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A DESCRIPTION OF ANGLERS AND ANGLING USE IN TWO AREAS OF THE UINTA MOUNTAINS

by

John F. Hoagland

A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF SCIENCE

in

Forest Science

UTAH STATE UNIVERSITY
Logan, Utah

1973

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The author is especially grateful to his advisor, Dr. James J. Kennedy, Assistant Professor of Forest Sciences, Utah State University, who first suggested this study and whose counsel proved particularly valuable. To my Graduate Committee: Dr. Perry Brown and Dr. John Priollaud, appreciation is expressed for their time and effort in meetings, advise, and thesis review. The Wasatch National Forest and Utah Division of Wildlife Resources were also especially helpful in this study.

To my wife, Vicky, who deciphered the impossible calligraphy of the first draft.

John F. Hoagland

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ABSTRACT

A Description of Anglers and Angling Use In

Two Areas of the Uinta Mountains

by

John F. Hoagland, Master of Science

Utah State University, 1973

Major Professor: Dr. James J. Kennedy
Department: Forest Science

The High Uinta Primitive Area, Utah's most popular high mountain recreation area, has a reputation as an excellent trout and grayling fishery. Proposed for inclusion in the National Wilderness Preservation System, the area faces several management dilemmas. The primary problem being that managers must protect the resource from the effects of heavy recreational use without destroying the primitive and aesthetic dimensions of wilderness environment. It appears that much impact on the more accessible lakes is due to fishing use. The objectives of the study were: (1) to determine the proportions of angling to non-angling groups; (2) to describe certain characteristics of these anglers; (3) to examine the importance of fishing and factors affecting fishing enjoyment; and (4) to determine the angler's knowledge and experience with adjacent de facto wilderness alternatives.

The method of data collection was an interview questionnaire administered on Highline trail leading into the Primitive area and Notch Mountain trail leading to de facto wildlands. A conservative stratified sampling scheme was used to obtain proper representation of weekday, weekend and holiday users of both areas. Results were coded and punched for computer organization and tabulation.

The results indicate that slightly more than half the groups contacted were comprised of one or more fishermen planning to fish the study area; with slightly greater proportions of anglers using the Primitive area.

Over half the anglers were visiting the areas for the first time and were motivated by the desire to "escape" from routine, get outdoors, and enjoy mountain scenery. Fishing was not an important motive but was a preferred activity. Anglers of the study areas fished more than average Utah fishermen and preferred high mountain lake and stream fisheries.

Anglers reported high catch rates and mostly rated the fishing as "good". Hypothetical catch reductions did not bother anglers because as many stated, "fishing was secondary". However, the dissatisfactions of less successful anglers and the angler's desire to maintain the fishery through stocking still reveal some importance in fishing activity. Anglers also appeared to be somehwat intolerant with increased crowd levels.

Most anglers were inexperienced and ignorant of de facto alternatives. It appeared that decisions regarding such alternatives were partially based on

Notch Mountain standards. Also, the accessibility and high amounts of day-use suggest that different kinds of experiences may be sought in the Notch Mountain area.

(111 pages)

CHAPTER I

INTRODUCTION

Statement of General Problem

Since its enactment in 1964, the Wilderness Act has served as a managerial guide for portions of undeveloped federal land areas, primeval in character, and without permanent improvements or human habitation. Such areas are managed to preserve wilderness conditions and provide wilderness type recreation opportunities for the public. One such area is the High Uinta Primitive Area of northeastern Utah. Situated near the populated Wasatch Front, this region has traditionally provided alpine type camping and fishing for numerous recreationists. It appears that much of the pressure on the more accessible and popular lakes of the area is due to weekend and day-users and that a primary motivation for such use is fishing. The area is proposed for inclusion in the National Wilderness Preservation system and if placed under wilderness management constraints, continued resource degradation and facility development around lakes could not be tolerated.

As camping, hiking, and fishing activities in the High Uintas increase, managers are searching for strategies that help provide wilderness experience while preserving the quality of the resource itself. Regulatory strategies such as quota systems, mandatory permits, rotation of use areas, or limits to size of

parties may have to be implemented (Hendee et al., 1968). Such management decisions, however, tend to interfere with the user's freedom of choice and movement and may prove undesirable. Rather than restrict use, managers may divert excesses to less heavily used lakes within the wilderness area, or preferably, to substitutable lakes in a near by de facto[1] wilderness. The High Uinta Primitive Area has many lakes and de facto wildlands adjacent to its western boundary. Before such management decisions are made, however, user preferences, characteristics and behavior would be desirable input regarding formation of policies to insure user satisfaction and resource protection. The need to obtain some of this information is a major goal for this study.

In support of this goal, Allen (1965) contends that the value of fishing as an outdoor recreation activity is derived from certain satisfactions received. These satisfactions stem from the tangible rewards of the catch and from the less tangible, although equally real, pleasures provided by relaxation in pleasant surroundings. The value of wilderness fishing may also be derived from these satisfactions. Fishery managers generally use the more tangible indicators of some of these satisfactions, such as numbers of anglers, or size and number of catch to evaluate and alter their management efforts. Wilderness managers, however, have attempted to determine the importance of the less tangible satisfaction components, such as the effects of crowding or littering

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[1]De facto wilderness, for purposes of this study, is defined as being an area displaying wilderness characteristics as defined by the Wilderness Act but having no official designation.

on the recreational experience. Kennedy (1970), Hendee et al. (1968) and Lucus (1964) suggest that these less tangible recreation components can be defined and quantified to varying degrees. This involves understanding factors in the angler's perception of fishing, and particularly for this study, how fishing is perceived in a wilderness setting. Within this context, research concerning anglers and angling was undertaken in the proposed High Uinta Wilderness Area and adjacent de facto wildlands.

Justification

The importance of fishing as a recreational activity has been emphasized in numerous studies. The Outdoor Recreation Resource Review Commission (ORRRC 1962) and more recently the Bureau of Outdoor Recreation (BOR 1967) indicate fishermen-days will triple by the year 2000. These and surveys by the Bureau of Sport Fisheries and Wildlife (BSFW 1970) clearly indicate the national importance of recreational fishing in the United States and recommended that fishing should receive wider recognition as a resource of national significance. McFadden (1969) also recognized the recreational importance of fishing and emphasized the need for more research in his analysis of fishing use trends in freshwater fisheries in North America.

Serious angler research began in the early fifties with creel censuses, participation rates, and trout population studies (Allen 1951; Calhoun 1950; Ellis et al. 1958; McFadden 1956 & 1961). Such studies emphasized the fishery

resource and the subsequent effects on fish population and habitat caused by angling. The angler himself came under surveillance when fishery managers began to recognize the importance of monitoring the fisher user. The effects of management on anglers were first considered by Wales and Lane (1957) in an angler opinion analysis of trout fishery management practices. McFadden et al. (1964) also surveyed the opinions of Michigan sport fishermen, examining attitudes on fisher expenditures, stocking practices and license fees.

The importance of fishing as an activity in relation to other types of recreation has been documented in several studies. Meuller et al. (1962) found that 75 percent of the campers interviewed fished sometime during their trip while 46 percent fish frequently. Stroud (1966) found that 75 percent of his sample were camping to accommodate fishing (and hunting). Stroud (1966) also found that one third of the wilderness campers gave fishing as their main objective and 75 percent cited it as an activity to be engaged in during their trip.

Recreational use of wilderness has received substantial research, but the role of wilderness fishing has been understated. Fishing has been emphasized as an activity but its impact and importance to the overall wilderness experience has not been specifically studied. In his recreational carrying capacity study in the Quetico-Superior area, Lucus (1964) found that wilderness "qualities" were the main attraction for most canoeists while other visitors considered fishing or scenery primary. Hendee et al. (1968) study of wilderness users in the Pacific Northwest found fishing as a high-ranking activity among users. Stankey (1971) also found that users in the Bridger and Bob Marshal

Wilderness Areas and the High Uinta Primitive Area participated in fishing and considered it a major on-site activity.

While the role of fishing in wilderness situations has been considered an "on-site" activity, the wilderness angler himself has had little specific attention. Yet studies emphasizing general angler characteristics, their behavior, and preferences have started to emerge. These studies have been tenuous and do not consider wilderness anglers nor wilderness fishery resources. One such study by Hewston and Franklin (1969) studied the activities, characteristics and satisfactions of recreationists at Flaming Gorge Reservoir in northeastern Utah. In the first year of fishing, 1964, 42 percent of the parties interviewed stated fishing as a primary purpose of the trip. Hewston and Franklin also found that 71 percent of those parties fishing ranked this activity second only to sightseeing; and that 94 percent of all parties fished sometime during their trip regardless of the major purpose of the visit.

The fishery resource and its fishermen were explored even further in a comprehensive study by Brown (1968). Emphasizing the angler, Brown studied the preferences, criteria for satisfaction and motives of fishermen at specific fisheries in two counties of California. He found "quality" fishing to be the primary motive for the majority of visits to the study areas. Anglers perceived "quality" in terms of size, number, fighting ability, fish palatability and challenge of species, in order of decreasing importance. This research also detected a relationship between length of trip and the importance of catching fish;

those staying less time were more concerned with catching greater numbers of fish than those staying longer. Also, less experienced anglers tended to be significantly more catch oriented than those with more experience.

Surveys conducted by state fish and wildlife agencies provide numerous data on anglers. These surveys usually emphasize angler characteristics, fishing pressure, and harvest data. Such a survey was conducted by Bangerter (1968) for the state of Utah. He found that the average Utah fisherman took 6.0 trips and spent a mean of 8.65 days fishing. Anglers had a success rate of .88 fish per hour of fishing effort and 15 percent of the anglers took 51 percent of the state catch. Utah anglers also preferred fishing in lakes and reservoirs (68.8 percent). In an unusually thorough state survey, Gordon (1970) attempted to ascertain preferences, behavior and opinions of anglers utilizing Idaho sport fishery resources in 1967. This study found that a majority of nonresident anglers preferred to catch a moderate number of medium sized fish rather than many small ones or a few large ones. Also, approximately two-thirds of all respondents fished in streams for trout and many anglers who expressed an opinion thought fishing-for-fun (catch and release programs) a worthwhile idea and said they would try it. Gordon indicated that future Idaho anglers will be likely to pay more for their fishing, assign high priorities to hatchery fish production, and support fishery research and evaluation. Gordon's study is an example of a state survey going beyond the usual inventory.

In sum, the above studies describe the importance of fishing on state and national levels, and suggest fishing's importance in a wilderness setting. With

the exception of Brown (1968) and Gordon (1970), detailed examination of angler preferences and behavior have been rare. Furthermore, the need to study anglers and angling in a wilderness situation is illustrated. Such a need prompted the initiation of this research.

Objectives

Objectives of this study are: (1) to determine the number of angling[2] and non-angling groups using the study areas; (2) to describe the general demographic and fishing characteristics of these anglers; (3) to examine the on-site importance of fishing and factors affecting fishing enjoyment; and (4) to determine the angler's knowledge and experience with adjacent de facto wilderness alternatives.

Delimitations of the Study

Study area

The location of the High Uinta Mountains is shown on the vicinity map in Figure 1. These mountains are the highest in the state with elevations ranging from 8,000 to 13,449 feet and are the only major east-west oriented mountain range in the United States. They are rich in geological and biological

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[2]Groups were considered "angling groups" if at least one group member, fourteen years or older, was going to fish.

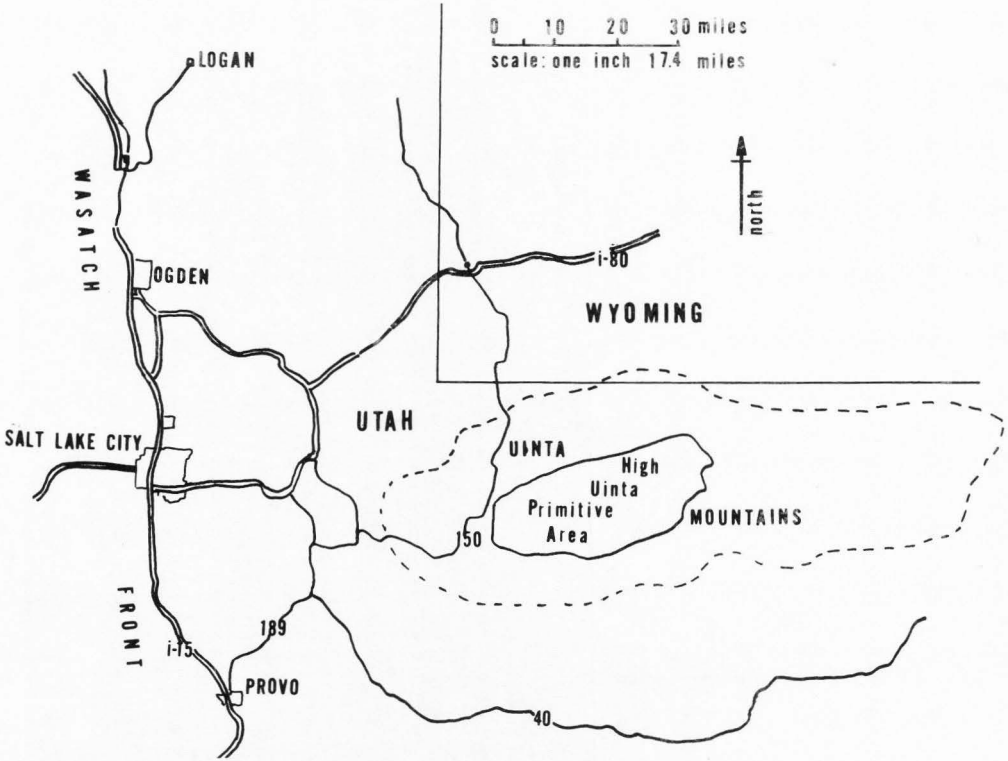

Figure 1. Vicinity map

interests with over 150 small alpine lakes which are famous for their trout and grayling fishing.

Approximately 241,000 acres in the central portion of the Uinta Mountains were designated as a Primitive Area in 1931, and is under the jurisdiction of the Ashley and Wasatch National Forests. The Primitive Area plus certain adjacent areas are proposed for inclusion in the National Wilderness Preservation System under the Wilderness Act of 1964 (PL 88-577). The proposed wilderness would occupy approximately 35 percent of the Unita range, leaving substantial areas of de facto wilderness subject to management under the less restrictive Multiple Use Act.

The western portion of the Uintas is dissected by State Highway 150 which provides two to four hour access for Utah's highly populated Wasatch Front.[3] High mountain lake basins and cirques of this western end are the most accessible and heaviest used areas in the Uintas. Accessibility and continuous trout stocking make the Uinta alpine lakes the most popular high mountain fishery in the state.

Two of these lake basins and their trailheads were study locations for the project: the Highline trailhead which provides eastbound access into the Primitive Area and the Notch Mountain trailhead providing access to de facto wildlands west of the Primitive area. Figure 2 shows locations of these areas.

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[3]The five Wasatch front counties of Box Elder, Davis, Weber, Salt Lake, and Utah had a population of 849,818, which accounted for 80.2 percent of the state's 1970 population of 1,059,273 (Bureau of Economic and Business Research, 1973).

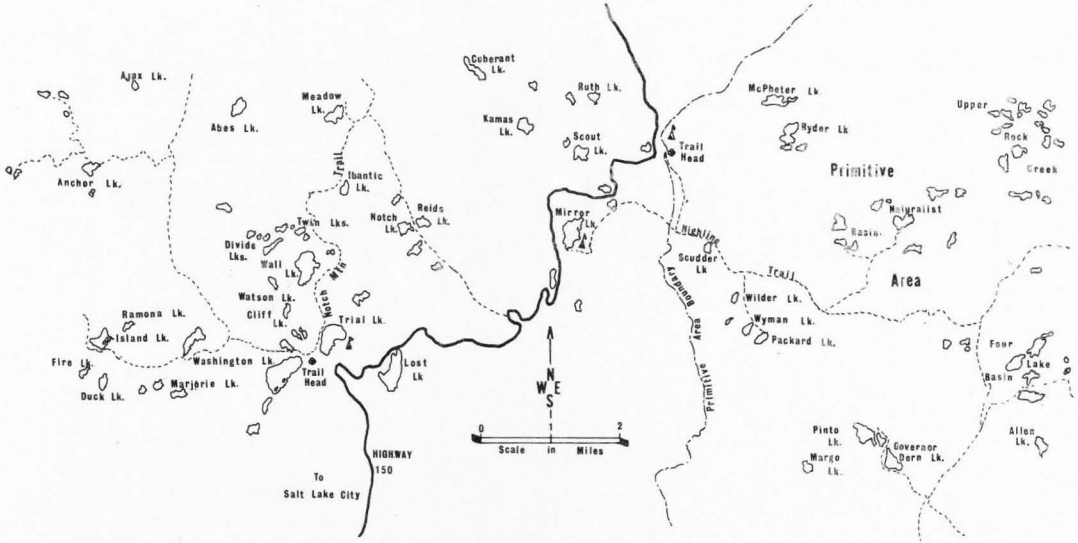

Figure 2. Map showing Highline and Notch Mountain trails.

The Highline trailhead near Mirror Lake provides users with ample parking, horse loading facilities and limited camping areas. This is the main access point for the Highline trail that spans the entire length of the Primitive area and joins with numerous primary and secondary trail systems. The many lakes along the trail systems are usual destinations of users and are generally within a day's hike of each other. The Naturalist Basin and Four Lakes Basin are popular areas used by many eastbound users of the Highline trail and are between 7 and 10 miles from the trailhead.

The Notch Mountain trail and its adjoining trail system serve a large de facto wilderness adjacent to the western boundary of the Primitive area. The trailhead itself is not developed like the Highline trailhead but a large developed campground near Trial Lake provides campers with easy access. The distances between lakes and adjoining trail systems are considerably less than on the Highline trail and lakes within two miles of the trailhead are used the most. Beyond these more heavily used lakes the uncrowded and "primitive" de facto wildlands begin.

Recreational use

Since the study is concerned only with High Uinta users, the results are influenced by the "type" of user that is drawn to the area. Stankey (1971) and Hendee et al. (1968) have shown that characteristics of wilderness users vary between areas. Therefore a description of past use trends may be helpful.

A Forest Service survey (1971), conducted during the 1 July to 10 September 1971 season, found approximately 1722 groups or 18,306 visitors entered the Primitive area. The mean group size was 4.5 people. The mean length of stay for registering groups was 2.56 days or about five visitor days,[4] putting total visitor days at 91,530. Backpackers represented 82 percent of total use. The peak period occurred between late July and mid-August, with weekend and holiday use considerably greater than weekday use. Visitor groups originated from 33 states, Canada and Europe. Eighty-seven percent of the users resided in Utah, with 77 percent living along the Wasatch Front, and 35 percent living in Salt Lake City. Approximately 30 percent of all groups left the Primitive area the same day they entered, 62 percent stayed two days (four visitor days) or less and 92 percent stayed five days (ten visitor days) or less.

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[4]"Visitor day" is defined as one visitor for one twelve hour day.

CHAPTER II

METHOD

The Questionnaire

Design and administration

Data were collected for this study by a questionnaire (Appendix A), designed to be used in a field interview situation. The questionnaire was divided into four parts corresponding with the study objectives.

Interview questions were of fixed alternative (multiple choice) and open-ended types. Fixed alternative questions have limited response dimensions and were used to secure factual information and clear cut opinions. When response alternatives were known and limited in number such questions proved most efficient. When the relevant dimensions of responses could not be predicted, open-ended questions provided a better indication of the respondent's information or opinion about the subject and permitted follow-up probing by the interviewer (Backstrom and Hurch 1963). Open-ended questions are not without interviewer bias (Wales and Lane 1957) and fixed alternative questions are subject to undetectable biases resulting from variance in question interpretation by respondent. Such weaknesses were recognized and prompted the combining of both, not only to balance any discrepancies but to explore the most suitable question type for on-trail interviewing. Both types seemed to complement each other and improve the flow of the interview.

Pretesting the questionnaire commenced with in-class interviews during a graduate Psychology class at Utah State University. Students and professor acted as respondents and critics for the questionnaire. Field testing was conducted on the Highline trail and in Naturalist Basin between 23 June and 30 June, 1972. Due to lingering snow and bad spring weather, few parties were contacted. Enough interviews were given, however, to aid in recognizing interviewing problems, and improve questionnaire format and recording schemes.

The questionnaire was administered by the author at the Highline trail registration station and the Notch Mountain trailhead. These trailheads are the most popular embarking points accessible to Highway 150 and were selected to insure high user contact and representative views.

The study was conducted during the summer of 1972, beginning 1 July and ending 10 September. Past user data indicated little or no use before or after this ten week period due to late spring snow pack and early inclement fall weather.

Parties were contacted and asked if anyone in the group intended to fish while in the study area. If so, one fisherman, fourteen years or older, from each party was randomly selected as interviewee. Respondents were asked to speak for themselves, not for their group. The interview lasted three to five minutes, depending on the loquaciousness of the respondent. Most parties were happy to cooperate, with only one party refusing the interview. Interviews were conducted from 8:00 a.m. to 8:00 p.m. on weekends and holidays and from 8:00

a.m. to 6:00 p.m. on weekdays. Shortly after initiating the field season, it became apparent that parties entering or exiting late in the day or during periods of inclement weather were reticent to participate. As a consequence an abbreviated form of the questionnaire was developed. This technique proved satisfactory for obtaining interviews from persons who otherwise would not have been contacted. No disparity existed in responses obtained from the different forms. Field contacts yielded 131 interviews on Highline trail and 83 on Notch Mountain trail.

Delimitations of the questionnaire

Certain questions or groups of questions could not be answered accurately by all respondents. Respondents with no previous experience in the study areas could not accurately answer questions regarding the usual factors attracting them to the study area, undesirable conditions of the area, or descriptions of past fishing success. Also, anglers lacking experience with both the primitive and de facto alternatives could not make accurate comparisons between the two. As a result, non applicable questions were common for certain sections of the questionnaire and percentages and totals are discussed in terms of full response data with "nonapplicables" being ignored. Therefore sample sizes vary considerably with different sections of the results discussion.

Sampling Procedure

Selection of sample sizes for this study were based on 1971 registration records compiled for the Uinta Primitive Area by the Wasatch and Ashley National Forests. At the time of sample selection, trailhead breakdowns of data were not available, so total use estimates for the entire Primitive area were assumed to represent Highline and Notch Mountain trailheads.

Sampling size

Population estimates based on visitor registration have proved inaccurate. Such data omits users who fail to register, and thus, often shows nothing more than minimum use (Lucus et al. 1971). The Forest Service study (1971) for the Primitive area showed the 1971 registration response rate to be approximately 43 percent of actual use.[5]

Given potential inaccuracies in 1971 Forest Service use estimates, possible increases in 1972 use, and the difficulty in calculating sample sizes for open-ended questions, a conservative 25 percent sample (based on 1971 use figures) was planned. Use figures for the Notch Mountain trailhead were nonexistent but the Forest Service predicted use for this area would be significantly lower than the Highline trail. Therefore, the Notch Mountain sample was increased to 35 percent, insuring an adequate sample size to be compared to the

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[5]The Forest Service later adjusted their use estimates by a factor of 2.33 to compensate for non registrants.

Highline trail sample. With 1694 parties registered in the Primitive area during the 1 July to 10 September 1971 season, a 25 percent sample required contact with approximately 424 parties in the 1927 season (1 July to 10 September). Our summer, 1972 use estimates (as calculated in Appendix C) indicated 730 parties would enter the Primitive area via the Highline trail. Of these, 256 parties were actually contacted representing a 35 percent sample. Estimates for the Notch Mountain trail indicated 409 parties would use this trail and 176[6] parties were contacted rendering a 43 percent sample for Notch Mountain. Differences in actual and planned sample sizes may be a result of inaccurate estimates of previous use from registration data.

Sample stratification

Forest Service data (1971) displayed marked differences in monthly use distribution. Use peaked on weekends and holidays, dropping off significantly during the middle of the week. To prevent understating the opinions of the less represented weekday users, the sample was stratified by month, weekdays, and holidays. A stratified sample would best obtain a proper representation of any existing differences and, regardless of such differences, facilitate a more accurate sample of the entire population (Selltig et al. 1951). Strata were

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[6]These figures represent total angling and nonangling use. They include incomplete interviews not used in actual cata analysis, resulting in slightly higher sample sizes.

weighted according to the number of weekdays, weekends and holidays in each month and days within each stratum were randomly selected to provide an expected 25 percent sample of use. Before actual sample days could be selected, however, expected monthly, weekly and daily sample sizes had to be calculated. These calculations are presented in Appendix B.

During July, weekend activity appeared to begin on Friday and continued through Saturday with weekend use dropping significantly on Sundays. For this month the weekend stratum included Fridays and Saturdays with the weekday stratum incorporating Sunday through Thursday. During July sampling, large numbers of unexpected Sunday day-users arrived. Therefore, weekends were redefined to include Sundays for the months of August and September. Redefining the strata had little or no effect on the sample size during July since two Sundays were already included in holiday stratum. All holidays during the study period fell on weekdays, therefore, the two days preceeding the holidays were stratified as holidays.

Data Analysis

All usable questionnaire data were coded and punched on computer cards for organization and tabulation by computer. A program was developed that enabled the recall and separation of specific types of data for analysis.

Chi square analysis was used to test for significant differences between groups of users[7]. The null hypothesis usually under test was that Highline and Notch Mountain anglers do not differ with respect to some characteristics or with respect to some relative frequency of these characteristics (Siegel 1956). For this study, a difference was considered significant if departure from the expected frequency of responses could have occurred from chance sampling not more than five percent of the time ($p \leq .05$). Only significant differences are reported. Throughout the study differences are mentioned in the text, but they are only significant if followed by a Chi square description meeting the $p \leq .05$ criterion (Siegel 1956).

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[7] For a complete discussion of Chi square see Non-parametric Statistics for Behavioral Sciences, by Sidney Siegel (New York: McGraw-Hill Book Co., 1956), pp. 104-111 and 175-179.

CHAPTER III

RESULTS AND DISCUSSION

Data characterizing Highline and Notch Mountain trail users follows. Results are listed in percentages and when significant differences occur, Chi square (X^2) information is given. Results are discussed by objectives of this study and are segregated into four main sections: (1) angler and non-angler comparisons, (2) a description of anglers, (3) importance of fishing to anglers and factors affecting fishing enjoyment, and (4) angler experience and knowledge of de facto wilderness alternatives.

Angler and Non-angler Comparisons

This research focused on anglers utilizing parts of the High Uinta Primitive Area and its adjacent de facto alternative. The non-angling population was essentially ignored with limited data gathered for total count and general descriptive purposes. These limited data are presented in this section for comparative purposes even though such comparisons were not part of the study objectives. In retrospect, more information on non-anglers might have enabled more meaningful comparisons. The need for base data concerning anglers was deemed more important at the onset of the study, however. This is the only section of this chapter that presents data on non-anglers.

Angler and non-angler proportions, and other descriptive data

The first objective of this research was to determine the proportions of anglers and non-anglers using the study areas. It was originally hypothesized that a majority of the use was attributed to fishermen.[8] Findings indicate that slightly more than half (58 percent) of the groups contacted contained members intending to fish while visiting the area. The Highline trail had a higher proportion of angling groups (61 percent) than Notch Mountain trail (56 percent) (Table 1).

Table 1. Angler and non-angler proportions

Trail	Anglers	Non-anglers	Total
Highline (N = 216)	61	39	100%
Notch Mtn. (N = 148)	56	44	100%
Combined	58	42	100%

[8] If 50 percent or more of the use was attributed to fishermen, the hypothesis was considered correct.

Anglers and non-anglers were not significantly different with respect to previous experience in the study areas. Both groups were dominated by users visiting the study areas for the first time (Table 2). However, if groups are separated according to trail, some differences exist. The non-angling group on Notch Mountain had 23 percent more experience in Uinta Primitive Area than the anglers, a difference significant but unexplainable ($X^2 = 6.8$, $df = 1$, $.005 > p > .001$). With exception to the aforementioned case, Notch Mountain and Highline anglers and non-anglers did not differ significantly with respect to past experience (Table 3).

Table 2. General visitation experience for anglers and non-anglers

Experience level	Angler (N = 214)	Non-angler (N = 150)
Previous experience	45	37
No previous experience	55	63
Total	100%	100%

In light of the experience portrayed by both groups, destination patterns offer further comparisons. Non-anglers on both trails as well as Notch Mountain anglers, selected destinations inversely proportional to the distance of lakes from the trail head (Table 4). The closer a lake to the trail, the greater its use by

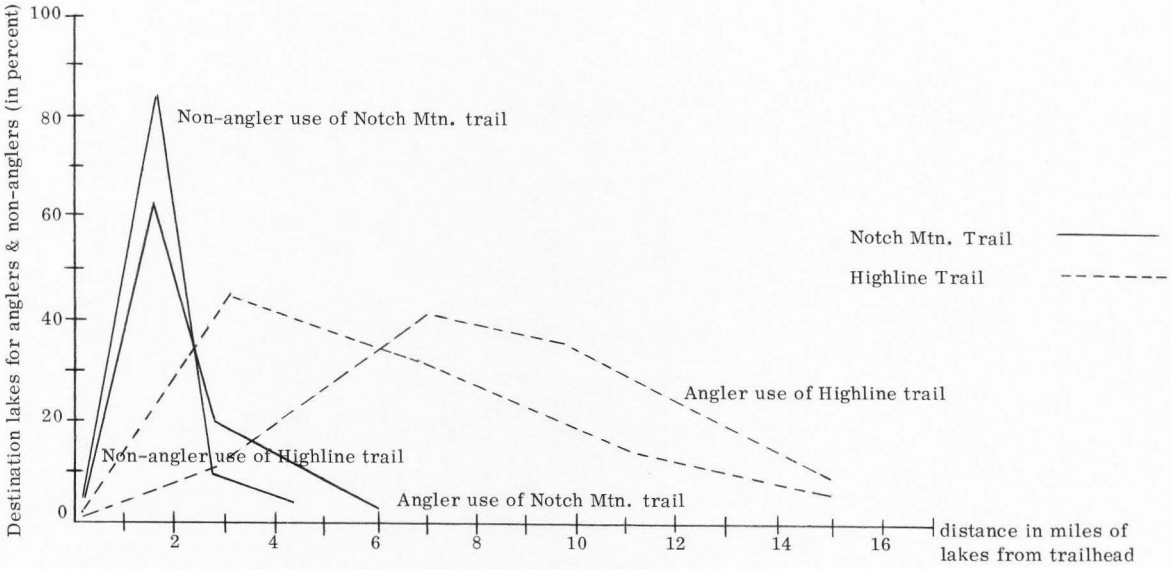
Table 3. Notch Mountain angler and non-angler visitation experience in the Primitive area

Experience	Anglers (N = 83)	Non-anglers (N = 57)
Primitive Area experience	16	39
No Primitive Area experience	84	61
Total	100%	100%

non-anglers. Conversely, anglers traveled greater distances to their destinations. As will be pointed out later, day use was much more prevalent on the more accessible Notch Mountain trail. Although day-use information was not gathered for non-anglers, the high use of closer lakes on both trails may be due to the day-user. For example 47 percent of the Notch Mountain anglers were day users and the Forest Service (1971) found that 30 percent of the sampled users entering the Primitive area were also day-users. What portion of day-use is attributed to non-anglers is not known but the overall day use impact on dispersion patterns can be visualized (see Figure 3).

Table 4. Destinations, distance and use by anglers and non-anglers

Trail	Lake	Distance (miles)	Angler	Non-angler
			(%)	(%)
Highline (N = 204)	Scudder, Wilder Wyman, Packer, McPheter, Ryder	1 - 4	16	44
	Naturalist Basin, Carolyn, Olga	5 - 8	40	31
	Four Lake Basin, Pinto, Margo	9 - 12	34	18
	Brinton, Meadows, Upper Rock Creek Drainage	13+	10	7
	Total		100	100
Notch Mtn (N = 148)	Wall, Watson, Cliff Star, Long Lovenia	1 - 2	64	84
	Divide, Booker, Clyde, John, Upper and Lower Twin, Wier Ibantic, Marjorie	2 1/4 - 3 1/4	20	11
	Island, Meadow, Pot Duck, Fire, Ramona	3 1/2 - 5	13	5
	Rhoads, Abes, Anchor	5 1/2+	3	0
	Total		100	100



*percentages plotted at midpoint of distance zones illustrated in Table 5.

Figure 3. Use distribution in relation to distance along Highline and Notch Mountain traisl

Mode of travel selected by anglers and non-anglers did not vary with respect to foot and horse travel. However, with respect to trailbikes differences did occur on the Notch Mountain trail where trailbikes are permitted. Table 5 shows that non-anglers used significantly more (11 percent) trailbikes than anglers on the Notch Mountain trail system ($X^2 = 7.9$, df = 2, $.025\ p \leq .01$). One may speculate as to why these groups differ in their choice of travel modes and to what degree these choices are compatible, but the dearth of data concerning such matters prohibits documentation.

Table 5. Modes of travel for anglers and non-anglers of Highline and Notch Mountain trails

Mode of travel	Fishermen (N = 214)		Non-fishermen (N=150)	
	Highline	Notch Mtn.	Highline	Notch Mtn.
Foot	76	96	81	83
Horse	24	1	19	3
Trailbike		3		14
Total	100%	100%	100%	100%

A Description of Anglers

The second objective of this study was to describe general characteristics of anglers using Notch Mountain and Highline trails. The following

description encompasses demographic and use characteristics as well as the angler's reason for entering the study areas. Preferred on-site activities and general fishing behavior are also examined.

Descriptions generally refer to anglers of both study areas. However, when significant differences occur between trails, descriptions are discussed separately.

Demographic and use characteristics

Accessibility of the study areas enables over eighty percent of Utah's residents to reach a primitive, alpine environment within two to four hours. The accessibility and reputation of the study areas as a high mountain fishery is evident in the high degree of resident use. Ninety-five percent of the anglers contacted were Utahns (Table 6). Most (89 percent) lived along the Wasatch Front, with 43 percent living in Salt Lake City (Table 7). A previous survey of the Primitive area (USFS, 1971) found 13 percent less Utahns with fewer residents from Salt Lake City (35 percent). These variations may be attributed to different sampling times and techniques; while our research sampled only anglers, the Forest Service study sampled all users. Higher percentages of local residents among the angling sample could also be due to non-resident license fees. Perhaps resident anglers may be more appreciative or knowledgeable of the good fishing reputation of the High Uinta fishery. In their analysis of the Flaming Gorge Fisher, Hewston and Franklin (1969) found that 82 percent of

Table 6. State residences of respondents

	State						
	Utah	Calif.	Colorado	Wyoming	Nevada	Other	Total
	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Highline (N = 130)	92	2	2	1	1	2	100
Notch Mtn. (N = 83)	98	1	0	0	0	1	100
Combined (N = 213)	95	2	1	.5	.5	1	100

Table 7. Resident distribution of Utah anglers

	Salt Lake City	Other Wasatch Front cities	Other Utah areas[a]	Total
	(%)	(%)	(%)	(%)
Highline (N = 121)	40	46	14	100
Notch Mtn. (N = 76)	47	46	7	100
Combined (N = 197)	43	46	11	100

[a]This includes non-Wasatch Front visitors both urban and rural

the visitors were Utahns and 41 percent resided in Salt Lake City. The reputation of this new fishery had been known to Utahns only since 1964.

Consistent with findings of Hendee et al. (1968) and Burch and Wenger (1967), our wilderness anglers were predominantly young to middle-aged adults; mean age was 30.2 years. Virtually all anglers contacted on both trails were male (99 percent). The number of women traveling with male parties was quite high but very few all female parties were contacted. Without exception, women traveling in mixed parties let the men respond to questions.

The predominance of students as an occupational class (31 percent) may explain our low age structure (Table 8). Stankey (1971b) points out that wilderness use may be a function of education, and that college educated persons are especially over-represented among wilderness users. This seems to be consistent with the high number of students we contacted. Semi-professional, skilled, and professional workers, respectively, comprised nearly half (49 percent) the angler occupations. The rural occupations of farming and ranching were the least represented. No significant differences with respect to age, sex, or occupation were found between Notch Mountain and Highline trail anglers.

Anglers traveled in parties of 4.25 (mean) people.[9] These figures do not differ with Forest Service (1971) findings. A review of Stankey's (1971) raw

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[9]Many studies report length of stay in number of days, while others use number of nights. It is difficult to interpret differences in the two methods, however, this investigator feels nights more accurately define length of stay by eliminating travel time bias.

Table 8. Occupation of respondents

Occupation class	Highline (N = 131)	Notch Mtn. (N = 83)	Combined (N =214)
	(%)	(%)	(%)
Student	30	34	31
Semi-Professional	19	16	18
Skilled	18	13	16
Professional	16	15	15
Non-Skilled	10	14	12
Farmer-Rancher	1	0	1
Military	1	5	2
Other[a]	3	2	3
Unemployed	2	1	2
Total	100	100	100

[a]"Other" in this case refers to self-employed.

data[10] for the western Primitive area indicates respondents traveled in a mean party of 6.9 people. The variance in party size may be due to unusually large horse packing parties embarking from trailheads not sampled by this study.

[10]Raw data gathered for the study but not printed in his dissertation.

Outfitters and dude ranches located in the western part of the High Uintas organize large packtrips into the Primitive area.

The length of stay data combined for both trails indicated anglers mean length of stay was 2.2 nights. However the individual trails differed with Highline anglers staying approximately one night longer than Notch Mountain anglers (Table 9). Also the amount of day use encountered in both areas differed considerably. Notch Mountain witnessed 47 percent day use while the Highline trail had only 7 percent day use. These lenght of stay figures allude to possible differences in the study area themselves which will be discussed subsequently.

Table 9. Length of stay

	Mean length of stay	Percent day-use
		(%)
Highline		
Actual	2.76 nights	7
Usual	2.68 nights	
Notch Mtn.		
Actual	1.72 nights	47
Usual	1.90 nights	
Combined		
Actual	2.24 nights	27
Usual	2.29 nights	

Anglers who had previously visited the area were also asked for their usual length of stay during past visits. Little or no differences existed between usual and planned length of stay for anglers using their respective trails. Again Highline anglers stayed approximately one day longer than Notch Mountain anglers during past visits (Table 9).

Foot travel or back packing was the travel mode of a majority (84 percent) of the respondents. Horses were used by 24 percent of the parties on the Highline trail but only 1 percent used horses in the Notch Mountain area. The latter trail does not have parking, loading and corral facilities needed by horse users; natural food for horses is also limited. Notch Mountain recorded the only use of trailbikes since they are not permitted in the Primitive area (Table 10).

Table 10. Mode of travel

	Travel mode			
	Foot	Horse	Motorbikes	Total
	(%)	(%)	(%)	(%)
Highline (N = 131)	76	24	0	100
Notch Mtn. (N = 83)	96	1	3	100
Combined (N =214)	84	15	1	100

Destination and visitation experience

Destinations of respondents were collected to ascertain dispersion patterns. Combining these data for both trails was not possible since each leads to different lakes and lake basins.

Most Highline anglers (74 percent) traveled between five and twelve miles to their destination (Table 5). Within these distances are the more popular fishing and scenic resources along the trail system. The most accessible as well as the most distant lakes were used the least (Table 5). Figure 3 illustrates how Highline anglers dispersion patterns approach a normal frequency distribution. Use dispersion on the Notch Mountain trail differ from the Highline trail with 64 percent of the respondents utilizing lakes within two miles of the trailhead. Here use was somewhat inversely proportional to distance from the trailhead, causing a frequency distribution to be skewed right (Figure 3).

The disparity in destination selections between the two trails can be partially explained by the dimensions of each study area. The Primitive area is much larger with lakes distributed at greater distances along the trail. Notch Mountain lakes are much closer to the trailhead (see maps of study areas). The amount of day-use is another explanation for differences in distribution. Accessibility and the presence of well developed campground facilities near the Notch Mountain trail head contribute to day-use appeal, with many anglers staying in the developed campgrounds and taking day hikes to more distant lakes. Forty-seven percent of the Notch Mountain anglers did not stay over night while visiting

these lakes. This day-use indicates differences in access and use and also suggests variance in the kinds of experience expected from users of the respective study areas.

Inexperienced users. As discussed in angler and non-angler comparisons, first-time users were in the majority (over 55 percent). The previous visitation experience for anglers, analyzed separately by trail indicate similar findings. More than half (56 percent) of the Highline anglers interviewed had no previous experience in the Primitive area (Table 10). Notch Mountain anglers (54 percent) displayed similar experience characteristics (Table 11). It appeared that many users were not only exploring the Uintas for the first time but were also enjoying their first back-country experience. The respondents' previous experience with other primitive areas was not explored and perhaps could have been valuable in comparison to other wilderness recreation research (Hendee et al. 1968; Burch and Wenger, 1967). Such a high percentage of first-time users may reflect the growing popularity of backpacking and wilderness travel in general and the easy access of the Uintas in particular.

Table 11. Visitation experience of Highline anglers

	Primitive area (N = 131)		Naturalist Basin (N = 58)[a]	
	Experience	No experience	Experience	No experience
	(%)		(%)	
Percentage	44	56	66	34

[a]These are the 44 percent experienced in the Primitive areas.

Table 12. Visitation experience of Notch Mountain anglers

	Notch Mountain (N = 83)		Primitive area (N = 83)	
	Experience	No experience	Experience	No experience
	(%)		(%)	
Percentage	46	54	16	84

Experienced users. Less than half (44 percent) the Highline anglers contacted had previously visited the Primitive area (Table 11). These experienced anglers were asked if they had ever visited the Naturalist Basin during a previous visit.[11] Although 66 percent of these Highline anglers had previously visited the Naturalist Basin, 74 percent[12] of them did not return to the area. Conversely, 44 percent[13] of the inexperienced Highline groups selected Naturalist Basin as their destination. The experienced wilderness anglers also tended to disperse more, traveling greater distances to their destinations. Past experience with the Uintas and perhaps other wilderness areas may have encouraged experienced anglers to seek out more isolated alternatives. Failure to return to to Naturalist Basin may be caused by crowded conditions experienced previously or the attraction of more distant, unknown alternatives. As subsequent data will

[11]Naturalist Basin was singled out because of its popularity. Also, identification of a specific destination helped verify previous visits.

[12]These data are not reported on tables.

[13]These data are not reported on tables.

indicate, Highline anglers value "escape" and "primitiveness" more than other anglers contacted (Table 13).

The percentage (46 percent) of previously experienced anglers on the Notch Mountain trail was similar to that found on the Highline trail. However, a smaller number of these anglers had visited the Primitive area (16 percent). These anglers were also asked if they had visited the Naturalist Basin but the sample was too small to warrant discussion (Table 12). The data thus far indicate that Notch Mountain anglers stayed fewer nights and were also mainly day-users (47 percent). They also hiked shorter distances to their destination. These data, and the fact that Notch Mountain anglers have limited experience in the Primitive area again suggest differences in access and use and variance in the kinds of experiences expected from users of the respective study areas.

Reasons for entering study areas and preferred activities

To examine the motives for visiting the study areas, anglers were asked open-ended questions on what factors they liked about the area they were entering. They were then asked to rank these factors as first and second most important reason for visiting the area (Appendix A, questions 8, 9, 10). Responses varied considerably and overlap may occur due to similarities of some responses (Table 13).

Significant differences ($X^2 = 14.5$, $df = 6$, $.025 > p > .01$) were found between Highline and Notch Mountain anglers with respect to their reasons for

Table 13. First and second ranked reasons for entering the study areas

	Rank #1			Rank #3			Sum of Rank #1 and #2		
	Highline (N = 60)	Notch Mtn. (N = 42)	Combined (N = 102)	Highline (N = 58)	Notch Mtn. (N = 42)	Combined (N = 100)	Highline	Notch Mtn.	Combined
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Getting out of doors, scenery	15	41	25	8	17	12	12	29	21
Getting away, escaping	30	14	23	47	23	37	38	19	29
Peace & quiet	11	7	10	7	5	6	9	6	7
Fishing	8	12	10	14	26	19	11	19	15
Primitiveness	11	5	9	0	3	1	6	4	5
Few people	10	2	7	8	10	9	9	6	7
Easy access	5	5	5	2	5	3	3	5	4
Hiking, riding[a] climbing	6	7	6	10	9	10	8	8	8
Good trails, camps	2	2	2	4	0	2	3	1	2
Clean, cool air & environment	2	5	3	0	2	1	1	3	2
Totals	100	100	100	100	100	100	100	100	100

[a]"riding" refers to horseback riding, however, 2 percent of the Notch Mountain anglers referred to trail bike riding as a secondary attractor.

entering the study areas. Many Notch Mountain anglers (41 percent) placed the highest value of "out-of-doors" and "scenery" while most Highline anglers (30 percent) felt the chance to "escape" or "get away from it all" was the first ranking attraction. More Highline than Notch Mountain anglers felt "peace and quiet" (11 percent), "primitiveness" (11 percent), and "fewer people (10 percent) were first ranking reasons for entering the study areas.

Fishing was originally hypothesized to be the top ranked motive for entering the study areas but the data do not support this hypothesis. Only 8 percent of the Highline anglers felt fishing was a first ranking reason for entering and 12 percent of the Notch Mountain groups felt that same way.

Fishing became more important as a second ranked motive for entering the study areas. Twenty-six percent of the Notch Mountain respondents felt fishing was the second most important reason for visiting the study area, while 14 percent of the Highline anglers ranked fishing similarly. Fishing is an important activity, as will be pointed out, but these data suggest it is not the first ranked motive of the visit for many anglers. It is more secondary in nature judging from angler responses. Brown (1968), in his analysis of trout anglers, found that fishing was the primary purpose for more than 80 percent of the trips to one of his study areas. However, Brown's study areas were popular fisheries accessible by automobile offering a developed environment where fishing had few substitute activities. Brown did find however, that anglers on longer trips considered the enjoyment of being in the outdoors, relaxing, and getting away from

an ordered environment into an unordered one, to be more important than fishing. Hewston and Franklin (1969) found that fishing was the primary reason for 37 percent of the visits to Flaming Gorge but 36 percent of their respondents also came primarily to view the scenery. At Flaming Gorge, as in the Highline and Notch Mountain areas, scenery and other attractions seemed to be more important reasons for trips than fishing. Escape from the routine, getting outdoors and mountain scenery were first ranked motives selected by most Highline and Notch Mountain anglers as the reasons for entering both study areas (Table 13).

Preferred activities. A question seeking the on-site activities (Appendix A, question 12) revealed that 35 percent of the anglers on both trails ranked fishing first or second as the preferred activity during their trip (Table 14). Other preferred activities included hiking (23 percent), rest and relaxation (10 percent), and general camping (9 percent). In all 65 percent of the anglers on both trails ranked other activities over fishing. As previously discussed, "escape" and "getting outdoors" were not top ranked motives attracting anglers to the study area. However, fishing was an important activity preferred by 35 percent of the anglers. These data suggest that what motivated an angler to enter an area and what he does when he gets there are two different things. However, it is difficult to separate the two when one considers that a motive may be something (a need or desire) that causes someone to act and that the activity may directly or indirectly fulfill that motive or provide a setting or opportunity for its fulfillment. For example, the angler may be motivated to

Table 14. Activities ranked either first or second[a] in importance by anglers

Activity	Highline (N = 100)	Notch Mountain (N = 87)	Combined (N = 181)
	(%)	(%)	(%)
Fishing	38	32	35
Hiking	19	27	23
Resting, Relaxation	13	7	10
Horseback Riding	13	3	8
General Camping	5	14	9
Photography	4	7	6
Waterplay, Swimming	3	7	5
Nature Study	3	0	2
Exploring	2	3	2
Totals	100	100	100

[a] i.e., 38 percent of the respondents ranked fishing either first or second as the most popular activity

enter an area by the desire to escape or get outdoors and when he reaches his destination that motive may be at least partially fulfilled by fishing or some other activity. Such speculation alludes to the complexity of wilderness fishing activity. Other studies also indicate this same complexity. Lucus (1964) found that wilderness values were the main motive for canoe trippers. While canoeing was obviously the main activity for these users, it was not the primary attraction or motivation. The same may be true of wilderness fishermen. Also, Hewston and Franklin (1969) found that fishing was the preferred activity for 75 percent of the visitors to Flaming Gorge Reservoir but only 37 percent came

for the sole purpose of fishing.

Undesirable conditions. Factors that disturbed or displeased respondents were gathered by open-ended questions to help identify management problems and further describe angler characteristics (Appendix A, question 11). Thirty-six percent of anglers contacted on both trails stated no undesirable conditions marred their experience. However, excessive crowding and littering were the main complaint of 29 percent of the anglers. Twenty percent of the Notch Mountain anglers felt motor bikes were undesirable while poor fishing displeased only 6 percent of the respondents on both trails (Table 15). Crowding and subsequently littering are problems endemic to recreational facilities of all types. Lucus (1964) found many wilderness users were sensitive to crowding and that crowded conditions affect what one perceives as wilderness. For this study it was originally thought that anglers might be more crowd tolerant than other wildland users. The concentration of use around popular fisheries seemed to testify to this and the data indicate that this may be true. Crowding was an undesirable condition mentioned by only 17 percent of the anglers. However, littering, motor bikes, and horses were also undesirable conditions mentioned by anglers. These may be by-products of crowding and suggest that anglers may be more intolerant to crowding and its subsequent effects than is initially apparent.

Another undesirable condition worth mention requires referral back to discussion of travel mode. Travel mode data indicate only 3 percent of the Notch Mountain anglers used trailbikes. yet 20 percent felt they were undesirable.

Table 15. Undesirable conditions mentioned by anglers in both study areas

Undesirable condition	Highline (N = 59)	Notch Mtn. (N = 41)	Combined (N = 100)
	(%)	(%)	(%)
No undesirable conditions	44	25	36
Crowding	17	17	17
Litter	12	12	12
Trailbikes	0	20	8
Poor fishing	8	3	6
Horses	5	2	4
Physical environment	7	14	10
Management & facilities	7	7	7
Total	100	100	100

Obviously, the high annoyance levels generated by so few trail bikes indicate a considerable problem in need of correction.

With exception to trailbike displeasure, Notch Mountain and Highline anglers did not differ significantly on undesirable conditions.

General fishing behavior and knowledge of stocking practices

Certain characteristics regarding general fishing behavior were collected to determine if respondents fished more than the average Utah fishermen. The respondent's usual fishing locale, method and normal number of trips per year were obtained.

Data indicate that high mountain lakes and streams were the preferred (41 percent) fishing locale for Notch Mountain and Highline groups, while 21 percent preferred streams or rivers and 19 percent favored reservoirs (Table 16). In comparison, Bangerter's (1968) Fishing Harvest Inventory for the state of Utah reported that 69 percent of the anglers preferred to fish in reservoirs or lakes while 31 percent preferred to fish in streams. This suggests that our sample is nonrepresentative of general Utah fishermen.

Table 16. Preferred fishing locale

	Locale					
	High lakes & streams	Low lakes	Streams & Rivers	Reservoir	Other[a]	Total
	(%)	(%)	(%)	(%)	(%)	(%)
Highline (N = 131)	45	5	19	17	14	100
Notch Mtn. (N = 79)	35	8	23	23	11	100
Combined (N = 210)	41	6	21	19	13	100

[a]"other" refers to a combination of locales.

Bait fishing was the preferred method for 41 percent of anglers contacted, however, more Highline anglers fished regularly with flies than did Notch Mountain anglers. Lures were preferred by 23 percent of the anglers on both trails

(Table 17). In comparison to our data, Gordon (1970) found that 73 percent of all Idaho anglers used bait at least part of the time and 44 percent used flies at least one quarter of the time. It appears that bait is not as popular in our study areas as in other typical fisheries. Whether or not this reflects the difficulty in carrying bait into the backcountry, or the successful reputation of artificials in the High Uintas is not clear.

Table 17. Preferred fishing methods of Highline anglers

	Method				
	Flies	Bait	Lures	Other[a]	Total
	(%)	(%)	(%)	(%)	(%)
Highline (N = 131)	34	36	23	7	100
Notch Mtn. (N = 80)	21	50	23	6	100
Combined (N = 211)	29	41	23	7	100

[a]"other" refers to a combination of methods.

Most high elevation lakes and streams were devoid of fish until stocking programs began in the 1930's. Forty-eight percent of the respondents were knowledgeable about fish stocking practices in the study areas, 32 percent thought trout were native and 20 percent knew nothing about stocking. These data may be misleading since conflicts in defining native and hatchery stock may exist. For

example, trout originally planted as fingerlings or stocked trout that spawn may be considered native by some and not native by others. What is important here however, is that so many anglers knew stocking was a common practice in the study areas.

In sum this section found that anglers from both trails displayed similar demographic and use characteristics. However, they differed in length of stay, with Notch Mountain anglers being day-use oriented and staying fewer nights. Also, anglers exhibited similar levels of visitation experience. Approximately half the users had no previous experience in their respective study areas with Notch Mountain anglers being the least experienced in the Primitive area. Many anglers experienced Naturalist Basin did not return.

Many anglers ranked "escape" and "getting outdoors" as primary motives for entering the study areas and reported fishing as a preferred on-site activity. Crowding and litter were the major undesirable conditions encountered by anglers with trail bikes generating high annoyance levels on the Notch Mountain trail.

Anglers of both study areas were nonrepresentative of general Utah fishermen, preferring high mountain lake and stream fisheries. They were also knowledgeable about stocking practices in the study areas.

The Importance of Fishing to Anglers of the Study Areas

The third objective of this study was to examine the importance of fishing and factors affecting the fishing enjoyment of anglers of both study areas. Anglers

were asked to rate their present fishing experience and an open-ended question sought an explanation for their rating (Appendix A, questions 17 and 18). The effects of number and catch reduction, and presence of other fishermen were also presented to anglers. Anglers were then asked to respond to various stocking programs in a wilderness situation.

Importance of success and rating of fishing

The Uinta anglers sampled were relatively successful, reporting a catch rate of 2.2 fish[14] per hour of fishing effort. The mean for Utah in 1968 was .88 fish per hour (Bangerter, 1968). Hewston and Franklin (1969) found the mean catch per hour for anglers on Flaming Gorge to be 1.97 fish. Highline anglers caught more fish per hour than did Notch Mountain anglers, but size of fish did not vary significantly from the mean of ten inches (Table 18).

Table 18. Fishing success measurements

	Measurements			
	Number of fish caught (mean)	Hours fished per day (mean)	# fish caught per hour (mean)	Length of catch (mean)
Highline (N = 76)	8.7	3.4	2.6	10
Notch Mtn. (N = 38)	7.8	4.4	1.8	10
Combined (N = 114)	8.2	3.75	2.2	10

[14]This figure includes released fish.

Angling success was also confirmed by the way anglers rated the fishing quality. Forty-seven percent of the anglers who had previously visited the study area[15] rated the fishing as generally "good" or "excellent" and 53 percent rated it as "fair" or "poor". In a previous open-ended question concerning undesirable conditions (p. 43) only 6 percent of the anglers complained of poor fishing, yet when asked to rate fishing, through a fixed alternative (multiple choice) question, 19 percent rated the fishing as poor. Such differences suggest that anglers may rate the fishing as "poor" but since fishing is not a decisive aspect of the entire experience it did not effect the overall experience evaluation. Such "poor ratings" may describe the fishing but do not necessarily connote undesirable conditions during a visit to the study areas. Table 19 shows how anglers rated fishing quality in both study areas.

Table 19. How anglers rated fishing in the study areas.

	Rating				
	Excellent	Good	Fair	Poor	Total
	(%)	(%)	(%)	(%)	(%)
Highline (N = 77)	6	40	34	20	100
Notch Mtn. (N = 37)	3	43	35	19	100
Combined (N = 114)	5	42	34	19	100

[15]Only experienced anglers were asked to rate fishing. Inexperienced anglers could not make accurate ratings with no previous fishing exposure.

Experienced anglers were also asked why they rated the fishing as they did. Anglers who rated fishing positively ("good" or "excellent") did so because of their success rate; 44 percent being satisfied because of the number of fish caught. Nine percent of the anglers rated the angling negatively ("poor"), claiming it was generally slow and 7 percent were negative because of crowding. The small size of fish dissatisfied another 7 percent of the anglers. Several response groups were regarded as neutral in that a response could connote positive or negative ratings. In this category, 11 percent of the anglers rated the fishing as sometimes "hot or cold" ("sometimes good or bad"), and 8 percent stated fishing quality depended on the skill of the angler (Table 20).

Hypothetical catch reductions. The aforementioned catch rates and angler ratings were factors in the fishing experience which indicated a relatively high degree of angler success and satisfaction. To determine the importance of these factors and the importance of fishing as an activity anglers were confronted with a question on hypothetical catch reduction. A majority (69 percent) of the anglers reported no disappointment if their normal catch was reduced by half, 50 percent responded similarly to 100 percent catch reductions. Although most anglers reported no disappointment in catch reductions, the percentage of anglers "slightly" or "very disappointed" increased from 31 percent to 50 percent as catches were hypothetically reduced from 50 to 100 percent of the usual catch (Table 21).

Table 20. Why anglers rated fishing qualities as they did

Reason for rating	Highline (N = 76)	Notch Mtn. (N = 35)	Combined (N = 111)
	(%)	(%)	(%)
Positive ratings			
Few fishermen	0	6	2
Caught several fish	51	29	44
Native trout (species)			
Sub total	51	41	48
Neutral ratings			
Weather factors	2	3	2
Dependent on skill	9	6	8
Fishing "hot or cold"	11	12	11
Wrong bait	4	9	5
Sub total	26	30	26
Negative ratings			
Too many fishermen	9	3	7
Lakes have low carrying capacity	1	6	3
Fishing usually slow	5	17	9
Fish are too small	8	3	7
Sub total	23	29	26
Total	100	100	100

Table 21. Expressed disappointment due to 50-100 percent catch reductions

Disappointment	50% reduction			100% reduction		
	Highline (N = 73)	Notch Mtn. (N = 33)	Combined (N = 106)	Highline (N = 127)	Notch Mtn. (N = 76)	Combined (N = 205)
	(%)	(%)	(%)	(%)	(%)	(%)
Very disappointed	12	6	10	29	16	24
Slightly disappointed	19	24	21	23	30	26
Not at all disappointed	69	70	69	48	54	50
Total	100	100	100	100	100	100

Anglers were asked in an open-ended question (Appendix A, question 25) why 100 percent catch reductions did or did not bother them. Most (52 percent) anglers were not disappointed because, as they implied, "fishing was secondary," or, in other words, some aspects of their trip were more important than fishing. However, 20 percent of the anglers stated they "came to fish" and therefore were disappointed with catch reductions. These data fit those of Stroud (1964) who concluded that since nearly two-thirds of the nation's anglers take less than one-third of all fish caught and half of these catch nothing, a substantial number of anglers must be fishing "mostly for the fun of it" (Table 22).

As discussed earlier, anglers in our study fished more than the average Utah fishermen and experienced rather high success. Yet anglers claimed catches

Table 22. Reasons for expressed disappointment with stock reductions

Reasons	Highline (N = 127)	Notch Mtn. (N = 76)	Combined (N =203)
	(%)	(%)	(%)
No disappointment			
Fishing is secondary	52	48	51
Don't expect to catch fish	2	4	2
Fishing is just a sport	7	13	9
Sub Total	61	65	62
Slightly & very disappointed			
Came to fish	18	24	20
Always have caught fish in the past	4	3	2
Have heard good reports	5	5	5
Need fish for food	12	3	9
Sub Total	39	35	38
Total	100	100	100

catches were not important mainly because fishing was secondary. But if catch rates were lower than reported, would hypothetical reductions be as acceptable and fishing so secondary to anglers? To test such a hypothesis the expected and actual success rates and fishing ratings of a small sample of entering and exiting anglers on the Highline trail were compared.[16] Results indicated that anglers

[16]Initially only anglers entering the area were interviewed. However, the value of entering and exiting opinions for comparison was recognized. Therefore both groups were interviewed. Those entering groups also encountered as they were leaving were not interviewed.

entering the Primitive area had a higher expected success rate than the actual success rate reported by exiting anglers (Table 23). More conclusive was how the group rated fishing quality. Eleven percent of the entering anglers rated the fishing as excellent while none of the exiting anglers felt this way (Table 24). Also with respect to catch reductions, only 11 percent of the entering anglers expressed slight disappointment with 50 percent catch reductions (Table 25), while 56 percent of the exiting anglers would be "slightly" or "very disappointed". Similarly, exiting anglers expressed 20 percent more displeasure with 100 percent catch reductions than entering anglers (Table 26). Such data appears to indicate that the actual catch is more important than expected catch in the angler's fishing experience. To some anglers the tangible reward of the catch assumes great importance while others are satisfied by just experiencing the outdoors. Concurrent to this, Brown (1968) contented that skill and experience mature the angler's perception. Relaxation, pleasurable activities, environment and exercise of skill become more important than the catch, as long as an acceptable level of success is achieved in the long run.

Fishing and stocking of fish in wilderness situations. To further test the importance of fishing, anglers were simply asked, "How important is fishing to your Wilderness or Primitive area experience?" (Appendix A, question 42). Fifty-six percent reported it was "fairly important, 31 percent said it was "very important" and 13 percent felt it was not at all important (Table 27). A majority (87 percent) of the anglers placed some degree of importance in fishing in wilderness situations but of these over half felt it only fairly important. Notice that

Table 23. Fishing success measurements of entering and exiting anglers

	Number of fish (mean)	Hours/day (mean)	#fish/hour (mean)	Length of catch (mean)
Entering anglers (expected) (N = 59)	9.6	3.0	3.2	10.3
Exiting anglers (actual) N = 63	7.3	3.9	1.9	9.8

Table 24. How entering and exiting anglers rated fishing quality

	Rating				
	Excellent	Good	Fair	Poor	Total
	(%)	(%)	(%)	(%)	(%)
Entering anglers (N = 37)[a]	11	43	41	5	100
Exiting anglers (N = 37)	0	38	27	35	100

[a]Only experienced anglers were confronted with this rating resulting in a smaller "N" value.

Table 25. Expressed disappointment of entering and exiting anglers over 50 percent catch reduction

	Disappointment			
	Very disappointed	Slightly	Not at all	Total
	(%)	(%)	(%)	(%)
Entering anglers (N = 36)	0	11	89	100
Exiting anglers (N = 34)	26	30	44	100

Table 26. Expressed disappointment of entering and exiting anglers over 100 percent catch reductions

	Disappointment			
	Very disappointed	Slightly	Not at all	Total
	(%)	(%)	(%)	(%)
Entering anglers (N = 55)	16	24	60	100
Exiting anglers (N = 63)	38	22	40	100

Table 27. The importance attached to fishing in wilderness situations by anglers

	Importance			
	Very important	Fairly important	Not at all important	Total
	(%)	(%)	(%)	(%)
Highline (N = 130)	28	57	15	100
Notch Mtn. (N = 70)	90	9	1	100
Combined (N = 200)	31	56	13	100

Notch Mountain anglers were much more single-minded in their pursuit of fishing in a general wilderness situation. This appears to be contradictory when so many (48 percent) Notch Mountain anglers previously stated fishing was secondary to them. However, more Notch Mountain anglers felt fishing was a top ranked

motive for entering the study area. Also, more Notch Mountain than Highline anglers expressed disappointment with stock reductions because as they stated "they came primarily to fish." Notch Mountain anglers may also be more fishing oriented because of the area they are visiting. Many lakes are more accessible and the "primitiveness" or "escape" motives were much less prevalent among these anglers using the Notch Mountain trail. Since this particular question dealt with wilderness situations in general, the data suggest that perhaps these anglers have a different concept of wilderness fishing.

To determine how anglers felt about fishery management practices in the study areas, opinions on stocking practices in wilderness situations were obtained (Appendix A, question 40). Eighty percent of the anglers from both trails felt stocking of fingerlings was desirable and 66 percent felt similarly about the stocking of catchable size stock.[17] Eighty-seven percent felt that no stocking was undesirable in a wilderness situation (Table 28). In support of this Gordon (1970) found only 9 percent of resident anglers in Idaho expressed disappointment with stocked fish, and as previously mentioned, many of the anglers (48 percent) from our sample were knowledgeable of stocking practices in the study areas. These data support the contention that anglers desire maintenance of the fishery resource through stocking practices. McFadden et al. (1964) also found that trout anglers were in favor of trout stocking programs. He reports

[17]Stocking of catchable size trout in the High Uinta lake is not feasible since stocking is done by air.

Table 28. Angler responses to stocking practices in a wilderness situation

Response	Stocking practices								
	Stock catchable size			Stock fingerling size			No stocking		
	Highline	Notch Mtn.	Combined	Highline	Notch Mtn.	Combined	Highline	Notch Mtn.	Combined
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Desirable	70	63	66	80	81	80	9	7	9
Neutral	3	5	5	8	6	7	4	5	4
Undesirable	27	32	29	12	13	13	87	88	87
Total	100	100	100	100	100	100	100	100	100

that 52 percent of the trout anglers contacted supported trout stream (and lake) maintenance by stocking. The anglers also felt stocking was an activity required to meet future fishing needs.

Effects of crowding. The effects of crowding were also considered in the over all importance of fishing to anglers. Sixty-seven percent of the respondents stated they were "not bothered" by present numbers of fishermen contacted on their trip and 37 percent stated they would "not be bothered" by a hypothetical 100 percent increase in this number of fishermen (Table 29). The data point to a tolerance for the present number of fishermen but this declines as these numbers were doubled. Previous data indicated crowding to be the major undesirable condition encountered by 17 percent of the anglers in both study areas. This indicates that perhaps crowding is perceived differently in fishing situations as opposed to the overall backcountry experience.

Table 29. How anglers reacted to present and increased crowd levels

	Present			Increased		
	Highline	Notch Mtn.	Combined	Highline	Notch Mtn.	Combined
	(%)	(%)	(%)	(%)	(%)	(%)
Bothered very much	7	3	5	30	25	28
Bothered slightly	28	27	28	36	33	35
Not bothered at all	65	70	67	34	42	37
Total	100	100	100	100	100	100

In sum, this section indicated fishing was not of great importance to anglers utilizing the Highline and Notch Mountain trails. However, Notch Mountain anglers appear to be more fishing oriented. Catch reductions and number of other fishermen appear as no threat to the angler who catches fish and feels angling is of "secondary" importance. The dissatisfactions of less successful anglers and the angler's desire to maintain the fishery through stocking still reveal a desire for fishing activity, however "secondary" it may be.

Angler Experience and Knowledge of Alternative Fisheries

The final objective of this study was to explore the extent of knowledge and experience Highline trail anglers have of adjacent de facto wilderness alternatives west of Highway 150. Anglers entering the Primitive area via the Highline trail were the primary targets of this objective with comparative data gathered on the Notch Mountain trail. Open-ended questions collected information on past de facto experience and reasons for failing to utilize this alternative (Appendix A, question 31). Comparisons between the Notch Mountain and the Primitive area were obtained to verify previous information regarding visitation experience (Appendix A, questions 35-38).

Visitation experience with de facto alternatives

The results showed that a majority (73 percent) of the Highline anglers had never visited the de facto alternative west of Highway 150. Such high per-

centages of inexperienced anglers resulted in a small sample size of anglers with de facto experience (N = 36), which requires any conclusions to be drawn with caution.

Initial visitation experience data indicated over half (56 percent) of the anglers were on their first trip to the Primitive area and as previously discussed the extent of experience elsewhere in the Uintas was not determined. The data concerning de facto visitation experience indicates most (73 percent) anglers were also inexperienced west of the Primitive area. Thus, anglers visiting the Primitive area for the first time appear to be visiting the entire Uinta area for the first time.

It was suggested earlier in the discussion that the reputation of an area affects its use. Highline angler responses to open-ended questions revealed that "lack of knowledge and experience" was the major reason (53 percent) for not utilizing alternative sites. Several respondents (14 percent) stated "lack of time" and others (19 percent) gave no reason for their failure to explore alternatives (Table 30). These data indicate that information regarding the de facto alternative areas is lacking. With respect to information about potential areas, Stone and Taves (1956) found that most wilderness users first learned about an area via friends, relatives or work associates. With such high percentages of first time users visiting the Primitive area, its reputation seemed to be more obvious than the de facto alternative. The effects of reputation not only attract users to the Primitive area, but also deflect use from possible de facto

Table 30. Reasons given by inexperienced anglers for not using alternative areas

Reasons	Highline (N = 93) (%)	Notch Mtn. (N = 64) (%)	Combined (N = 157) (%)
No experience or knowledge of areas	53	36	45
Lack of time	14	28	20
No reason given	19	10	15
Crowding and too accessible	7	3	5
Fishing isn't that important	2	6	5
No guide or companion	2	6	4
Too far to hike	0	11	4
Desire primitive experience	3	0	2
Totals	100	100	100

alternatives. Seven percent of the anglers having never visited a western de facto alternative claimed the areas were too accessible and prone to crowding. Others (3 percent) desired a "primitive experience" unobtainable in de facto alternatives (Table 30). This seems ironic when many de facto alternatives are less crowded and as "primitive" as the Primitive area. An area's reputation, as the data indicate, seems to influence the decision framework of the inexper-

ienced angler. Analysis of data for anglers with previous experience also testifies to this.

Approximately one fourth (27 percent) of the anglers contacted in the Primitive area reported visitation experience west of Highway 150. A large majority (91 percent) of this use was within the Notch Mountain trail system. Why anglers have not explored other alternative resources is not known. However, Notch Mountain's popularity as an alternative may be attributed to its reputation, accessibility, good trails and facility development near the trail head. This being the case, the Notch Mountain area may service a different kind of experience, rather than provide an alternative to the kinds of things available in the Primitive area. This is supported by the reports of anglers experienced in both areas. These anglers were asked why they had not selected the de facto alternative areas for this trip. Fifty-three percent of the Highline anglers stated that "primitiveness" was an essential criterion in their selection of the Primitive area over a western alternative and 50 percent of the Notch Mountain users felt access and time were the basic reasons for not selecting the Primitive area as an alternative site. Judging from the data, different kinds of users with different needs are utilizing the two areas (Table 31).

Notch Mountain's popularity and reputation may also contribute to the minimal use received by other alternative sites. It may act as a "bad example", discouraging further exploration of other areas west of the highway. Evidence of this can be seen in the comparisons anglers made between the areas (Table 32). Anglers were asked to compare the fishing, numbers of fishermen (or

Table 31. Reasons experienced anglers did not select alternatives

Reason	Highline (N =26)	Notch Mtn. (N = 10)	Combined (N = 36)
	(%)	(%)	(%)
Primitiveness	53	0	38
Exploring new area	23	30	25
Crowded	8	20	11
Going along with crowd	8	0	6
Enjoy both areas	4	0	3
Showing friend or family	4	0	3
Access and time	0	50	14
Total	100	100	100

crowding), and the scenery of the Primitive area and the de facto alternative areas.[18] Most (48 percent or more) anglers felt their Primitive area experience was superior to the western alternative. The exception to this was the scenery comparison. More anglers felt scenery was comparable for both areas (Table 32).

[18]Since most alternative experience was in the Notch Mountain area, comparisons are, for practical purposes, referring to Notch Mountain.

Table 32. Comparisons of fishing, crowding, and scenery by anglers experienced in both areas.

Study areas	Greater catch			Larger fish			Fewer fishermen			Better scenery		
	High-line	Notch Mtn.	Combined	High-line	Notch Mtn.	Combined	High-line	Notch Mtn.	Combined	High-line	Notch Mtn.	Combined
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Primitive area	55	89	72	45	78	62	52	44	48	55	11	33
Western alternative	24	0	12	24	11	17	31	33	32	14	33	24
Same	21	11	16	31	11	21	17	23	20	31	56	43
Total	100	100	100	100	100	100	100	100	100	100	100	100

The data indicate that the Notch Mountain area did not provide the solitude of fishing quality the Primitive area did but that scenic demands were met by both. An explanation of this is illustrated by the Notch Mountain destinations selected by Highline anglers experienced in both areas. Figures (Table 33) indicate that most (64 percent) of the trips on the Notch Mountain trail, were within 3 1/4 miles of the trail head. True de facto wilderness on the Notch Mountain trail lies beyond this distance. If anglers were seeking a primitive experience within the Notch Mountain area they apparently were not receiving it. Another consideration is that the Notch Mountain area may be used for a different kind of experience. Its accessibility, prevalence of trailbikes, and use by large numbers of day users attest to this possibility.

Table 33. De facto alternative lakes and distances used by Highline anglers (N = 36)

Lake	Distance in miles	Percent
Wall, Watson, Cliff Star, Long, Lovenia	1-2	32
Divide, Booker, Clyde John, Upper & Lower Twin, Weir, Ibantic Marjorie	2 1/4 - 3 1/4	32
Island, Meadow, Pot Duck, Fire, Ramona	3 1/2 - 5	27
Rhoads, Abes, Anchor Other lakes	5 1/2+	9
Total		100

In sum, the data indicate that most Highline anglers (73 percent) had no previous experience with de facto alternatives. It appears that decisions regarding western alternatives are partially based on Notch Mountain standards obtained by experience, or for the inexperienced, by the reputation of the area. It appears that the more accessible reaches of the Notch Mountain de facto area do not provide the solitude or fishing success that the Primitive area does, nor are the same kinds of experiences sought in both areas. High amounts of day-use on Notch Mountain and angler comparisons of both areas attest to this. To render alternative sites useful as management tools, proper information regarding them should be disseminated. The sites are there, the problem is making them available to the public.

CHAPTER IV

SUMMARY AND CONCLUSIONS

Close proximity to the highly populated Wasatch Front make the High Uinta Primitive Area Utah's most popular high mountain recreation area. The area's reputation as an excellent trout and grayling fishery is a special attraction. Proposed for inclusion in the National Wilderness Preservation system, the High Uinta Primitive Area faces several management dilemmas. The primary problem being that managers must protect the physical resource from the effects of heavy recreational use without destroying the primitive and aesthetic dimensions of the wilderness environment. Our study hypothesized that much of the impact on the more accessible lakes is due to users whose primary motive is fishing. Before management decisions regarding the restriction or control of use are made, input regarding angler motives, characteristics, behavior and preferences would be desirable information. The need to obtain some of this information was a major justification for this study, and prompted the objectives: (1) to determine the proportions of angling to non-angling groups using the study areas; (2) to describe certain demographic and fishing characteristics of these anglers; (3) to examine the importance of fishing and factors affecting fishing enjoyment; and (4) to determine the angler's knowledge and experience with adjacent de facto wilderness alternatives.

The principal method of data collection was an interview questionnaire administered in the field. The questionnaire utilized open-ended questions for exploration of response dimensions and fixed alternative questions to permit factual answers and provide necessary intervals between probings.

Past user registration was used to determine sample size. Possible inaccuracies in registration data and expected increases in use prompted the selection of a conservative 25 percent sample size. Due to fluctuations in monthly use distributions, the sample was stratified to facilitate a more accurate representation of the entire population. Strata were weighted according to the number of weekdays, weekends, and holidays in each month and days from each strata were selected for a planned 25 percent random sample. The actual total sample collected was 35 percent for the Highline trail and 43 percent for the Notch Mountain trail. Usable data was coded and punched for computer organization and tabulation.

Angler and Non-angler Proportions

It was originally hypothesized that a majority of the use around the more accessible lakes in the study areas was attributable to fishermen. Results showed that slightly more than half the groups contacted were comprised of one or more anglers planning to fish in the study areas. This was less than we anticipated, but still indicates substantial fishing use. The Primitive area had slightly greater proportions of anglers than the Notch Mountain area. Although data was

limited for non-anglers, some comparisons were made. Both anglers and non-anglers were dominated by first time users. Differences existed between anglers and non-anglers with respect to previous experience in the study areas, destination and mode of travel.

A Description of Anglers

Anglers of both study areas were mostly Utah residents from the highly urbanized Wasatch Front. Demographically, they were similar to other wilderness users (Lucus, 1964; Hendee et al. 1965) being predominantly young male adults and mostly students, semi-professional or skilled workers. Anglers traveled in parties of 4.5 (mean) people and Highline anglers stayed 2.8 (mean) nights, with Notch Mountain anglers staying approximately one night less. Backpacking was the most popular mode of travel with horses being used less on the Notch Mountain trail. The Notch Mountain trail had the only use of trailbike.

Highline anglers traveled greater distances to their destination with the closest and furthest lakes being used the least. Conversely, Notch Mountain anglers utilized the lakes closest to the trailhead. This disparity in dispersion pattern can be explained by the larger size of the Primitive area, and the high degree of day-use encountered on the Notch Mountain trail. Much of this day-use may be attributed to the accessibility and presence of well developed campground facilities near the Notch Mountain trailhead. In addition, Highline anglers may travel further in hopes of attaining a more "primitive" environment.

Highline anglers valued "escape" and "primitiveness" more than other anglers contacted.

Over half the anglers of both study areas were visiting the study areas for the first time. Experience in wilderness or primitive areas other than the Uintas was not determined. However, data concerning experience with de facto alternatives revealed that most anglers were also inexperienced with these High Uinta areas. Over half the anglers who did have experience in the Primitive area had previously visited the heavily used Naturalist Basin. Most of these anglers were not returning to Naturalist Basin. Many of the first time users, however, selected Naturalist Basin as their destination.

As subsequent data indicate, Highline anglers value "escape" and "primitiveness" more so than other anglers contacted. Such may be the reason for experienced users avoiding heavily used areas like Naturalist Basin. The selection of Naturalist Basin by first time users may be attributed to "word of mouth" information regarding popular areas passed on to the inexperienced user. Such high percentages of first time users reflect the increasing popularity of backpacking and wilderness travel in general and the easy access of the Uintas in particular.

An initial hypothesis of this study was that anglers were primarily motivated by fishing to visit the study areas. Data do not support this, with fishing ranked third as a motive for visiting the study areas. Anglers felt escape from routine, getting outdoors, and mountain scenery were more important than fishing as motivational forces attracting them to the areas. What motivated anglers and what activities they preferred at their destinations appear to be two different things.

Many anglers ranked fishing as the first or second most preferred activity. Hiking was also a preferred activity. While Primitive area qualities were the main trip motives, fishing and other activities were preferred on-site behavior. It initially appeared that motives and activities were in contradiction. Many motivational forces are intangible factors which can not be manifested in a particular activity. However, what motivates the angler into entering a primitive environment may be peripherally associated with his fishing activity. The importance of fishing as an activity will be discussed subsequently.

From the description of the general fishing behavior of anglers it appears that anglers utilizing the study areas fish more than the average Utah fishermen. They preferred bait fishing less than other anglers and most were knowledgeable about fish stocking practices in the study areas. They preferred fishing in high mountain lakes and streams more than other anglers, suggesting that they utilized a select mountain fishery rather than the usual reservoir or lake.

The Importance of Fishing to Anglers of the Study Areas

The reported catch rates and verbal ratings of fishing enjoyment indicated that anglers were utilizing a "quality" fishing resource with high rewards. To test the importance of fishing and its subsequent benefits, anglers were confronted with hypothetical catch reductions. A majority of the anglers reported no disappointment with 50 percent catch reductions and half of them reported similarly to 100 percent catch reductions. In open-ended questions, 6 percent

of the anglers complained of poor fishing yet 19 percent felt the fishing was poor when asked to rate the fishing "quality". The different responses indicate that poor fishing to many is not considered a "bad quality" or undesirable condition effecting the overall wilderness trip. When asked why catch reductions would or would not disappoint them, most anglers stated that fishing was "secondary" to them or implied that some aspects of their trip were more important.

Judging from these data, fishing is not as important as originally suspected. However, if the expected and actual catch rates and fishing ratings of entering and exiting anglers are compared, fishing seems to gain in importance. Whether or not the total wilderness experience is improved is not known. Exiting anglers reported lower than expected catch rates and none rated the fishing as "excellent". Similarly, more exiting anglers expressed disappointment with hypothetical catch reductions than the entering anglers. Such data indicate the catch may be more important than entering anglers would like to admit. The discrepancies between entering and exiting angler responses suggest validity problems in the questionnaire and its administration. In this case, entering responses dealt with angler expectations while exiting responses drew on the recent experience. Our study initially intended only to examine entering anglers. The late inclusion of exiting anglers resulted in a small sample size for analysis but nevertheless emphasized the validity problem and the need for further research concerning such problems.

Fishing may be secondary as long as the catch rate is maintained. If the angler is successful, relaxation, enjoyment of the environment or exercising of skill may become more important than the catch itself. When asked how important fishing was in their overall wilderness experience, over half the anglers on the Highline trail stated it was "fairly important". Notch Mountain anglers reported differently, with 90 percent claiming fishing was "very important" to them. Why Notch Mountain anglers place more importance on fishing is not known. However, they had lower catch rates, perhaps indicating a need for a tangible reward for their effort. Notch Mountain anglers were also primarily day users who may be seeking more rewards due to time limits on their stay.

These findings point out the complexity of wilderness fishing as an activity. For example, when anglers expressed the secondary importance of fishing they may mean that normal fishing behavior (cast-catch-kill) is secondary suggesting that fishing in a wilderness setting may be different. Also, there may be some overlap with fishing activity fulfilling the "escape" and "primitive" motives that attracted anglers.

Well over half the anglers of both trails expressed the desire to maintain the wilderness fishery through stocking practices and many were knowledgeable concerning existing stocking practices in the Uintas. Very few anglers felt stocking was an undesirable practice in a wilderness situation. As data indicate, environment may be the main attraction for many wilderness users and fishing may be of secondary importance to wilderness anglers, but fishing activity and its

maintenance through stocking appear to be acceptable in the wilderness situation.

The effects of other fishermen (or crowding) were also considered in the overall importance of fishing to anglers. It was originally hypothesized that anglers would be tolerant towards crowding. Most of the anglers stated that present crowd levels did not bother them. The data suggest a tolerance for the present number of fishermen but this declined as the crowd numbers were hypothetically doubled. Reaction to present levels of other fishermen may be due to the "secondary" importance of fishing, but as fishermen numbers increase, the fishing success rates may be threatened. Also, previous data indicated crowding to be the major undesirable condition encountered by 17 percent of the anglers in both study areas. It appears that while fishing, anglers may be more tolerant of crowds, but under other wilderness situations, such as at camp, crowding may be undesirable.

In sum, fishing does not appear to be of primary importance to anglers utilizing the Highline and Notch Mountain trails. Catch reductions and other anglers appear as no threat to the angler who catches fish and feels angling is of secondary importance. The dissatisfactions of less successful anglers and the angler's desire to maintain the fishery through stocking will reveal some importance in fishing activity.

Angler Experience and Knowledge of Alternative Fisheries

Highline anglers were the only group sampled with respect to experience and knowledge of de facto wilderness alternatives. Results showed that most anglers were inexperienced with the alternatives due to "lack of knowledge and experience" of areas. High percentages of inexperienced users resulted in a small sample size, making valid examination of such data questionable.

The high percentage of inexperience was reinforced by large numbers of first time users visiting the study areas. The data suggest that information regarding alternatives is lacking, and that the reputation of the Primitive area attracts first time users and deflects use from alternative areas. For example, anglers who never visited a Primitive area claimed the western alternatives were too accessible and prone to crowding. Others desired a primitive experience unobtainable in de facto alternatives. It should be pointed out that reported experience in de facto alternatives was reported almost entirely in the Notch Mountain trail area. Comparisons by anglers of the Primitive area and the de facto alternative (Notch Mountain) revealed that anglers felt their Primitive area experience to be superior to the de facto alternative. Anglers felt that the Notch Mountain alternative did not provide the fishing "quality" or the solitude that the Primitive area did. Again the high concentration of day-users near the more accessible lakes of Notch Mountain attest to this feeling, and suggest different kinds of experiences may be sought in this area. Nevertheless, beyond these

more accessible and heavier used lakes lie more "primitive" de facto wildlands capable of providing substitutes for the Primitive area.

In sum, most anglers were inexperienced and ignorant of de facto alternatives. It appeared that decisions regarding such alternatives were partially based on Notch Mountain standards obtained by experience, or for the inexperienced, by the reputation of the area.

Recommendations

This paper reports a pilot study initiated to explore and describe anglers and angling use in a Primitive backcountry situation. Many of the results are inconclusive and reveal areas in need of further investigation. Other results substantiate recommendations for possible management use.

Since data concerning non-anglers were limited, the need for information on this group is evident. Their motives, characteristics, and preferences would provide valuable comparisons with the angler data gathered in this study. The degree to which these two groups are compatible would be of significant interest not only for managers of the High Uinta Primitive area but for managers and researchers concerned with other wildland areas.

Much of the use encountered at more popular and accessible lakes is attributed to fishing. Continued stocking of these lakes may encourage continued resource degradation. Data indicate that anglers are not primarily motivated by fishing and in fact consider it to be of secondary importance. True, anglers

named fishing as a preferred activity and desired maintenance of the fishery through stocking but its secondary status may tolerate a stocking reduction to reduce user impact on degraded areas. Stocking reductions of heavily used fisheries may aid in dispersion of use and allow for restoration of the resource.

Small groups of trailbike riders created a great deal of annoyance on the Notch Mountain trail. It seems that such inequity cannot be tolerated in an environment where "primitiveness" and "escape" are valued by many. The exclusion of trailbikes from foot and horse trails is recommended.

The accessibility and presence of well developed campgrounds near the Notch Mountain trailhead attributed much to the high amount of day users encountered in this area. In future design and development of trail systems, the development or nondevelopment of trailhead facilities may prove useful in controlling the amount and types of use. This is particularly evident in the development of horse care facilities near trailheads. The lack of such facilities at Notch Mountain certainly contributes to the few horsepackers encountered in the area.

Many users entering the study areas were first-time users or had no previous experience with de facto alternatives. An area's reputation or "word of mouth" information seems to attract many of these first time users, channeling them into heavily used areas. Through some type of informational dissemination program, alternative areas could be made more available. Much of the de facto wildlands could provide users with alternative recreational areas during peak periods of use or act as substitutes for areas in need of restoration. The

use of information dispersal through the issuance of permits could serve to distribute use and facilitate the collection of needed use data. Also, a permit system would give visitors an opportunity to ask questions, obtain maps and otherwise improve their trip with better information (Hendee and Lucus, 1973). Furthermore, studies by Hendee et al. (1968) and Stankey (1971) show substantial acceptance by visitors of the need for more control over wilderness use. The implementation of a permit system to aid in the dispersal of crowds to de facto alternatives may prolong the need for more restrictive use controls.

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APPENDIXES

Appendix A

Fishing Use Questionnaire

FISHING USE QUESTIONNAIRE

Questionnaire code number	____ ____ ____	Age	____ ____
Date	____ ____ ____	Occupation	____
Trail number	____	Residence (state)	____ ____
Time	____ ____ ____ ____	Length of residence	____ ____
Travel mode	____	Sex	____
Direction	____	Size of Party	____ ____

1. Do you mind me asking your destination? _____ ____

2. How long will you be in the study area?*
(nights) _____ ____ ____

3. Are you going to be fishing while in the area?
(1) yes (2) no ____

IF NO, TERMINATE, IF YES, CONTINUE
WITH QUESTION #4

4. Could you tell me if you've been in the area before?
(1) yes (2) no ____

5. Have you ever been to the Naturalist Basin? ____
(1) yes (2) no

IF BOTH NO, SKIP TO #13. IF EITHER YES,
CONTINUE WITH #6

6. How often have you been to the area in the last
two years? (times) _____ ____ ____

---

*'Area' should be replaced with the respondent's destination.

7. How many nights do you usually stay on a trip? ____ ____

8. What is it you like about the Area (i.e., what are some of the good things about the area)

_____ ____ ____

_____ ____ ____

_____ ____ ____

9. You mentioned (first three from #8). Out of these which is the most important to you? _____ (i.e., what is your primary purpose for coming into the Area?)

10. Second most important? _____

11. Is there anything you do not like about the Area (i.e., are there any bad things about the area)?

_____ ____ ____

_____ ____ ____

_____

12. Could you tell me some of the things or activities that you will be doing once you get into the Area?

_____ ____ ____

_____ ____ ____

_____ ____ ____

LEAD INTO GENERAL FISHING INFORMATION

13. Can you remember about how many days you fished last year? (days) ____ ____

14. About how many of these were after fish other than trout? (days) ____ ____

15. Do you do most of your trout fishing in:
(1) high lakes & streams (2) low lakes (3) streams & rivers (4) reservoirs (5) other ____

16. When you are trout fishing, which method do you use the most: (1) flies (2) lures (3) bait (4) other ____

17. How would you describe the fishing in the Area?
(1) excellent (2) good (3) fair (4) poor ____

18. Why do you say that?
_____ ____ ____
_____ ____ ____
_____

19. Would you say the fish are stocked or native in the Area? (1) stocked (2) native (3) don't know ____

20. How many fish do you usually catch in a day in the Area, including those you throw back as well as those you keep? (number of fish) _____ ____

21. How many hours a day would you say you spent fishing while in the Area? (hours/day) _____ ____ ____

22. What is the average length of your catch?
(inches) _____ ____ ____

23. You mentioned you usually caught _____ (reply from #20) fish per day. How would you feel if you caught half that many this trip? (1) very disappointed (2) slightly disappointed (3) not at all disappointed. ____

24. If you didn't catch any fish this trip, how would you feel? (1) very disappointed (2) slightly disappointed (3) not at all disappointed ____

25. Why do you say that? _____
_____
_____ ____ ____

26. While you are in the Area, about how many fishermen do you expect to see per day? (fishermen) _____ ____ ____

27. How do you feel about this? Would it bother you (1) very much (2) slightly (3) not at all ____ ____

28. If you saw (twice the reply to #26) fishermen would it bother you? (1) very much (2) slightly (3) not at all ____

29. Have you fished these lakes to the west of the highway (or in Naturalist Basin-Primitive Area) (1) yes (2) no ____

30. If yes, how long ago? (years) _____ ____ ____

31. If no, are there any particular reasons for not fishing them? _____

_____ ____ ____

(Then skip to #40)

32. Can you remember some of the lakes you fished?

_____

_____ ____ ____

33. How would you say fishing in the Area compares to fishing in the Naturalist Basin-Primitive Area (or Western region)?

_____

_____ ____ ____

IF COMPARISON IS POSITIVE FOR OTHER AREA, GO TO #35

34. Why did you choose this area rather than the Western region (or Naturalist Basin)?

_____

_____

_____ ____ ____

SOME STANDARD QUESTIONS OF COMPARISON

35. In which area do you catch more fish?
(1) N. B. (2) West (3) same ____

36. In which area were the fish bigger?
(1) N. B. (2) West (3) same ____

37. Which area had fewer fishermen?
(1) N. B. (2) West (3) same ____

38. Which area had better scenery? (1) N. B.
(2) West (3) same ____

39. Thinking about the primitive or wilderness nature of this area, how desirable or undesirable do you think:
a. the planting of catchable trout is
(1) D (2) N (3) U ____
b. the planting of fingerling trout is
(1) D (2) N (3) U ____
c. no planting of trout is
(1) D (2) N (3) U ____

40. How important or valuable are primitive or wilderness areas to you personally?
(1) very important, (2) fairly important
(3) not at all important ____

41. How important is fishing to your wilderness or Primitive Area experience?
(1) very important, (2) fairly important,
(3) not al all important ____

Indicate if interested in follow-up questionnaire and a summary of results.

Follow-up questionnaire _____

Summary or results _____

Name: _____

Address: _____

Appendix B

Calculation of Strata Distribution

Calculation of Strata Distribution

Expected monthly sample size

First expected monthly sample size was calculated. This was done by taking the total 1972 sample size and multiplying it by the monthly percentage of 1971 total use. For example, July encountered 43.5 percent of the total use during 1971. 43.5 percent of the 1927 sample of 424 set the expected monthly sample at 184. Thus, the expected number of parties on a monthly basis was obtained (Table 34).

Table 34. Expected monthly sample size

	July	August	September	Total
1971 total use figures (parties)	737	832	125	1694
Monthly percentages of use	43.5	49.1	7.4	100%
Distribution based on 25 percent sample size	184[a]	208	32	424[b]

[a] 184 is 43.5 percent of 424, etc.

[b] 424 is 25 percent of 1694

Expected stratum sample size

With expected monthly sample size, calculated sample sizes for each stratum could be obtained by taking the percentage of days in each stratum and

multiplying by the expected monthly sample. For example, 19, or 61 percent of all the days in July, were weekdays.[19] Sixty-one percent of expected July sample of 184 is 112. A total of 112 parties could then be expected during July weekdays (Table 35).

Table 35. Expected stratum sample size for 1972

Month	Sample size	Stratum	#Days per stratum	%Days per stratum	Parties per stratum
July	184	Weekday	19	61	112[a]
		Weekend	8	26	38
		Holiday	4	13	24
		Total	31	100%	184
August	208	Weekday	19	74	153
		Weekend	12	26	55
		Holiday	---	---	---
		Total	31	100%	208
September	125	Weekday	5	50	16
		Weekend	3	30	10
		Holiday	2	20	6
		Total	10	100%	32

[a]61% of 184 = 112, etc.

Expected daily sample size

Having determined the expected number of parties per stratum, the number of parties on a daily basis could be calculated. This was done by

[19]Stratification was based on 1972 months.

dividing total number of days in each stratum into 1971 total number of parties for each stratum. For example, there were 19 weekdays and 396 parties in July, 1971. 396 divided by 19 results in an expected average of 21 parties per day for weekdays in July (Table 36).

Table 36. Expected daily sample size per stratum for 1972

Month	Strata	#Days per stratum	#Parties per strata 1971	#Parties expected per day, 1972
July	Weekday	19	396	21
	Weekend	8	190	24
	Holiday	4	151	38
	Total	31	737	83
August	Weekday	19	441	23
	Weekend	12	391	33
	Holiday	--	---	--
	Total	31	832	56
Sept.	Weekday	5	37	7
	Weekend	3	38	13
	Holiday	2	50	25
	Total	10	125	45

Number of sample days

The final step was to determine the number of days to sample in each stratum. This was done by dividing expected number of parties per stratum by expected number of parties per day in that stratum. For example, 112

parties per week and 21 parties per weekday could be expected in July; 112 divided by 21 resulted in 5 weekdays to sample in July (Table 37).

Table 37. Number of days to sample for each trail; 1972

Month	Stratum	Expected parties per stratum 1972	Expected parties per day 1972	Days to sample[a]
July	Weekday	112	21	5
	Weekend	48	24	2
	Holiday	24	38	1
	Total	184	83	8
August	Weekday	127	23	5
	Weekend	81	33	3
	Holiday	--	--	-
	Total	208	56	8
Sept.	Weekday	16	7	2
	Weekend	10	13	1
	Holiday	6	25	1
	Total	32	45	4

[a]An equalization factor of 1.4 was used to increase the Notch Mountain sample to 35 percent.

Having calculated the number of days to sample for each stratum (Table 37), all days of the month were grouped according to their stratum and the proper number of days to sample were selected at random. This procedure was repeated for each month.

Use figures for Notch Mountain trailhead were nonexistent but the Forest Service estimated use for this area to be significantly lower than Highline trail. Therefore, an equalization factor of 1.4 was used to increase the Notch Mountain sample to 35 percent insuring an adequate representation of the population (Table 37).

Appendix C

Estimation of Monthly Total Use Based on Sample

Table 38. Estimation of July total use based on sample

	Highline Trail			Notch Mountain Trail		
	Weekdays	Weekends	Holiday weekends	Weekday	Weekends	Holiday weekends
Average # parties/day	5.5	19.3	32.0	5.6	18.3	11.5
Average party size	4.7	3.5	5.2	4.1	3.7	3.5
Average # people/day	26	67	165	23	67	40
Total # days/stratum	19	8	4	19	8	4
Total # people/stratum	494	536	660	437	536	160
Total # groups/stratum	105	154	128	106	146	46
Total # people/month			1690			1133
Total # groups/month			387			298
Actual # groups sampled			122			106
Sample size			29%			36%

Table 39. Estimation of August total use based on sample

	Highline Trail			Notch Mountain Trail		
	Weekdays	Weekends	Holiday weekends	Weekday	Weekends	Holiday weekends
Average # parties/day	12.3	18.8	--[a]	6.2	7.5	--
Average party size	4.0	3.7	--	3.4	3.5	--
Average # people/day	49	69	--	21	26	--
Total # days/stratum	19	12	--	19	12	--
Total # people/stratum	931	828	--	399	312	--
Total # groups/stratum	234	226	--	118	90	--
Total # people/month		1759	--		711	--
Total # groups/month		460	--		208	--
Actual # groups sampled		124	--		67	--
Sample size		27%	--		32%	--

[a]There were no holidays in August.

Table 40. Use estimation of September total use based on sample

	Highline Trail			Notch Mountain Trail		
	Weekday	Weekend	Holiday weekends	Weekday	Weekend	Holiday weekends
Average # parties/day	0[a]	6	14	0	0	3
Average party size	0	2.7	5.0	0	0	2.7
Average # people/day	0	16	70	0	0	8
Total # days/stratum	5	3	2	5	3	2
Total # people/stratum	0	48	140	0	0	16
Total # groups/stratum	0	18	28	0	0	6
Total # people/month			188			16
Total # groups/month			46			6
Actual # groups sampled			20			3
Sample size			43%			50%

[a]No parties were contacted on weekdays during September.

Table 41. Use estimation for entire 1972 season (1 July to 10 September) based on sample

	Highline Trail			Notch Mountain Trail		
	Weekdays	Weekends	Holiday weekends	Weekdays	Weekends	Holiday weekends
Average # party/day[a]	5.9	14.7	23	3.9	8.6	7.3
Average party size[a]	2.9	3.3	5.1	2.5	2.4	3.1
Average # people/day[a]	25	51	118	15	31	24
Total # days/stratum	13	23	6	43	23	6
Total # people/stratum	1075	1173	708	645	713	144
Total # groups/stratum	254	338	138	168	197	44
Total # people/season			2956			1502
Total # groups/season			730			409
Actual # groups sampled			256			176
Sample size			35%			43%

[a]These figures are based on the averages of July, August and September.