table 6-A).

Question 9. Where would you go for the same activities if this site was not available?

The data collected were not valid in 1975. In 1976, 53.7 percent replied they did not know of a place.

Question 10. Do you like that site as well as this one?

1975 - 145 valid responses	1976 - 92 valid responses
Yes - 68.3 percent	80.4 percent
No - 31.7 percent	19.6 percent

Question 11. a) What is your state of residence? b) County or town?

1975 - 205 valid responses	1976 - 195 valid responses
a) Montanans - 81.5 percent	77.4 percent
1975 - 165 valid responses	**1976 - 147 valid responses**
b) Billings - 48.5 percent	41.5 percent
Forsyth - 11.5 percent	10.2 percent
13 other towns in Montana - 12.7 percent	19.0 percent
	Miles City - 17.7 percent
	Columbus - 11.6 percent

Poor response from Montanans in 1975 account for the percentage variance from 100 percent.

Question 12. Check the broad income category into which your combined household fits.

1975 - 203 valid responses	1976 - 180 valid responses
Under $4,999 - 13.6 percent	12.2 percent
$5,000 - $7,999 - 13.1 percent	15.0 percent
$8,000 - $11,999 - 25.6 percent	21.7 percent
$12,000 - $15,999 - 27.8 percent	25.6 percent
Over $16,000 - 19.9 percent	25.6 percent

Question 13. Do you think this site presently is too crowded, just right, or not used enough?

1975 - 203 valid responses	1976 - 183 valid responses
Too crowded - 12.8 percent	10.4 percent
Just right - 71.9 percent	80.9 percent
Was not used enough - 15.3 percent	8.7 percent

Question 14. Should the site be more fully developed?

1975 - 197 valid responses	1976 - 175 valid responses
Yes - 62.7 percent	Yes - 50.9 percent
No - 37.6 percent	No - 49.1 percent

Question 15. a) Do you want more recreation sites along the Yellowstone River? b) Within how many miles upstream or downstream would you like to see at least one more site?

1976 Only - 175 valid responses

Yes - 80.6 percent
No - 19.4 percent

	1975 - 173 valid responses	1976 - 136 valid responses
b)	Zero to five - 28.9 percent	11.0 percent
	Five to 15 - 32.4 percent	34.6 percent
	Fifteen to thirty - 22.5 percent	30.9 percent
	Over 30 miles - 16.2 percent	23.5 percent

Question 16. a) Has the increasing cost of gasoline decreased the distance you travel to a recreational area? b) Check the miles covered in a typical previous years recreation trip, and c) Check the miles covered in a typical recreation trip this year.

	1975 - 203 valid responses	1976 - 182 valid responses
a)	Yes - 57.7 percent	39.6 percent
	No - 46.3 percent	60.4 percent

	1975 - 190 valid responses	1976 - 164 valid responses
b)	Zero to five miles - 14.2 percent	3.7 percent
	50-250 miles - 25.8 percent	30.5 percent
	250-450 miles - 16.3 percent	18.9 percent
	Over 450 miles - 43.7 percent	47.0 percent

	1975 - 195 valid responses	1976 - 166 valid responses
c)	Zero to fifty miles - 20.5 percent	13.3 percent
	50-250 miles - 31.8 percent	31.9 percent
	250-450 miles - 16.4 percent	13.9 percent
	Over 450 miles - 31.3 percent	41.0 percent

An interesting note here is that the percentage of trips over 450 miles decreased significantly in 1975 and 1976 while shorter recreational trips increased.

Question 17. a) Check the type of vehicle you arrive in. b) Check the items of equipment you have with you.

1975 Only - 204 valid responses

a) Car - 49.8 percent
Pickup - 22.7 percent
Pickup with camper - 12.8 percent
Other modes - 14.8 percent

1975 Only - 212 valid responses

b) Boats - 17 percent
Tents - 10.8 percent
Fishing gear - 56.6 percent
Sleeping bags - 23.1 percent
Firearms - 14.1 percent

Question 18. Check your occupation. Check your spouse's occupation. (Table 7-A)

Thus, in total for 1975 and 1976, employed blue collar was the most common form of employment of the interviewee, while housewife was the most common occupation of spouses. This corresponds with the larger amount of males interviewed than females for 1975 and 1976.

Question 19. a) Check your sex and b) check your age.

1975 - 204 valid responses	1976 - 186 valid responses
a) Males - 68.3 percent	76.3 percent
Females - 31.7 percent	23.7 percent
1975 - 197 valid responses	1976 - 136 valid responses
b) 5-18 - 10.7 percent	10.9 percent
19-30 - 27.9 percent	22.8 percent
31-50 - 37.1 percent	37.5 percent
Over 50 - 24.4 percent	28.8 percent

Question 20. Enter the number of other persons in your group within each age and sex category (Table 8-A).

The percentage figures represent those people who responded that their groups contained the various age groups. The number of people in parenthesis represents the percentage figure; it does not signify the total number within each group. Results were not valid for total numbers within each age and sex group.

Question 21. a) Are insects a problem to you in this area? b) Have they reduced the time you spent enjoying your favorite activities? c) Would you return to this area if the insect problem remains the same? d) Would you return to this area if the insect problem was reduced?

1975 - 201 valid responses	1976 - 245 valid responses
a) Yes - 63.7 percent	40.8 percent
No - 36.3 percent	33.9 percent
	Somewhat 25.3 percent
1975 - 191 valid responses	1976 - 223 valid responses
b) Yes - 42.4 percent	39.0 percent
No - 57.6 percent	61.0 percent
1975 - 188 valid responses	1976 - 224 valid responses
c) Yes - 84.6 percent	65.2 percent
No - 15.4 percent	34.8 percent

1975 - 184 valid responses

d) Yes - 92.0 percent
No - 9.1 percent

Question 22. a) Are you aware of the location of public lands along the river near this area? b) Are you aware of the location of public lands near your home - if this area is not near your home? c) Do you know that literature is available at any Bureau of Land Management Office providing information and the location of those areas, free of charge?

	1975 - 192 valid responses	1976 - 212 valid responses
a)	Yes - 41.1 percent	45.8 percent
	No - 58.9 percent	54.2 percent
	1975 - 155 valid responses	1976 - 216 valid responses
b)	Yes - 56.8 percent	45.8 percent
	No - 43.2 percent	54.2 percent
	1975 - 191 valid responses	1976 - 245 valid responses
c)	Yes - 63.9 percent	49.4 percent
	No - 36.1 percent	50.6 percent

Question 23. Within the past year, in which of the following activities have you participated on these public lands adjacent to the Yellowstone River?

	1975 - 212 valid responses	1976 - 257 valid responses
No activities	15.6 percent	28.0 percent
Fishing	55.7 percent	64.6 percent
Boating	25 percent	40.1 percent
Picnicking	34.4 percent	45.5 percent
Camping	28.8 percent	52.1 percent
Hunting	28.3 percent	30.4 percent
Other recreational activities	10.4 percent	29.6 percent

Question 24. Yearly, how many days do you spend at other sites on the Yellowstone River and its tributaries? (Table 9-A).

Table 2A. Percent of people engaged in various recreational activities (hours per day) 1975/1976.

	HOURS PER DAY											
	1	2	3	4	5	6	8	10	12	14	*Not Valid	Number Non Responses
Picnicking	42.2/57.1	40.0/22.9	2.2/12.9	-	-	0/0	0/0	-	0/0	0/0	24.0/0	167/187
Horseback riding	25.0/100.0	25.0/0	-	-	-	-	50.0/0	-	-	-	0/0	208/255
Bicycling	37.5/50.0	25.0/50.0	12.5/0	12.5/0	-	-	12.5/0	-	-	-	0/0	204/253
Playing outdoor games	40.0/43.8	10.0/25.0	20.0/0	10.0/18.8	-	-	10.0/0	-	-	-	10.0/0	202/241
Swimming	42.1/69.4	26.3/19.4	5.3/0	5.3/0	5.3/0	-	5.3/0	-	-	-	10.6/0	193/221
Water skiing	25.0/100.0	-	25.0/0	-	-	25.0/0	25.0/0	-	-	-	-	208/254
Motor biking	14.3/90.9	14.3/0	14.3/0	-	42.9/0	-	14.3/0	-	-	-	-	205/246
Motor boating	47.1/60.0	35.3/0	-	0.20/0	-	0/20.0	11.8/0	-	-	-	-	195/252
Rest and relaxation	24.0/45.2	20.0/13.5	-	13.3/0	-	-	-	-	-	-	-	137/153
Sightseeing	40.0/48.1	40.0/19.2	-	0.13.5	-	-	10.0/0	-	-	-	-	192/205
Walking, hiking	31.3/59.1	0/25.0	-	18.8/0	12.5/0	18.8/0	-	-	-	-	-	196/213
Bird watching	33.3/50.0	33.3/25.0	0/16.7	-	-	-	16.7/0	-	-	-	16.7/0	206/245
Rock hounding	50.0/46.0	19.2/22.0	0/14.0	0/12.0	-	-	11.5/0	-	-	-	-	186/207
Pleasure driving	58.3/52.9	16.7/26.5	-	-	-	-	-	-	-	-	-	200/223
Fishing	15.8/37.4	14.9/0	8.9/11.5	20.8/14.5	-	16.8/0	-	-	-	-	-	111/126

* Not valid responses were those which defied "common sense" i.e. 24 hours of water skiing per day.

* Non responses are categories which were not answered. The author assumes that the vast majority of these non responses did not engage in the respective recreational activity. Response less than 10 percent is not listed, represented by zeros (0).

Table 3A. The most favored recreational activity (159 valid responses).

Activities	1975 - 159 Valid Responses Percentages	1976 - 156 Valid Responses Percentages
Picnicking	1.3	2.6
Swimming	7.5	8.3
Water Skiing	.6	.6
Motor Biking	1.3	1.9
Motor Boating	1.9	.6
Rest and Relaxation	15.1	9.6
Sightseeing	3.8	0
Walking and Hiking	2.5	3.2
Floating	4.4	5.1
Rock Hunting	4.4	9.0
Fishing	57.2	57.7
Bicycling	0	.6
Total	100.0	100.0

Thus, from the number of non-responses and percent of responses noting the most favorite activity along the river, fishing and rest and relaxation were the recreational activities most engaged in and most preferred during the survey periods.

Table 4A. Species sought by fisherman (181 valid responses).

Species	1975 - 181 Valid Responses Percentages	1976 - 120 Valid Responses Percentages
Pike, sauger, walleye	46.5	15.8
Paddlefish	7.8	5.8
Catfish	24.1	20.0
Sturgeon	0.9	2.5
Ling	1.7	3.3
Sucker, carp	5.2	.8
Trout	30.3	50.8
Bass	2.6	0.0
Bullhead	0	.8

Table 5A. Species caught by fisherman (31 valid responses).

Species	1975 - 31 Valid Responses Percentages	1976 - 76 Valid Responses Percentages
Pike, sauger, walleye	28.6	15.7
Paddlefish	6.3	3.9
Catfish	27.0	22.4
Sturgeon	4.8	1.3
Bullhead	1.6	1.3
Ling	3.2	1.3
Sucker, carp	4.8	6.6
Goldeye	7.9	1.3
Trout	12.7	44.7
Bass	1.6	0
Whitefish	1.6	1.3

A note is made that the study period did not cover during the peak paddlefishing period.

Table 6A. On-site facility and recreational conditions rating, 1975 - 1976.

	Number of Valid Responses	Percent of Valid Responses			
		Exceptional	Good	Fair	Poor*
Picnic Facilities	150/165	10.7/8.5	40.0/49.1	24.0/27.9	25.3/14.5
Rest Rooms	138/148	8.0/2.7	25.4/39.2	21.0/24.3	45.7/33.8
Camping Sites	145/156	10.3/7.1	35.9/52.6	31.7/28.8	22.1/11.5
Children's Activities, Equipment	111/119	2.7/3.4	14.4/14.3	16.2/26.9	66.7/55.5
Weed Mowing	130/141	5.4/2.8	20.8/27.7	20.8/27.7	54.6/41.8
Access Roads	165/167	11.5/9.0	32.7/41.3	32.7/32.3	18.8/17.4

* The "poor" category includes responses at locations where certain activities and/or conditions were not present, including privately owned lands.

Table 7A. Occupational percentages.

	1975-192 1976-187 Valid Responses Interviewee		1975-122 1976-116 Valid Responses Spouse of Interviewee	
Self Employed White Collar	5.7	3.7	5.7	3.4
Self Employed Blue Collar	6.8	6.4	2.5	2.6
Employed White Collar	10.4	9.1	14.8	12.1
Employed Blue Collar	34.9	24.6	18.9	23.3
Professional	10.9	4.8	0	7.8
Student	7.8	10.2	0	.9
Housewife	7.8	5.9	50.0	41.4
Agriculture	3.6	3.2	1.6	0
Retired	12.0	18.7	6.6	8.6

Table 8A. Percentages of group ages.

	1-12	13-18	19-30	30-50	Over 50
Males*	26.1 (29)	21.6 (24)	20.7 (23)	17.1 (19)	14.4 (16)
Females**	12.7 (14)	10.9 (12)	29.1 (32)	32.7 (36)	14.5 (16)

1975 only

Males* - 111 valid responses
Females** - 110 valid responses

Table 9A. Percentage of recreationists spending days at other sites.

	1	2-3	4-5	6-9	10-15	16-20	Over 20	None
1975 Percent of 199 valid responses	9.0	15.1	10.1	10.6	15.6	4.0	15.6	19.6
1976 Percent of 125 valid responses	2.4	10.8	10.8	8.8	10.4	4.4	17.9	35.1