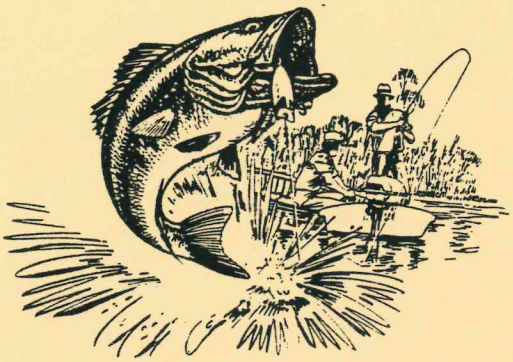
Montana Statewide Angling Pressure 1989



Montana Department of
Fish, Wildlife & Parks

Montana

Statewide Angling Pressure

Mail Survey

1989

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Montana Department of Fish, Wildlife and Parks

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INTRODUCTION

The Montana Department of Fish, Wildlife and Parks has conducted statewide angling mail surveys in the past. Bishop (1959, 1960 & 1961) conducted the first recorded mail survey of fishing pressure on a statewide basis for Montana. He found that residents fished 1,323,129 angler days, nonresident season license holders fished 60,632 angler days, and nonresident 6-day permit holders fished 40,933 angler days for the 1958 season. In 1959 residents fished 1,345,000 angler days, nonresident season license holders fished 54,000 angler days, and nonresident 6-day permit holders fished 121,000 angler days. In 1960 the third annual survey was conducted and residents fished 1,356,000 angler days, nonresident season license holders fished 53,000 angler days, and nonresident 7-day permit holders fished 112,000 angler days.

In 1968 the statewide angling pressure mail survey was again initiated by Holton (1970). He found residents had fished 1,519,126 angler days, nonresident season license holders fished 69,653 angler days, and nonresident 6-day permit holders fished 161,772 angler days. Holton (1971) conducted another statewide survey for the 1969 license year. No results were reported because it was felt they were too high due to sampling problems.

In 1975, Gaffney (unpublished data) conducted a statewide survey of angling pressure by mail. He found residents fished a total of 2,314,030 angler days and nonresidents 508,034 angler days for a statewide total of 2,822,093 angler days. An attempt was made to continue that statewide survey in 1976 using the 1975 mailing lists. This did not provide adequate samples for nonresidents, so only resident pressure was obtained.

Holton (1974) stated,

> "The lack of up-to-date fishing pressure information on individual waters has been a handicap in fisheries management. It is recommended that (the) evaluation of (a) mail survey to fill this need be accomplished as soon as feasible."

The surveys were started again in 1982 and run for four consecutive years (McFarland, 1989). The statewide angling pressure ranged from 2,197,402 to 2,723,713 angler days. In 1986 the surveys were again cancelled for lack of funding.

In 1989, the Montana Legislature approved funding for an "Enhanced Survey of Angling Pressure". The funding was such that the survey was to be conducted every other year. In March, 1989, the statewide angling use mail survey was again re-initiated.

METHODS

The 1989 statewide angling mail pressure survey began in March of 1989 and was conducted for the license year ending in February, 1990.

Samples were drawn from the Department's Sportsman's Database. There are six types of fishing licenses available to residents: a season license, a combo license, a sportsman's license, a "senior" license, a "youth" license and a disabled license. A season license is required for those resident anglers between the ages of 15 and 61 inclusive (a conservation license is required as a prerequisite to purchasing any fishing license). Residents between the ages of 12 and 14 inclusive, are required to purchase a conservation license to fish. These were determined by using the date of birth on the Conservation license and were classified as "youth" license holders. The combo license combines a season fishing license and a conservation license. A sportsman's license provides a deer "A" tag, elk tag, bear tag, conservation license, a game bird stamp and a fishing license. Residents 62 years of age and older are entitled to fish by purchasing a conservation license. These were determined by using the date of birth on the Conservation license and were classified as "senior" license holders. Residents who are certified as permanently and substantially disabled may purchase a "Disabled Persons Conservation License". The "senior", "youth", and "disabled" licenses were combined for the "SYD" population.

Nonresidents 15 years of age and older must have a valid Montana fishing license to fish. Those nonresidents under the age of 15 may fish by buying a nonresident license or by being in the company of an adult with a valid Montana fishing license. If the latter the combined limit may not exceed the limit for one adult. Nonresidents have four types of licenses available for fishing in Montana; a combo license, a seasonal license, a two-day permit, and the big game combo. A nonresident conservation license is required as a prerequisite to purchaasing any nonresident fishing license. The combo license combines a nonresident conservation license and seasonal fishing license. The big game license includes a conservation license, an elk tag, a deer "A" tag, a black bear tag, a fishing license and an upland game bird license. A two-day permit enables the nonresident angler to fish for two consecutive days of their choice. An angler may purchase as many two-day permits as they want.

A computer program was written in PASCAL to create three populations of anglers from which to draw samples. A resident population, a nonresident population and a "SYD" population were created each month. The resident population comprised the following license types: combo, season, and sportsman. The nonresident population comprised the following license types: nonresident combo and nonresident season. The "SYD" population consisted of the following license types: senior (62 years of age and older), youth (between 12 and 14 years of age inclusive), and disabled.

Gaffney (1982) sampled the 17,000 nonresident big game license holders in 1980 and found that 29.6% had fished while in Montana. They averaged 3.9 days fishing per person which would account for nearly 20,000 man days of use. This is less than 1% of the total pressure in the state. Due to budgetary constraints and the small amount of pressure, the big game license holders were not included in the nonresident sampling for 1989.

A PASCAL computer program was used to pull a random sample from each population. The amount pulled from each population was proportionally allocated to the angling pressure each population exerted from previous surveys. This proportion remained constant throughout all sampling periods.

The sample from each population was copied into a dBASE format structure and wave information and sequential serial numbers added. Mailing labels were produced and affixed to each questionnaire. The questionnaire along with a cover letter, a map, and a return envelope were stuffed into window envelopes and mailed (see appendix for examples). All questionnaires were mailed first class presorted.

Sampling was done on a stratified basis. Strata (waves) were monthly for the resident, seasonal nonresident, and SYD populations (Table 2).

Nonresident 2-day license holders could not be sampled directly, so nonresident conservation license holders were sampled and questions asked to ascertain if they were valid 2-day permit holders. These questionnaires were sent out in February since less than 2% (2509) of the 2-day permits are remitted after this date. The questionnaire asked about their fishing in Montana for the entire license year.

Table 1. Period of time covered for waves for the 1989 statewide angling survey.

Wave	Time Period covered
1	March '89
2	April
3	May
4	June
5	July
6	August
7	September
8	October
9	November
10	December
11	January '90
12	February
99	Nonresident 2-day

Authorized private dealers sell fishing licenses throughout the state. In addition the seven regional headquarters and the Helena office sell licenses. All licenses are to be remitted to the licensing bureau in Helena by the 10th of the following month of the sale. Each license is a five-part form. The original remains with the angler, the first copy was sent to Bozeman for use in the surveys, the second copy was retained in Helena, the third copy was sent to the area warden and the fourth copy was retained by the license dealer. The licenses usually arrived in Bozeman one week after they were remitted to Helena. Samples for the previous month were then pulled and the questionnaires mailed around the 20th of the following month. For example, samples for August would be pulled and sent around the 20th of September.

Table 2. Number of questionnaires sent for each wave by residency for 1989

Wave	Mailed Res	Nonres	Useable Res	Nonres	Returns Res	Nonres
1	278	22	276	22	172	16
2	4635	365	4514	355	2523	231
3	9270	730	8989	708	5099	411
4	9270	730	8830	695	4736	405
5	9270	730	8835	696	4944	456
6	9270	730	8832	696	4980	465
7	9270	730	8829	695	5270	487
8	9270	730	8810	322	5337	506
9	4635	365	4355	343	2680	244
10	4450	350	4188	330	2685	251
11	4450	350	4137	325	2676	242
12	4450	350	4125	324	2789	226
99		10000		9156		4869

Past surveys indicated that residents provide approximately 80% of the pressure (Gaffney 1975, McFarland 1989), therefore sampling was done on a 80/20 split between residents and nonresidents (i.e. proportional allocation). Actual numbers sent varied slightly from wave to wave (Table 2). Proportional allocation was used for determining sample sizes from wave to wave. For the "summer" waves 10,000 residents and nonresidents were sampled. In the "winter" the rate dropped to 5,000 residents and nonresidents. Since waves 1 and 2 had fewer license holders from which to sample, these two waves were sampled at a less intense level.

Two survey questionnaires were used, one for residents and season nonresidents and the other for 2-day nonresidents. The resident/nonresident questionnaire (see appendix A for examples), included questions on: what water was fished; nearest landmark , town, or county; date fishing occurred; and number of days fished; hours fished; species of fish caught; number of that species caught; number of that species kept; and whether the fishing was primarily from shore, boat or ice. Also included were two questions for an economic study being done to determine the value of a day of fishing. The questions were: was the main purpose of the trip to fish, and round trip distance traveled. The 2-day questionnaire was the same basic design but included questions to ascertain if the respondent was a valid 2-day fishing permit holder and how many permits they bought. The survey also asked about their entire year of fishing versus a single month.

To ease the sorting process different colored forms were used for each wave. Different colors were also used for initial and remail mailings.

Remail questionnaires were mailed, to those individuals who had not yet responded, from two to four weeks after the initial mailing. Returns for each wave were monitored and when they slowed down to a few each day the remail was sent. Included in the remail was a letter of explanation, (see appendix A for examples), a duplicate questionnaire and a return envelope. Returns were grouped and counted according to

type of license, wave and mailing (initial or remail).

Phone surveys were made to those individuals who had not responded in either the initial or remail mail survey. The phoning began with wave 5 (July) and continued through wave 12 (February). The phoning was delayed until July due to budget and hiring constraints based upon the fiscal year. Data from this survey was used to modify each wave for the nonresponse bias. The formula used was:

$$A_{ij}=R_{ij}+\frac{P_{ij}}{M_{ij}}[1-R_{ij}]$$

where A_{ij} = Adjustment factor for nonresponse for the ith wave and jth residency

R_{ij} = Response rate for mail survey for ith wave and jth residency (response rate is the total number of returns divided by the total number of surveys mailed out minus the number of nondeliverable surveys)

P_{ij} = Phone rate of days fished per respondent for ith wave and jth residency

M_{ij} = Mail rate of days fished per respondent for ith wave and jth residency

The adjustments for each wave are given in Table 3. The rates for waves where no phoning occurred were based on the average of the adjustments for the summer months where phoning occurred.

Table 3. Adjustment factors used by wave and residency to account for nonresponse bias.

WAVE	RESIDENT	NONRESIDENT
1	1.633	1.633
2	1.633	1.633
3	1.633	1.633
4	1.633	1.633
5	1.633	1.633
6	1.329	1.329
7	1.458	1.458
8	1.632	1.632
9	2.113	2.113
10	1.587	1.587
11	.9801	.9801
12	1.042	1.042
99		1.633

After all questionnaires were received those that had fished in Montana during the period in question were separated from those who said "no". The "yes" respondents were then hand coded and assigned a numeric code for each water fished. They were visually edited for accuracy and completeness.

All data were then keypunched with each day of fishing recorded as a single record. Edits were run to correct invalid water codes. FORTRAN computer programs were written to analyze the data and calculate fishing pressure and standard errors.

Estimates were made for individual waters based upon the formula:

$$P_j = \sum_{i=1}^{n} \left[\frac{E_{ij} * D_{ij}}{R_{ij}} \right] * A_{ij}$$

where P_j = Pressure for an individual water by the jth residency

E_{ij} = Number of eligible anglers for the ith wave and jth residency

D_{ij} = Days fished that particular water for the ith wave and jth wave

R_{ij} = Number of respondents from the survey for the ith wave and jth residency

A_{ij} = Adjustment factor for nonresponse for the ith wave and jth residency

n = number of waves in the estimate year or season
j = number of residency types (resident, nonresident, or total)

the variance was then calculated using

$$VAR(P_j) = \sum_{i=1}^{n} \left[\frac{E_{ij}^2 * VAR(D_{ij})}{R_{ij}} \right] * A_{ij}^2$$

Where P_j, E_{ij}, R_{ij}, D_{ij}, and A_{ij} are the save as above.

Pressure estimates between waves and residency were assumed to be independent so variances were summed to obtain total variances. The square root of the variance was taken and this number was reported as the error for fishing pressure.

RESULTS

1989 ANNUAL

Licensed anglers fishing on Montana waters exerted 2,336,085 angler days of pressure for the 1989 license year. Residents accounted for 1,766,152 angler days (75.6%) and nonresidents made up the remaining 569,933 angler days (24.4%). Individual water estimates sorted alphabetically are given in a separate report "Montana Statewide Angling Pressure 1989".

The pressure distributed between Fish, Wildlife and Parks regions (Figure 1) emphasizes the cold water fishery (Chart 1). Region 3 received the most angling pressure with 645,311 angler days (27.6%). Regions 4 and 1 were next in order with 453,175 angler days (19.4%) and 413,362 (17.7%) angler days respectively. Regions 2 and 5 were very similiar with 296,273 angler days (12.7%) and 300,328 angler days (12.9%) respectively. The warm water regions of 6 and 7 were the lowest in pressure with 127,659 (5.5%) and 89,981 (3.9%) angler days respectively.

Angling in Montana in 1989 was directed toward trout. Salmonid waters accounted for 87.7% (2,048,823 angler days) of the statewide pressure while nonsalmonid waters accounted for 9.3% (217,144 angler days) of the pressure and undesignated waters accounted for 3.0% (70,118 angler days) of the pressure (Chart 2). An undesignated water is one that did not have a unique code to assign, and therefore water type could not be determined. This water was assigned a generic code based on drainage and county so angling pressure could be estimated.

Within salmonid waters, the streams received slightly more pressure than the lakes, 52.7% versus 47.3%. The nonsalmonid lakes received more pressure than the nonsalmonid streams, 53.5% versus 46.5% respectively.

Salmonid angling dominated the pressure in regions 1, 2, 3, 4, and 5. Regions 6 and 7 were predominately nonsalmonid angling (Chart 3, Table 4).

Table 4. Angling pressure in angler days by region by water type for the 1989 angling year.

REG	WATER TYPE	TOTALS PRESSURE	TOTALS TRIPS	RESIDENTS PRESSURE	RESIDENTS TRIPS	NON-RESIDENTS PRESSURE	NON-RESIDENTS TRIPS
1	SALMONID STREAM	118979.	2331.	93018.	1680.	25961.	651.
	SALMONID LAKE	269317.	5061.	197121.	3377.	72196.	1684.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	12641.	225.	12331.	217.	310.	8.
	UNDESIG STRM MGMT	3592.	82.	1761.	34.	1831.	48.
	UNDESIG LAKE MGMT	8833.	172.	7435.	138.	1398.	34.
	REGIONAL PRESSURE ESTIMATES:	413362.	7871.	311666.	5446.	101696.	2425.
2	SALMONID STREAM	193223.	3699.	149851.	2627.	43372.	1072.
	SALMONID LAKE	95176.	1698.	83018.	1407.	12158.	291.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	2321.	52.	1528.	31.	793.	21.
	UNDESIG LAKE MGMT	5553.	97.	4904.	81.	649.	16.
	REGIONAL PRESSURE ESTIMATES:	296273.	5546.	239301.	4146.	56972.	1400.
3	SALMONID STREAM	388785.	8062.	220504.	4000.	168281.	4062.
	SALMONID LAKE	246536.	4738.	173318.	2972.	73218.	1766.
	NONSALMONID STREAM	157.	4.	157.	4.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	4917.	112.	2402.	47.	2515.	65.
	UNDESIG LAKE MGMT	4916.	97.	3659.	64.	1257.	33.
	REGIONAL PRESSURE ESTIMATES:	645311.	13013.	400040.	7087.	245271.	5926.
4	SALMONID STREAM	173323.	3196.	143730.	2475.	29593.	721.
	SALMONID LAKE	235641.	4250.	213849.	3712.	21792.	538.
	NONSALMONID STREAM	9118.	182.	8505.	165.	613.	17.
	NONSALMONID LAKE	21528.	395.	20753.	375.	775.	20.
	UNDESIG STRM MGMT	4167.	82.	3709.	70.	458.	12.
	UNDESIG LAKE MGMT	9398.	177.	8807.	162.	591.	15.
	REGIONAL PRESSURE ESTIMATES:	453175.	8282.	399353.	6959.	53822.	1323.
5	SALMONID STREAM	192414.	3892.	133237.	2391.	59177.	1501.
	SALMONID LAKE	89116.	1727.	70472.	1271.	18644.	456.
	NONSALMONID STREAM	8982.	137.	8300.	125.	682.	12.
	NONSALMONID LAKE	1293.	25.	1257.	24.	36.	1.
	UNDESIG STRM MGMT	1399.	31.	781.	15.	618.	16.
	UNDESIG LAKE MGMT	7124.	148.	4681.	87.	2443.	61.
	REGIONAL PRESSURE ESTIMATES:	300328.	5960.	218728.	3913.	81600.	2047.

Table 4. Angling pressure in angler days by region by water type for the 1989 angling year (continued).

REG	WATER TYPE	TOTALS PRESSURE	TOTALS TRIPS	RESIDENTS PRESSURE	RESIDENTS TRIPS	NON-RESIDENTS PRESSURE	NON-RESIDENTS TRIPS
6							
	SALMONID STREAM	9947.	197.	9537.	184.	410.	13.
	SALMONID LAKE	30747.	569.	28953.	531.	1794.	38.
	NONSALMONID STREAM	29409.	552.	28466.	528.	943.	24.
	NONSALMONID LAKE	51854.	968.	47316.	852.	4538.	116.
	UNDESIG STRM MGMT	369.	8.	297.	6.	72.	2.
	UNDESIG LAKE MGMT	5333.	95.	4972.	85.	361.	10.
	REGIONAL PRESSURE ESTIMATES:	127659.	2389.	119541.	2186.	8118.	203.
7							
	SALMONID STREAM	3236.	61.	3022.	55.	214.	6.
	SALMONID LAKE	2383.	48.	2203.	43.	180.	5.
	NONSALMONID STREAM	53414.	1001.	46198.	833.	7216.	168.
	NONSALMONID LAKE	28748.	574.	20727.	389.	8021.	185.
	UNDESIG STRM MGMT	173.	3.	173.	3.	0.	0.
	UNDESIG LAKE MGMT	2027.	41.	1766.	36.	261.	5.
	REGIONAL PRESSURE ESTIMATES:	89981.	1728.	74089.	1359.	15892.	369.
TOTAL							
	SALMONID STREAM	1079907.	21438.	752899.	13412.	327008.	8026.
	SALMONID LAKE	968916.	18091.	768934.	13313.	199982.	4778.
	NONSALMONID STREAM	101080.	1876.	91626.	1655.	9454.	221.
	NONSALMONID LAKE	116064.	2187.	102384.	1857.	13680.	330.
	UNDESIG STRM MGMT	26934.	607.	14085.	269.	12849.	338.
	UNDESIG LAKE MGMT	43184.	827.	36224.	653.	6960.	174.
	STATEWIDE PRESSURE ESTIMATES:	2336085.	45026.	1766152.	31159.	569933.	13867.

Region 3 had the largest angling pressure for salmonid streams (388,785 angler days) while region 1 had the largest angling pressure for salmonid lakes (269,317 angler days). Nonsalmonid stream fishing pressure was largest in region 7 (53,414 angler days), while the nonsalmonid lake angling pressure was largest in region 6 (51,854 angling days).

The majority of angling pressure in 1989 in all regions was exerted by residents (Chart 4). The percent of angling pressure by residents for each region was: region 1 - 75.4%, region 2 - 80.8%, region 3 - 62.0%, region 4 - 88.1%, region 5 - 72.8%, region 6 - 93.6%, and region 7 - 82.3%.

July (wave 5) was, overall, the peak fishing period, while March (wave 1) was the least fished period during the year (Table 5). Both residents and nonresidents preferred to fish during July while residents fished the least in March and nonresidents fished the least in February (wave 12). The majority of the nonresident pressure (60.4%) was exerted by the 2-day license holders. Since these anglers were sampled once at the end of the license year the pressure could not be classified into waves although it can logically be assigned to the summer season.

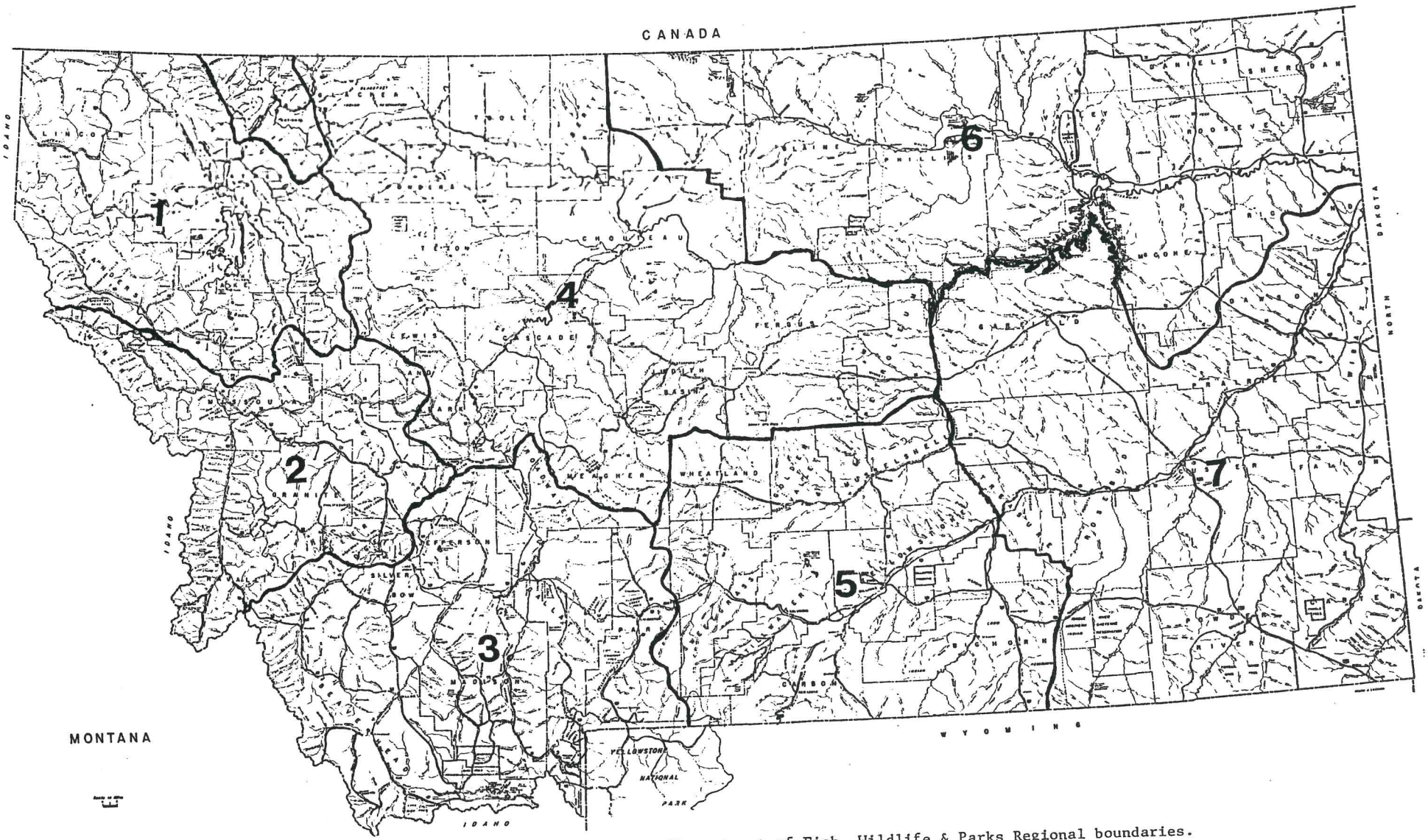

Figure 1. Map of the State of Montana showing the Department of Fish, Wildlife & Parks Regional boundaries.

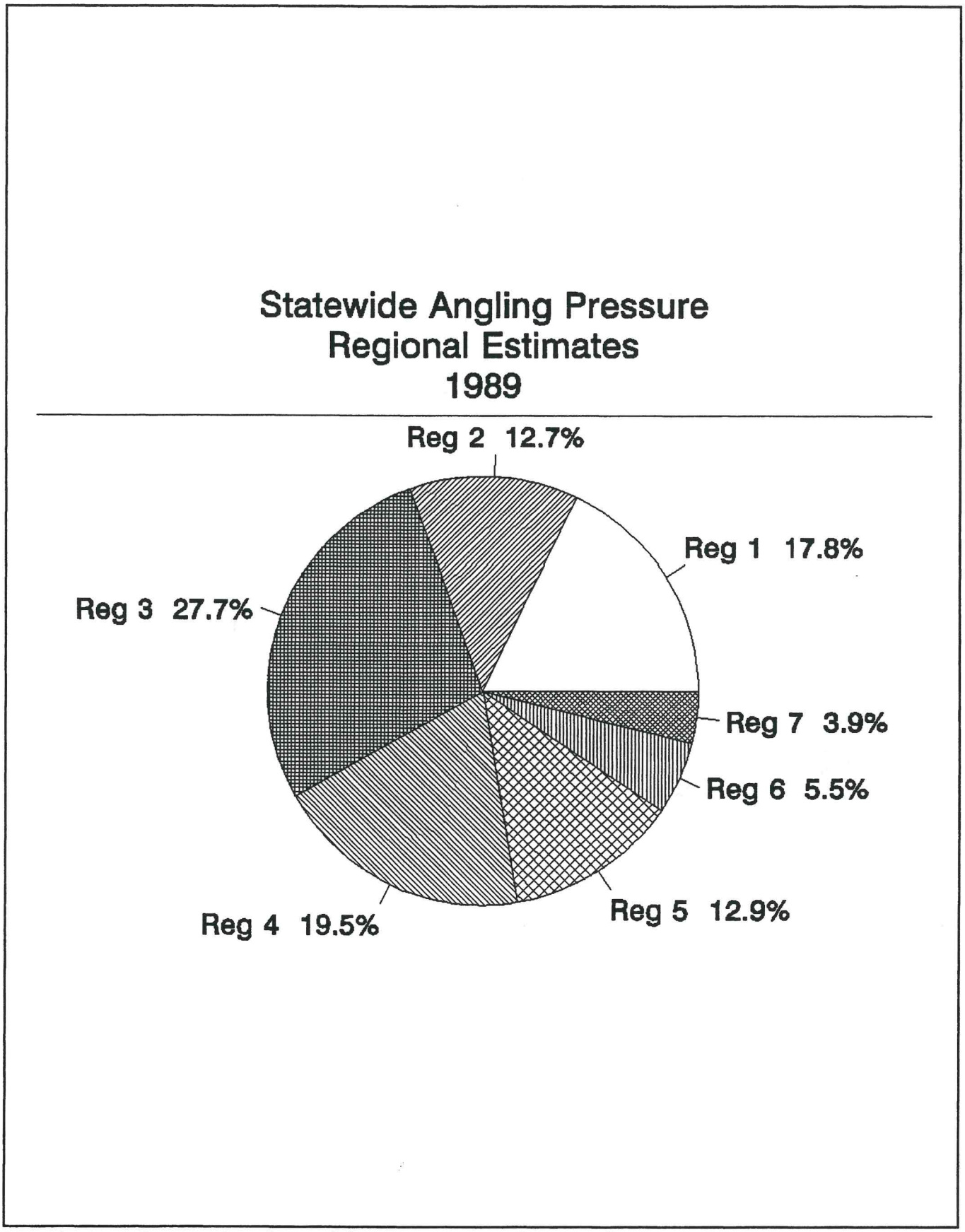

Chart 1. Percent of angling pressure by region for 1989.

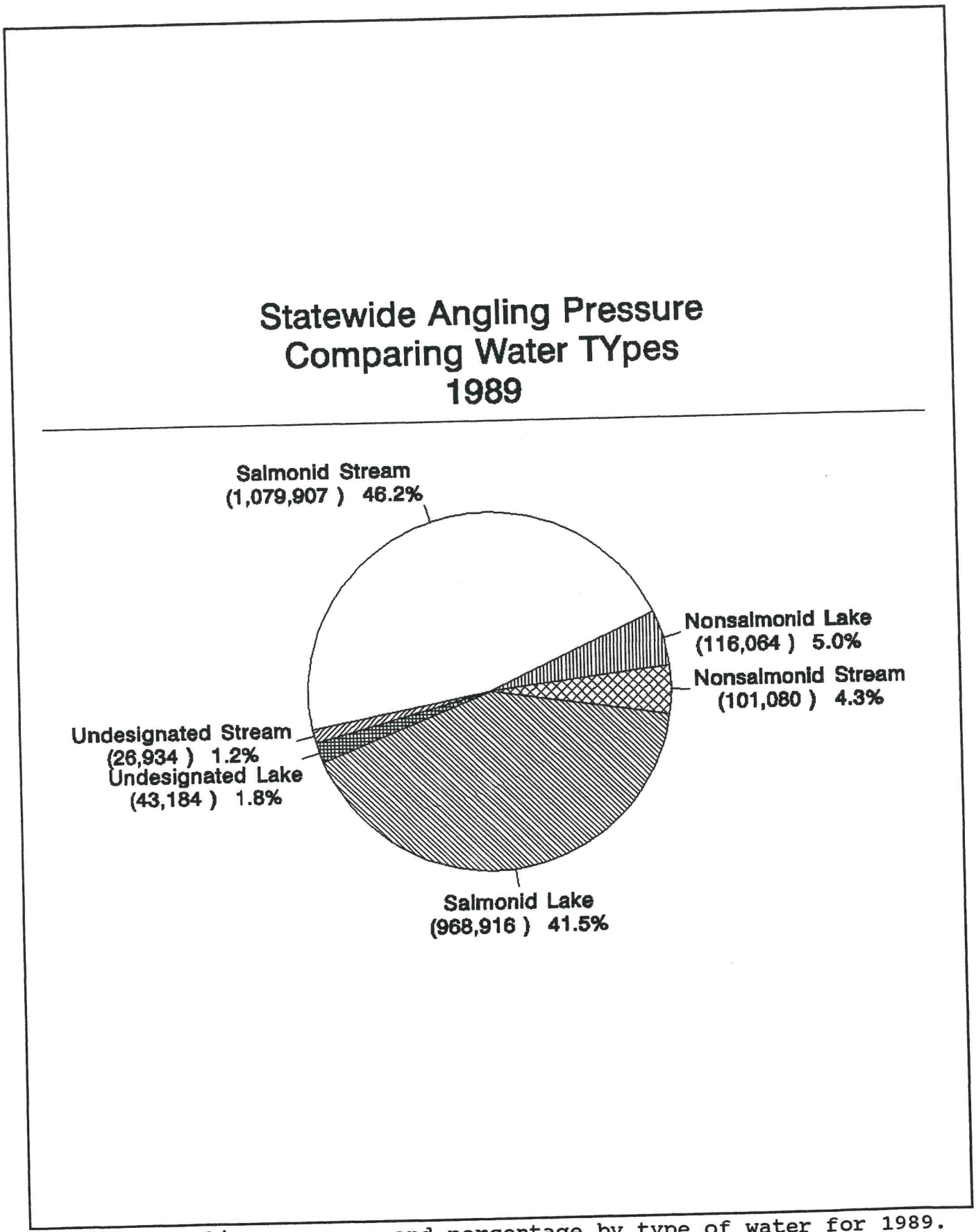

Chart 2. Angling pressure and percentage by type of water for 1989.

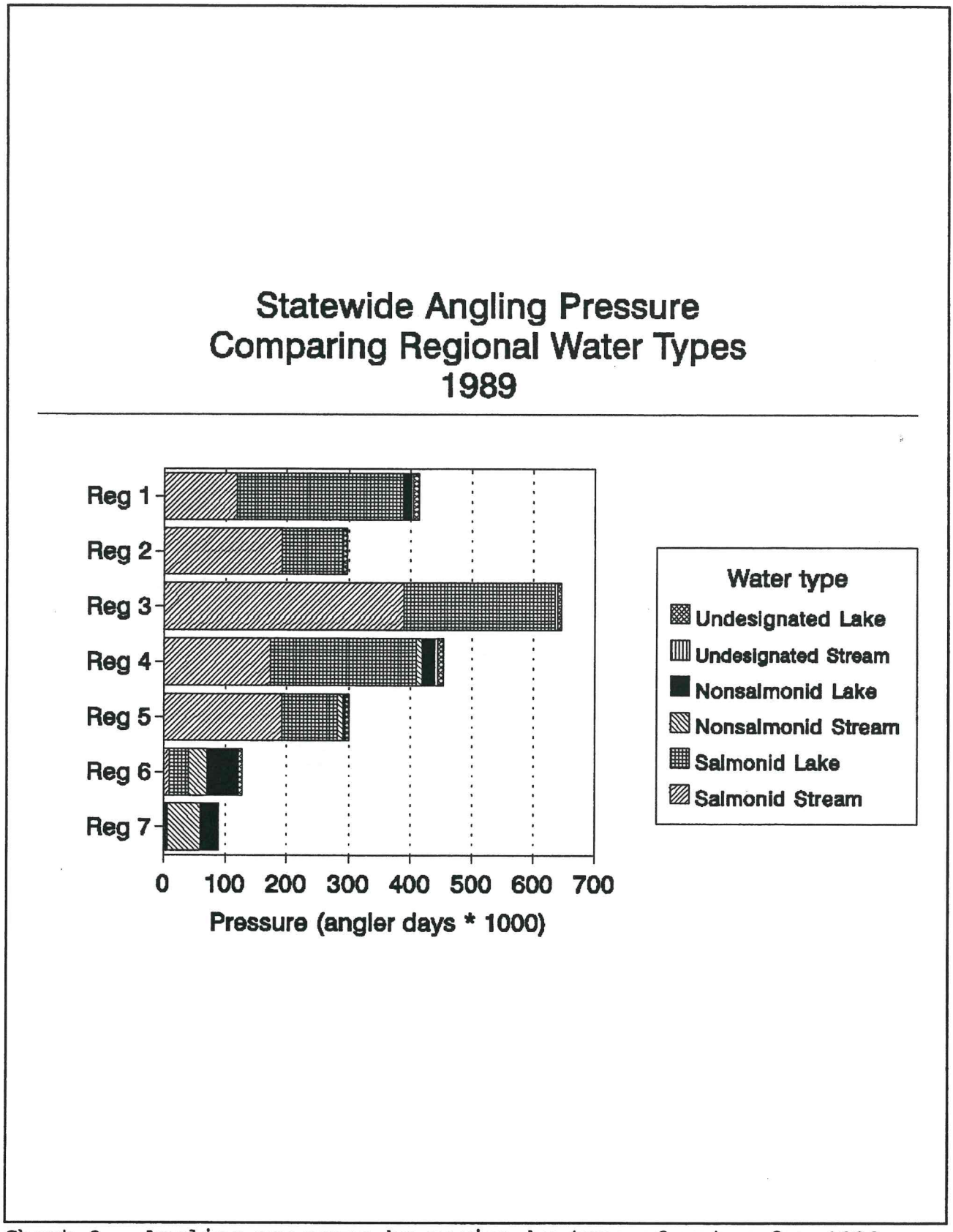

Chart 3. Angling pressure by region by type of water for 1989.

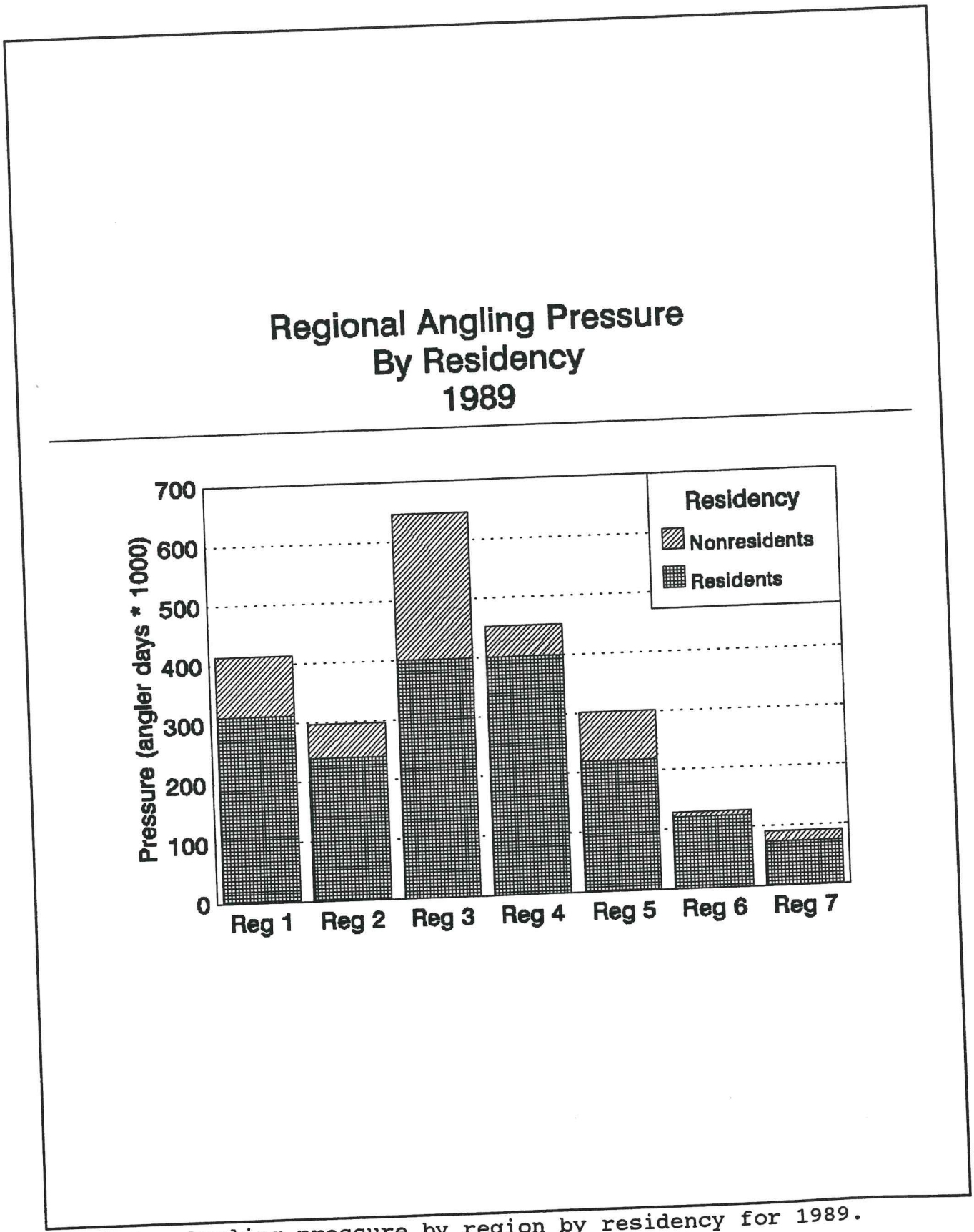

Chart 4. Angling pressure by region by residency for 1989.

Table 5. Pressure in angler days by wave for the 1989 survey year.			
WAVE	TOTAL	RESIDENT	NONRESIDENT
1	57,055	53,636	3,419
2	98,711	91,545	7,166
3	217,836	199,756	18,080
4	332,820	301,922	30,898
5	425,671	361,751	63,920
6	289,579	241,709	47,870
7	178,021	148,220	29,801
8	127,564	114,550	13,014
9	75,683	70,634	5,049
10	71,958	69,482	2,476
11	57,281	54,879	2,402
12	60,065	58,160	1,905
99	344,123		344,123

Angling pressure was summarized by the 22 major drainages within the state (Table 6). The lower Clark Fork River drainage contains the angling pressure from all the streams and lakes below the Bitterroot River, excluding the pressure from those waters contained in other drainages listed (Flathead, Kootenai, and Bitterroot). The Upper Clark Fork River drainage, likewise, contains all the angling pressure for waters above the Bitterroot River drainage excluding the pressure for those drainages listed. The upper Flathead River drainage contains the South Fork Flathead River drainage and all waters above the confluence of the South Fork Flathead River. The lower Flathead River drainage includes those waters below the confluence of the South Fork Flathead River including Flathead Lake and those waters (where pressure was obtainable) on the Kootenai-Salish Indian reservation. The lower Missouri River drainage covers all waters below the confluence of the Marias River, while the upper Missouri River drainage incorporates the area above the Marias River, again excluding those drainages listed separately.

Table 6. Angling pressure in angler days by drainage by water type for the 1989 angling year Mar '89 through Feb '89

DRAIN	WATER TYPE	TOTALS PRESSURE	TOTALS TRIPS	RESIDENTS PRESSURE	RESIDENTS TRIPS	NONRESIDENTS PRESSURE	NONRESIDENTS TRIPS
BEAVERHEAD DR							
	SALMONID STREAM	48748.	1026.	24813.	454.	23935.	572.
	SALMONID LAKE	45559.	1006.	22729.	427.	22830.	579.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	527.	12.	184.	4.	343.	8.
	UNDESIG LAKE MGMT	400.	6.	328.	4.	72.	2.
	DRAINAGE PRESSURE ESTIMATES:	95234.	2050.	48054.	889.	47180.	1161.
BIG HOLE DR							
	SALMONID STREAM	47962.	983.	31613.	582.	16349.	401.
	SALMONID LAKE	7089.	133.	6194.	110.	895.	23.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	241.	6.	61.	1.	180.	5.
	UNDESIG LAKE MGMT	1196.	23.	943.	16.	253.	7.
	DRAINAGE PRESSURE ESTIMATES:	56488.	1145.	38811.	709.	17677.	436.
BITTERROOT DR							
	SALMONID STREAM	59617.	1143.	45238.	795.	14379.	348.
	SALMONID LAKE	9620.	185.	8349.	153.	1271.	32.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	1056.	24.	720.	15.	336.	9.
	UNDESIG LAKE MGMT	2319.	45.	1983.	37.	336.	8.
	DRAINAGE PRESSURE ESTIMATES:	72612.	1397.	56290.	1000.	16322.	397.
BLACKFOOT DR							
	SALMONID STREAM	26640.	508.	22352.	398.	4288.	110.
	SALMONID LAKE	29099.	525.	26000.	455.	3099.	70.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	267.	6.	195.	4.	72.	2.
	UNDESIG LAKE MGMT	246.	5.	210.	4.	36.	1.
	DRAINAGE PRESSURE ESTIMATES:	56252.	1044.	48757.	861.	7495.	183.
LOWER CLARK FORK DR							
	SALMONID STREAM	48678.	978.	34238.	631.	14440.	347.
	SALMONID LAKE	27562.	490.	22389.	381.	5173.	109.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	39.	1.	39.	1.	0.	0.
	UNDESIG STRM MGMT	576.	13.	360.	7.	216.	6.
	UNDESIG LAKE MGMT	1033.	21.	961.	19.	72.	2.
	DRAINAGE PRESSURE ESTIMATES:	77888.	1503.	57987.	1039.	19901.	464.

Table 6. Angling pressure in angler days by drainage by water type for the 1989 angling year Mar '89 through Feb '89 (continued)

DRAIN	WATER TYPE	TOTALS PRESSURE	TOTALS TRIPS	RESIDENTS PRESSURE	RESIDENTS TRIPS	NONRESIDENTS PRESSURE	NONRESIDENTS TRIPS
UPPER CLARK FORK DR							
	SALMONID STREAM	77591.	1466.	62466.	1078.	15125.	388.
	SALMONID LAKE	51629.	888.	45271.	734.	6358.	154.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	982.	21.	606.	12.	376.	9.
	UNDESIG LAKE MGMT	2901.	45.	2696.	40.	205.	5.
	DRAINAGE PRESSURE ESTIMATES:	133103.	2420.	111039.	1864.	22064.	556.
LOWER FLATHEAD DR							
	SALMONID STREAM	47461.	901.	40703.	733.	6758.	168.
	SALMONID LAKE	168494.	3074.	131672.	2218.	36822.	856.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	10690.	187.	10416.	180.	274.	7.
	UNDESIG STRM MGMT	1524.	34.	853.	16.	671.	18.
	UNDESIG LAKE MGMT	5934.	116.	4983.	94.	951.	22.
	DRAINAGE PRESSURE ESTIMATES:	234103.	4312.	188627.	3241.	45476.	1071.
UPPER FLATHEAD DR							
	SALMONID STREAM	16516.	337.	12018.	222.	4498.	115.
	SALMONID LAKE	17318.	356.	13537.	262.	3781.	94.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	595.	13.	356.	7.	239.	6.
	UNDESIG LAKE MGMT	995.	19.	959.	18.	36.	1.
	DRAINAGE PRESSURE ESTIMATES:	35424.	725.	26870.	509.	8554.	216.
GALLATIN DR							
	SALMONID STREAM	74439.	1578.	43352.	793.	31087.	785.
	SALMONID LAKE	20784.	401.	13407.	235.	7377.	166.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	1116.	25.	462.	9.	654.	16.
	UNDESIG LAKE MGMT	1281.	27.	884.	16.	397.	11.
	DRAINAGE PRESSURE ESTIMATES:	97620.	2031.	58105.	1053.	39515.	978.
JEFFERSON DR							
	SALMONID STREAM	24467.	469.	19934.	365.	4533.	104.
	SALMONID LAKE	10603.	187.	9413.	157.	1190.	30.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	583.	12.	475.	9.	108.	3.
	UNDESIG LAKE MGMT	468.	9.	396.	7.	72.	2.
	DRAINAGE PRESSURE ESTIMATES:	36121.	677.	30218.	538.	5903.	139.

Table 6. Angling pressure in angler days by drainage by water type for the 1989 angling year Mar '89 through Feb '89 (continued)

DRAIN	WATER TYPE	TOTALS PRESSURE	TOTALS TRIPS	RESIDENTS PRESSURE	RESIDENTS TRIPS	NONRESIDENTS PRESSURE	NONRESIDENTS TRIPS
KOOTENAI DR							
	SALMONID STREAM	35881.	701.	25964.	452.	9917.	249.
	SALMONID LAKE	60614.	1238.	32764.	578.	27850.	660.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	1912.	37.	1876.	36.	36.	1.
	UNDESIG STRM MGMT	1024.	25.	247.	5.	777.	20.
	UNDESIG LAKE MGMT	1172.	22.	761.	11.	411.	11.
	DRAINAGE PRESSURE ESTIMATES:	100603.	2023.	61612.	1082.	38991.	941.
LITTLE MISSOURI DR							
	SALMONID STREAM	0.	0.	0.	0.	0.	0.
	SALMONID LAKE	812.	16.	812.	16.	0.	0.
	NONSALMONID STREAM	351.	10.	192.	4.	159.	6.
	NONSALMONID LAKE	420.	8.	420.	8.	0.	0.
	UNDESIG STRM MGMT	0.	0.	0.	0.	0.	0.
	UNDESIG LAKE MGMT	0.	0.	0.	0.	0.	0.
	DRAINAGE PRESSURE ESTIMATES:	1583.	34.	1424.	28.	159.	6.
MADISON DR							
	SALMONID STREAM	117777.	2497.	48064.	856.	69713.	1641.
	SALMONID LAKE	54428.	1143.	25518.	469.	28910.	674.
	NONSALMONID STREAM	157.	4.	157.	4.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	458.	10.	333.	6.	125.	4.
	UNDESIG LAKE MGMT	1077.	22.	641.	12.	436.	10.
	DRAINAGE PRESSURE ESTIMATES:	173897.	3676.	74713.	1347.	99184.	2329.
MARIAS DR							
	SALMONID STREAM	4704.	80.	4197.	66.	507.	14.
	SALMONID LAKE	31378.	523.	30410.	498.	968.	25.
	NONSALMONID STREAM	4280.	82.	4244.	81.	36.	1.
	NONSALMONID LAKE	17992.	323.	17465.	310.	527.	13.
	UNDESIG STRM MGMT	538.	7.	538.	7.	0.	0.
	UNDESIG LAKE MGMT	1006.	18.	970.	17.	36.	1.
	DRAINAGE PRESSURE ESTIMATES:	59898.	1033.	57824.	979.	2074.	54.
MILK DR							
	SALMONID STREAM	5451.	106.	5198.	99.	253.	7.
	SALMONID LAKE	25058.	465.	23667.	434.	1391.	31.
	NONSALMONID STREAM	11712.	220.	11294.	209.	418.	11.
	NONSALMONID LAKE	7986.	142.	7795.	137.	191.	5.
	UNDESIG STRM MGMT	48.	1.	48.	1.	0.	0.
	UNDESIG LAKE MGMT	3560.	68.	3112.	57.	448.	11.
	DRAINAGE PRESSURE ESTIMATES:	53815.	1002.	51114.	937.	2701.	65.

Table 6. Angling pressure in angler days by drainage by water type for the 1989 angling year Mar '89 through Feb '89 (continued)

DRAIN	WATER TYPE	TOTALS PRESSURE	TOTALS TRIPS	RESIDENTS PRESSURE	RESIDENTS TRIPS	NONRESIDENTS PRESSURE	NONRESIDENTS TRIPS
LOWER MISSOURI DR							
	SALMONID STREAM	22628.	440.	19973.	357.	2655.	83.
	SALMONID LAKE	19130.	375.	17486.	335.	1644.	40.
	NONSALMONID STREAM	19813.	378.	19072.	359.	741.	19.
	NONSALMONID LAKE	44280.	835.	39912.	723.	4368.	112.
	UNDESIG STRM MGMT	513.	11.	405.	8.	108.	3.
	UNDESIG LAKE MGMT	4378.	77.	3973.	68.	405.	9.
	DRAINAGE PRESSURE ESTIMATES:	110742.	2116.	100821.	1850.	9921.	266.
UPPER MISSOURI DR							
	SALMONID STREAM	156145.	2886.	129314.	2247.	26831.	639.
	SALMONID LAKE	257558.	4613.	228615.	3904.	28943.	709.
	NONSALMONID STREAM	2056.	42.	1695.	32.	361.	10.
	NONSALMONID LAKE	183.	4.	111.	2.	72.	2.
	UNDESIG STRM MGMT	3335.	69.	3083.	62.	252.	7.
	UNDESIG LAKE MGMT	4184.	82.	4004.	77.	180.	5.
	DRAINAGE PRESSURE ESTIMATES:	423461.	7696.	366822.	6324.	56639.	1372.
MUSSELSHELL DR							
	SALMONID STREAM	10365.	200.	9499.	182.	866.	18.
	SALMONID LAKE	10746.	178.	10285.	167.	461.	11.
	NONSALMONID STREAM	627.	11.	627.	11.	0.	0.
	NONSALMONID LAKE	2193.	47.	2038.	43.	155.	4.
	UNDESIG STRM MGMT	518.	11.	312.	6.	206.	5.
	UNDESIG LAKE MGMT	2780.	49.	2449.	44.	331.	5.
	DRAINAGE PRESSURE ESTIMATES:	27229.	496.	25210.	453.	2019.	43.
ST MARY DR							
	SALMONID STREAM	393.	7.	393.	7.	0.	0.
	SALMONID LAKE	5317.	69.	5218.	66.	99.	3.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	36.	1.	0.	0.	36.	1.
	UNDESIG LAKE MGMT	316.	7.	316.	7.	0.	0.
	DRAINAGE PRESSURE ESTIMATES:	6062.	84.	5927.	80.	135.	4.
SUN DR							
	SALMONID STREAM	9007.	180.	6478.	116.	2529.	64.
	SALMONID LAKE	23422.	428.	21737.	385.	1685.	43.
	NONSALMONID STREAM	39.	1.	39.	1.	0.	0.
	NONSALMONID LAKE	748.	12.	748.	12.	0.	0.
	UNDESIG STRM MGMT	362.	8.	290.	6.	72.	2.
	UNDESIG LAKE MGMT	1571.	26.	1499.	24.	72.	2.
	DRAINAGE PRESSURE ESTIMATES:	35149.	655.	30791.	544.	4358.	111.

Table 6. Angling pressure in angler days by drainage by water type for the 1989 angling year Mar '89 through Feb '89 (continued)

DRAIN	WATER TYPE	TOTALS PRESSURE	TOTALS TRIPS	RESIDENTS PRESSURE	RESIDENTS TRIPS	NONRESIDENTS PRESSURE	NONRESIDENTS TRIPS
LOWER YELLOWSTONE DR							
	SALMONID STREAM	3236.	61.	3022.	55.	214.	6.
	SALMONID LAKE	1382.	29.	1238.	25.	144.	4.
	NONSALMONID STREAM	53063.	991.	46006.	829.	7057.	162.
	NONSALMONID LAKE	28328.	566.	20307.	381.	8021.	185.
	UNDESIG STRM MGMT	125.	2.	125.	2.	0.	0.
	UNDESIG LAKE MGMT	1659.	34.	1587.	32.	72.	2.
	DRAINAGE PRESSURE ESTIMATES:	87793.	1683.	72285.	1324.	15508.	359.
UPPER YELLOWSTONE DR							
	SALMONID STREAM	242201.	4891.	164070.	2924.	78131.	1967.
	SALMONID LAKE	91314.	1769.	72223.	1304.	19091.	465.
	NONSALMONID STREAM	8982.	137.	8300.	125.	682.	12.
	NONSALMONID LAKE	1293.	25.	1257.	24.	36.	1.
	UNDESIG STRM MGMT	2514.	59.	998.	19.	1516.	40.
	UNDESIG LAKE MGMT	4708.	106.	2569.	49.	2139.	57.
	DRAINAGE PRESSURE ESTIMATES:	351012.	6987.	249417.	4445.	101595.	2542.
TOTAL							
	SALMONID STREAM	1079907.	21438.	752899.	13412.	327008.	8026.
	SALMONID LAKE	968916.	18091.	768934.	13313.	199982.	4778.
	NONSALMONID STREAM	101080.	1876.	91626.	1655.	9454.	221.
	NONSALMONID LAKE	116064.	2187.	102384.	1857.	13680.	330.
	UNDESIG STRM MGMT	26934.	607.	14085.	269.	12849.	338.
	UNDESIG LAKE MGMT	43184.	827.	36224.	653.	6960.	174.
	STATEWIDE PRESSURE ESTIMATES:	2336085.	45026.	1766152.	31159.	569933.	13867.

The lower Yellowstone River drainage represents the area below the mouth of the Bighorn River while the upper Yellowstone River drainage covers the Bighorn River drainage and all waters above the confluence of the Bighorn River. The pressure by drainage ranged from 423,461 angler days for the Upper Missouri River drainage to 1,583 angler days for the Little Missouri River drainage.

1989 SUMMER

The "summer" season for angling in Montana is considered as that period of the year between the first of May through the end of September. In 1989 1,787,924 (76.5%) days of angling pressure occurred during this period (Table 7). Percentages of angling pressure within the regions for the summer period was very similar to the entire year ranging from 71.5% for region 4 to 79.2% for region 3.

Residents accounted for 70.0% of the "summer" angling pressure (1,253,417 angling days). Within the regions the residents comprised anywhere from as high as 91.7% of the "summer" angling pressure in region 6 to as low as 55.1% of the pressure in region 3.

Table 7. Angling pressure in angler days by region by water type for the "summer" season of May '89 through September '89

REG	WATER TYPE	TOTALS PRESSURE	TOTALS TRIPS	RESIDENTS PRESSURE	RESIDENTS TRIPS	NON-RESIDENTS PRESSURE	NON-RESIDENTS TRIPS
1							
	SALMONID STREAM	95348.	1992.	71133.	1373.	24215.	619.
	SALMONID LAKE	207814.	4283.	137951.	2633.	69863.	1650.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	8915.	176.	8605.	168.	310.	8.
	UNDESIG STRM MGMT	3273.	76.	1511.	29.	1762.	47.
	UNDESIG LAKE MGMT	6928.	147.	5876.	118.	1052.	29.
	REGIONAL PRESSURE ESTIMATES:	322278.	6674.	225076.	4321.	97202.	2353.
2							
	SALMONID STREAM	154167.	3174.	112623.	2147.	41544.	1027.
	SALMONID LAKE	70576.	1409.	59108.	1130.	11468.	279.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	2145.	48.	1352.	27.	793.	21.
	UNDESIG LAKE MGMT	3737.	77.	3227.	63.	510.	14.
	REGIONAL PRESSURE ESTIMATES:	230625.	4708.	176310.	3367.	54315.	1341.
3							
	SALMONID STREAM	321108.	7043.	161983.	3138.	159125.	3905.
	SALMONID LAKE	180810.	3910.	114099.	2264.	66711.	1646.
	NONSALMONID STREAM	157.	4.	157.	4.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	4627.	107.	2181.	43.	2446.	64.
	UNDESIG LAKE MGMT	4091.	88.	2834.	55.	1257.	33.
	REGIONAL PRESSURE ESTIMATES:	510793.	11152.	281254.	5504.	229539.	5648.
4							
	SALMONID STREAM	123595.	2545.	95434.	1857.	28161.	688.
	SALMONID LAKE	165626.	3335.	144540.	2814.	21086.	521.
	NONSALMONID STREAM	7314.	152.	6701.	135.	613.	17.
	NONSALMONID LAKE	17114.	334.	16360.	315.	754.	19.
	UNDESIG STRM MGMT	3418.	71.	2960.	59.	458.	12.
	UNDESIG LAKE MGMT	6848.	143.	6257.	128.	591.	15.
	REGIONAL PRESSURE ESTIMATES:	323915.	6580.	272252.	5308.	51663.	1272.
5							
	SALMONID STREAM	148424.	3230.	93217.	1823.	55207.	1407.
	SALMONID LAKE	68177.	1431.	51195.	1003.	16982.	428.
	NONSALMONID STREAM	4906.	94.	4619.	86.	287.	8.
	NONSALMONID LAKE	913.	18.	877.	17.	36.	1.
	UNDESIG STRM MGMT	1284.	30.	666.	14.	618.	16.
	UNDESIG LAKE MGMT	5901.	131.	3645.	71.	2256.	60.
	REGIONAL PRESSURE ESTIMATES:	229605.	4934.	154219.	3014.	75386.	1920.

Table 7. Angling pressure in angler days by region by water type for the "summer" season of May '89 through September '89 (continued)

REG	WATER TYPE	TOTALS PRESSURE	TOTALS TRIPS	RESIDENTS PRESSURE	RESIDENTS TRIPS	NON-RESIDENTS PRESSURE	NON-RESIDENTS TRIPS
6							
	SALMONID STREAM	7598.	157.	7273.	148.	325.	9.
	SALMONID LAKE	22230.	448.	20623.	411.	1607.	37.
	NONSALMONID STREAM	19692.	415.	18749.	391.	943.	24.
	NONSALMONID LAKE	40387.	819.	35939.	705.	4448.	114.
	UNDESIG STRM MGMT	325.	7.	253.	5.	72.	2.
	UNDESIG LAKE MGMT	3717.	73.	3356.	63.	361.	10.
	REGIONAL PRESSURE ESTIMATES:	93949.	1919.	86193.	1723.	7756.	196.
7							
	SALMONID STREAM	2802.	53.	2609.	48.	193.	5.
	SALMONID LAKE	2074.	42.	1894.	37.	180.	5.
	NONSALMONID STREAM	38044.	799.	32027.	642.	6017.	157.
	NONSALMONID LAKE	22870.	490.	17437.	349.	5433.	141.
	UNDESIG STRM MGMT	96.	2.	96.	2.	0.	0.
	UNDESIG LAKE MGMT	1616.	35.	1355.	30.	261.	5.
	REGIONAL PRESSURE ESTIMATES:	67502.	1421.	55418.	1108.	12084.	313.
TOTAL							
	SALMONID STREAM	853042.	18194.	544272.	10534.	308770.	7660.
	SALMONID LAKE	717307.	14858.	529410.	10292.	187897.	4566.
	NONSALMONID STREAM	70113.	1464.	62253.	1258.	7860.	206.
	NONSALMONID LAKE	90199.	1837.	79218.	1554.	10981.	283.
	UNDESIG STRM MGMT	24425.	568.	11714.	232.	12711.	336.
	UNDESIG LAKE MGMT	32838.	694.	26550.	528.	6288.	166.
	STATEWIDE PRESSURE ESTIMATES:	1787924.	37615.	1253417.	24398.	534507.	13217.

"Summer" angling pressure by drainage (Table 8) ranged from 297,228 angler days for the upper Missouri River drainage to 1,495 angler days for the Little Missouri River drainage.

Angling pressure for residents by drainage ranged from a low of 35.9% for the Madison River drainage to a high of 95.1% for the Marias River drainage.

Table 8. Angling pressure in angler days by drainage by water type for the 1989 "summer" angling season
May '89 through September '89

DRAIN	WATER TYPE	TOTALS PRESSURE	TOTALS TRIPS	RESIDENTS PRESSURE	RESIDENTS TRIPS	NONRESIDENTS PRESSURE	NONRESIDENTS TRIPS
BEAVERHEAD DR							
	SALMONID STREAM	40025.	895.	17827.	347.	22198.	548.
	SALMONID LAKE	35206.	823.	15443.	316.	19763.	507.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	458.	11.	184.	4.	274.	7.
	UNDESIG LAKE MGMT	72.	2.	0.	0.	72.	2.
	DRAINAGE PRESSURE ESTIMATES:	75761.	1731.	33454.	667.	42307.	1064.
BIG HOLE DR							
	SALMONID STREAM	43772.	919.	28253.	529.	15519.	390.
	SALMONID LAKE	6500.	126.	5605.	103.	895.	23.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	241.	6.	61.	1.	180.	5.
	UNDESIG LAKE MGMT	849.	20.	596.	13.	253.	7.
	DRAINAGE PRESSURE ESTIMATES:	51362.	1071.	34515.	646.	16847.	425.
BITTERROOT DR							
	SALMONID STREAM	47827.	971.	33978.	638.	13849.	333.
	SALMONID LAKE	7793.	154.	6591.	123.	1202.	31.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	880.	20.	544.	11.	336.	9.
	UNDESIG LAKE MGMT	1991.	41.	1794.	35.	197.	6.
	DRAINAGE PRESSURE ESTIMATES:	58491.	1186.	42907.	807.	15584.	379.
BLACKFOOT DR							
	SALMONID STREAM	22744.	457.	18477.	348.	4267.	109.
	SALMONID LAKE	22309.	445.	19660.	381.	2649.	64.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	267.	6.	195.	4.	72.	2.
	UNDESIG LAKE MGMT	246.	5.	210.	4.	36.	1.
	DRAINAGE PRESSURE ESTIMATES:	45566.	913.	38542.	737.	7024.	176.
LOWER CLARK FORK DR							
	SALMONID STREAM	39858.	844.	26208.	513.	13650.	331.
	SALMONID LAKE	21048.	416.	16563.	312.	4485.	104.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	39.	1.	39.	1.	0.	0.
	UNDESIG STRM MGMT	576.	13.	360.	7.	216.	6.
	UNDESIG LAKE MGMT	1033.	21.	961.	19.	72.	2.
	DRAINAGE PRESSURE ESTIMATES:	62554.	1295.	44131.	852.	18423.	443.

Table 8. Angling pressure in angler days by drainage by water type for the 1989 "summer" angling season May '89 through September '89 (continued)

DRAIN / WATER TYPE	TOTALS PRESSURE	TOTALS TRIPS	RESIDENTS PRESSURE	RESIDENTS TRIPS	NONRESIDENTS PRESSURE	NONRESIDENTS TRIPS
UPPER CLARK FORK DR						
SALMONID STREAM	60045.	1250.	45525.	876.	14520.	374.
SALMONID LAKE	35793.	713.	29606.	564.	6187.	149.
NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
UNDESIG STRM MGMT	982.	21.	606.	12.	376.	9.
UNDESIG LAKE MGMT	1413.	29.	1208.	24.	205.	5.
DRAINAGE PRESSURE ESTIMATES:	98233.	2013.	76945.	1476.	21288.	537.
LOWER FLATHEAD DR						
SALMONID STREAM	37133.	757.	30444.	590.	6689.	167.
SALMONID LAKE	123182.	2501.	87600.	1664.	35582.	837.
NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
NONSALMONID LAKE	7009.	139.	6735.	132.	274.	7.
UNDESIG STRM MGMT	1524.	34.	853.	16.	671.	18.
UNDESIG LAKE MGMT	4630.	97.	4025.	80.	605.	17.
DRAINAGE PRESSURE ESTIMATES:	173478.	3528.	129657.	2482.	43821.	1046.
UPPER FLATHEAD DR						
SALMONID STREAM	15861.	327.	11471.	214.	4390.	113.
SALMONID LAKE	16254.	340.	12473.	246.	3781.	94.
NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
UNDESIG STRM MGMT	477.	11.	238.	5.	239.	6.
UNDESIG LAKE MGMT	845.	18.	809.	17.	36.	1.
DRAINAGE PRESSURE ESTIMATES:	33437.	696.	24991.	482.	8446.	214.
GALLATIN DR						
SALMONID STREAM	64174.	1424.	34519.	667.	29655.	757.
SALMONID LAKE	17963.	369.	10655.	204.	7308.	165.
NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
UNDESIG STRM MGMT	1116.	25.	462.	9.	654.	16.
UNDESIG LAKE MGMT	1205.	26.	808.	15.	397.	11.
DRAINAGE PRESSURE ESTIMATES:	84458.	1844.	46444.	895.	38014.	949.
JEFFERSON DR						
SALMONID STREAM	18914.	387.	14519.	285.	4395.	102.
SALMONID LAKE	6452.	130.	5331.	101.	1121.	29.
NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
UNDESIG STRM MGMT	362.	8.	254.	5.	108.	3.
UNDESIG LAKE MGMT	468.	9.	396.	7.	72.	2.
DRAINAGE PRESSURE ESTIMATES:	26196.	534.	20500.	398.	5696.	136.

Table 8. Angling pressure in angler days by drainage by water type for the 1989 "summer" angling season May '89 through September '89 (continued)

DRAIN	WATER TYPE	TOTALS PRESSURE	TOTALS TRIPS	RESIDENTS PRESSURE	RESIDENTS TRIPS	NONRESIDENTS PRESSURE	NONRESIDENTS TRIPS
KOOTENAI DR							
	SALMONID STREAM	26229.	564.	17763.	343.	8466.	221.
	SALMONID LAKE	51854.	1120.	24409.	470.	27445.	650.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	1867.	36.	1831.	35.	36.	1.
	UNDESIG STRM MGMT	823.	21.	115.	2.	708.	19.
	UNDESIG LAKE MGMT	721.	17.	310.	6.	411.	11.
	DRAINAGE PRESSURE ESTIMATES:	81494.	1758.	44428.	856.	37066.	902.
LITTLE MISSOURI DR							
	SALMONID STREAM	0.	0.	0.	0.	0.	0.
	SALMONID LAKE	768.	15.	768.	15.	0.	0.
	NONSALMONID STREAM	307.	9.	148.	3.	159.	6.
	NONSALMONID LAKE	420.	8.	420.	8.	0.	0.
	UNDESIG STRM MGMT	0.	0.	0.	0.	0.	0.
	UNDESIG LAKE MGMT	0.	0.	0.	0.	0.	0.
	DRAINAGE PRESSURE ESTIMATES:	1495.	32.	1336.	26.	159.	6.
MADISON DR							
	SALMONID STREAM	97756.	2202.	31528.	619.	66228.	1583.
	SALMONID LAKE	46042.	1030.	19583.	392.	26459.	638.
	NONSALMONID STREAM	157.	4.	157.	4.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	458.	10.	333.	6.	125.	4.
	UNDESIG LAKE MGMT	1077.	22.	641.	12.	436.	10.
	DRAINAGE PRESSURE ESTIMATES:	145490.	3268.	52242.	1033.	93248.	2235.
MARIAS DR							
	SALMONID STREAM	2928.	61.	2464.	49.	464.	12.
	SALMONID LAKE	20171.	410.	19224.	386.	947.	24.
	NONSALMONID STREAM	2903.	60.	2867.	59.	36.	1.
	NONSALMONID LAKE	14342.	275.	13815.	262.	527.	13.
	UNDESIG STRM MGMT	39.	1.	39.	1.	0.	0.
	UNDESIG LAKE MGMT	832.	16.	796.	15.	36.	1.
	DRAINAGE PRESSURE ESTIMATES:	41215.	823.	39205.	772.	2010.	51.
MILK DR							
	SALMONID STREAM	4159.	86.	3906.	79.	253.	7.
	SALMONID LAKE	18293.	371.	16902.	340.	1391.	31.
	NONSALMONID STREAM	8415.	174.	7997.	163.	418.	11.
	NONSALMONID LAKE	4937.	101.	4767.	97.	170.	4.
	UNDESIG STRM MGMT	48.	1.	48.	1.	0.	0.
	UNDESIG LAKE MGMT	2470.	50.	2022.	39.	448.	11.
	DRAINAGE PRESSURE ESTIMATES:	38322.	783.	35642.	719.	2680.	64.

Table 8. Angling pressure in angler days by drainage by water type for the 1989 "summer" angling season May '89 through September '89 (continued)

DRAIN WATER TYPE	TOTALS PRESSURE	TOTALS TRIPS	RESIDENTS PRESSURE	RESIDENTS TRIPS	NONRESIDENTS PRESSURE	NONRESIDENTS TRIPS
LOWER MISSOURI DR						
SALMONID STREAM	17557.	357.	15431.	299.	2126.	58.
SALMONID LAKE	13493.	276.	12329.	243.	1164.	33.
NONSALMONID STREAM	13143.	282.	12402.	263.	741.	19.
NONSALMONID LAKE	35753.	724.	31475.	614.	4278.	110.
UNDESIG STRM MGMT	469.	10.	361.	7.	108.	3.
UNDESIG LAKE MGMT	3144.	61.	2739.	52.	405.	9.
DRAINAGE PRESSURE ESTIMATES:	83559.	1710.	74737.	1478.	8822.	232.
UPPER MISSOURI DR						
SALMONID STREAM	109896.	2279.	83664.	1645.	26232.	634.
SALMONID LAKE	178721.	3648.	150910.	2956.	27811.	692.
NONSALMONID STREAM	1953.	40.	1592.	30.	361.	10.
NONSALMONID LAKE	183.	4.	111.	2.	72.	2.
UNDESIG STRM MGMT	3085.	64.	2833.	57.	252.	7.
UNDESIG LAKE MGMT	3390.	72.	3210.	67.	180.	5.
DRAINAGE PRESSURE ESTIMATES:	297228.	6107.	242320.	4757.	54908.	1350.
MUSSELSHELL DR						
SALMONID STREAM	6611.	141.	6091.	128.	520.	13.
SALMONID LAKE	5991.	118.	5530.	107.	461.	11.
NONSALMONID STREAM	553.	10.	553.	10.	0.	0.
NONSALMONID LAKE	1848.	41.	1693.	37.	155.	4.
UNDESIG STRM MGMT	518.	11.	312.	6.	206.	5.
UNDESIG LAKE MGMT	2008.	39.	1864.	35.	144.	4.
DRAINAGE PRESSURE ESTIMATES:	17529.	360.	16043.	323.	1486.	37.
ST MARY DR						
SALMONID STREAM	393.	7.	393.	7.	0.	0.
SALMONID LAKE	1327.	26.	1228.	23.	99.	3.
NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
UNDESIG STRM MGMT	36.	1.	0.	0.	36.	1.
UNDESIG LAKE MGMT	316.	7.	316.	7.	0.	0.
DRAINAGE PRESSURE ESTIMATES:	2072.	41.	1937.	37.	135.	4.
SUN DR						
SALMONID STREAM	8418.	169.	5889.	105.	2529.	64.
SALMONID LAKE	16431.	330.	14767.	288.	1664.	42.
NONSALMONID STREAM	39.	1.	39.	1.	0.	0.
NONSALMONID LAKE	438.	8.	438.	8.	0.	0.
UNDESIG STRM MGMT	362.	8.	290.	6.	72.	2.
UNDESIG LAKE MGMT	771.	17.	699.	15.	72.	2.
DRAINAGE PRESSURE ESTIMATES:	26459.	533.	22122.	423.	4337.	110.

Table 8. Angling pressure in angler days by drainage by water type for the 1989 "summer" angling season May '89 through September '89 (continued)

DRAIN	WATER TYPE	TOTALS PRESSURE	TOTALS TRIPS	RESIDENTS PRESSURE	RESIDENTS TRIPS	NONRESIDENTS PRESSURE	NONRESIDENTS TRIPS
LOWER YELLOWSTONE DR							
	SALMONID STREAM	2802.	53.	2609.	48.	193.	5.
	SALMONID LAKE	1117.	24.	973.	20.	144.	4.
	NONSALMONID STREAM	37737.	790.	31879.	639.	5858.	151.
	NONSALMONID LAKE	22450.	482.	17017.	341.	5433.	141.
	UNDESIG STRM MGMT	48.	1.	48.	1.	0.	0.
	UNDESIG LAKE MGMT	1248.	28.	1176.	26.	72.	2.
	DRAINAGE PRESSURE ESTIMATES:	65402.	1378.	53702.	1075.	11700.	303.
UPPER YELLOWSTONE DR							
	SALMONID STREAM	185940.	4044.	113313.	2205.	72627.	1839.
	SALMONID LAKE	70599.	1473.	53260.	1038.	17339.	435.
	NONSALMONID STREAM	4906.	94.	4619.	86.	287.	8.
	NONSALMONID LAKE	913.	18.	877.	17.	36.	1.
	UNDESIG STRM MGMT	2399.	58.	883.	18.	1516.	40.
	UNDESIG LAKE MGMT	4109.	97.	1970.	40.	2139.	57.
	DRAINAGE PRESSURE ESTIMATES:	268866.	5784.	174922.	3404.	93944.	2380.
TOTAL							
	SALMONID STREAM	853042.	18194.	544272.	10534.	308770.	7660.
	SALMONID LAKE	717307.	14858.	529410.	10292.	187897.	4566.
	NONSALMONID STREAM	70113.	1464.	62253.	1258.	7860.	206.
	NONSALMONID LAKE	90199.	1837.	79218.	1554.	10981.	283.
	UNDESIG STRM MGMT	24425.	568.	11714.	232.	12711.	336.
	UNDESIG LAKE MGMT	32838.	694.	26550.	528.	6288.	166.
	STATEWIDE PRESSURE ESTIMATES:	1787924.	37615.	1253417.	24398.	534507.	13217.

1989 WINTER

The "winter" season for angling is from March through April and October through February of the following year. In 1989, 548,178 angler days (23.5%) of the annual fishing pressure occurred during this period (Table 9). Residents accounted for 93.5% of the total angling pressure for the "winter" season. Angling pressure was fairly evenly divided between salmonid streams and salmonid lakes with 41.4% and 45.9% of the "winter" pressure respectively.

The pressure from region to region ranged from a high of 134,518 angler days for Region 3 to a low of 22,481 angler days for Region 7. Angling pressure by residents for this period for each FWP region ranged from a low of 83.1% for region 7 to a high of 98.9% for region 6.

Winter angling pressure (Table 10) by drainage ranged from 126,236 angler days for the Upper Missouri River drainage to 88 angler days for the Little Missouri River drainage in Eastern Montana. Residents accounted for as low as 75.0% of the pressure in the Beaverhead River drainage to a high of 100% of the pressure in the Little Missouri River and St. Mary River drainages.

Table 9. Angling pressure in angler days by region by water type for the "winter" season of October '89 through April '90

REG	WATER TYPE	TOTALS PRESSURE	TOTALS TRIPS	RESIDENTS PRESSURE	RESIDENTS TRIPS	NON-RESIDENTS PRESSURE	NON-RESIDENTS TRIPS
1	SALMONID STREAM	23631.	339.	21885.	307.	1746.	32.
	SALMONID LAKE	61509.	778.	59177.	744.	2332.	34.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	3724.	49.	3724.	49.	0.	0.
	UNDESIG STRM MGMT	319.	6.	250.	5.	69.	1.
	UNDESIG LAKE MGMT	1905.	25.	1559.	20.	346.	5.
	REGIONAL PRESSURE ESTIMATES:	91088.	1197.	86595.	1125.	4493.	72.
2	SALMONID STREAM	39056.	525.	37229.	480.	1827.	45.
	SALMONID LAKE	24601.	289.	23910.	277.	691.	12.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	176.	4.	176.	4.	0.	0.
	UNDESIG LAKE MGMT	1816.	20.	1678.	18.	138.	2.
	REGIONAL PRESSURE ESTIMATES:	65649.	838.	62993.	779.	2656.	59.
3	SALMONID STREAM	67679.	1019.	58522.	862.	9157.	157.
	SALMONID LAKE	65723.	828.	59216.	708.	6507.	120.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	290.	5.	221.	4.	69.	1.
	UNDESIG LAKE MGMT	826.	9.	826.	9.	0.	0.
	REGIONAL PRESSURE ESTIMATES:	134518.	1861.	118785.	1583.	15733.	278.
4	SALMONID STREAM	49728.	651.	48297.	618.	1431.	33.
	SALMONID LAKE	70019.	915.	69312.	898.	707.	17.
	NONSALMONID STREAM	1804.	30.	1804.	30.	0.	0.
	NONSALMONID LAKE	4414.	61.	4393.	60.	21.	1.
	UNDESIG STRM MGMT	749.	11.	749.	11.	0.	0.
	UNDESIG LAKE MGMT	2551.	34.	2551.	34.	0.	0.
	REGIONAL PRESSURE ESTIMATES:	129265.	1702.	127106.	1651.	2159.	51.
5	SALMONID STREAM	43988.	662.	40018.	568.	3970.	94.
	SALMONID LAKE	20940.	296.	19278.	268.	1662.	28.
	NONSALMONID STREAM	4077.	43.	3682.	39.	395.	4.
	NONSALMONID LAKE	380.	7.	380.	7.	0.	0.
	UNDESIG STRM MGMT	116.	1.	116.	1.	0.	0.
	UNDESIG LAKE MGMT	1223.	17.	1036.	16.	187.	1.
	REGIONAL PRESSURE ESTIMATES:	70724.	1026.	64510.	899.	6214.	127.

Table 9. Angling pressure in angler days by region by water type for the "winter" season of October '89 through April '90 (continued)

REG	WATER TYPE	TOTALS PRESSURE	TOTALS TRIPS	RESIDENTS PRESSURE	RESIDENTS TRIPS	NON-RESIDENTS PRESSURE	NON-RESIDENTS TRIPS
6							
	SALMONID STREAM	2347.	40.	2262.	36.	85.	4.
	SALMONID LAKE	8518.	121.	8331.	120.	187.	1.
	NONSALMONID STREAM	9719.	137.	9719.	137.	0.	0.
	NONSALMONID LAKE	11468.	149.	11378.	147.	90.	2.
	UNDESIG STRM MGMT	44.	1.	44.	1.	0.	0.
	UNDESIG LAKE MGMT	1617.	22.	1617.	22.	0.	0.
	REGIONAL PRESSURE ESTIMATES:	33713.	470.	33351.	463.	362.	7.
7							
	SALMONID STREAM	434.	8.	413.	7.	21.	1.
	SALMONID LAKE	309.	6.	309.	6.	0.	0.
	NONSALMONID STREAM	15370.	202.	14170.	191.	1200.	11.
	NONSALMONID LAKE	5880.	84.	3293.	40.	2587.	44.
	UNDESIG STRM MGMT	77.	1.	77.	1.	0.	0.
	UNDESIG LAKE MGMT	411.	6.	411.	6.	0.	0.
	REGIONAL PRESSURE ESTIMATES:	22481.	307.	18673.	251.	3808.	56.
TOTAL							
	SALMONID STREAM	226863.	3244.	208626.	2878.	18237.	366.
	SALMONID LAKE	251619.	3233.	239533.	3021.	12086.	212.
	NONSALMONID STREAM	30970.	412.	29375.	397.	1595.	15.
	NONSALMONID LAKE	25866.	350.	23168.	303.	2698.	47.
	UNDESIG STRM MGMT	2511.	39.	2373.	37.	138.	2.
	UNDESIG LAKE MGMT	10349.	133.	9678.	125.	671.	8.
	STATEWIDE PRESSURE ESTIMATES:	548178.	7411.	512753.	6761.	35425.	650.

Table 10. Angling pressure in angler days by drainage by water type for the 1989 "winter" angling season October '89 through April '90

DRAIN	WATER TYPE	TOTALS PRESSURE	TOTALS TRIPS	RESIDENTS PRESSURE	RESIDENTS TRIPS	NONRESIDENTS PRESSURE	NONRESIDENTS TRIPS
BEAVERHEAD DR							
	SALMONID STREAM	8724.	131.	6986.	107.	1738.	24.
	SALMONID LAKE	10353.	183.	7286.	111.	3067.	72.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	69.	1.	0.	0.	69.	1.
	UNDESIG LAKE MGMT	328.	4.	328.	4.	0.	0.
	DRAINAGE PRESSURE ESTIMATES:	19474.	319.	14600.	222.	4874.	97.

Table 10. Angling pressure in angler days by drainage by water type for the 1989 "winter" angling season October '89 through April '90 (continued)

DRAIN WATER TYPE	TOTALS PRESSURE	TOTALS TRIPS	RESIDENTS PRESSURE	RESIDENTS TRIPS	NONRESIDENTS PRESSURE	NONRESIDENTS TRIPS
BIG HOLE DR						
SALMONID STREAM	4190.	64.	3359.	53.	831.	11.
SALMONID LAKE	590.	7.	590.	7.	0.	0.
NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
UNDESIG STRM MGMT	0.	0.	0.	0.	0.	0.
UNDESIG LAKE MGMT	347.	3.	347.	3.	0.	0.
DRAINAGE PRESSURE ESTIMATES:	5127.	74.	4296.	63.	831.	11.
BITTERROOT DR						
SALMONID STREAM	11790.	172.	11260.	157.	530.	15.
SALMONID LAKE	1827.	31.	1758.	30.	69.	1.
NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
UNDESIG STRM MGMT	176.	4.	176.	4.	0.	0.
UNDESIG LAKE MGMT	328.	4.	190.	2.	138.	2.
DRAINAGE PRESSURE ESTIMATES:	14121.	211.	13384.	193.	737.	18.
BLACKFOOT DR						
SALMONID STREAM	3896.	51.	3875.	50.	21.	1.
SALMONID LAKE	6792.	80.	6342.	74.	450.	6.
NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
UNDESIG STRM MGMT	0.	0.	0.	0.	0.	0.
UNDESIG LAKE MGMT	0.	0.	0.	0.	0.	0.
DRAINAGE PRESSURE ESTIMATES:	10688.	131.	10217.	124.	471.	7.
LOWER CLARK FORK DR						
SALMONID STREAM	8819.	134.	8030.	118.	789.	16.
SALMONID LAKE	6515.	74.	5827.	69.	688.	5.
NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
UNDESIG STRM MGMT	0.	0.	0.	0.	0.	0.
UNDESIG LAKE MGMT	0.	0.	0.	0.	0.	0.
DRAINAGE PRESSURE ESTIMATES:	15334.	208.	13857.	187.	1477.	21.
UPPER CLARK FORK DR						
SALMONID STREAM	17547.	216.	16942.	202.	605.	14.
SALMONID LAKE	15835.	175.	15663.	170.	172.	5.
NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
UNDESIG STRM MGMT	0.	0.	0.	0.	0.	0.
UNDESIG LAKE MGMT	1488.	16.	1488.	16.	0.	0.
DRAINAGE PRESSURE ESTIMATES:	34870.	407.	34093.	388.	777.	19.

Table 10. Angling pressure in angler days by drainage by water type for the 1989 "winter" angling season October '89 through April '90 (continued)

DRAIN	WATER TYPE	TOTALS PRESSURE	TOTALS TRIPS	RESIDENTS PRESSURE	RESIDENTS TRIPS	NONRESIDENTS PRESSURE	NONRESIDENTS TRIPS
LOWER FLATHEAD DR							
	SALMONID STREAM	10328.	144.	10259.	143.	69.	1.
	SALMONID LAKE	45316.	573.	44076.	554.	1240.	19.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	3680.	48.	3680.	48.	0.	0.
	UNDESIG STRM MGMT	0.	0.	0.	0.	0.	0.
	UNDESIG LAKE MGMT	1305.	19.	959.	14.	346.	5.
	DRAINAGE PRESSURE ESTIMATES:	60629.	784.	58974.	759.	1655.	25.
UPPER FLATHEAD DR							
	SALMONID STREAM	655.	10.	547.	8.	108.	2.
	SALMONID LAKE	1065.	16.	1065.	16.	0.	0.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	118.	2.	118.	2.	0.	0.
	UNDESIG LAKE MGMT	150.	1.	150.	1.	0.	0.
	DRAINAGE PRESSURE ESTIMATES:	1988.	29.	1880.	27.	108.	2.
GALLATIN DR							
	SALMONID STREAM	10265.	154.	8833.	126.	1432.	28.
	SALMONID LAKE	2820.	32.	2751.	31.	69.	1.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	0.	0.	0.	0.	0.	0.
	UNDESIG LAKE MGMT	77.	1.	77.	1.	0.	0.
	DRAINAGE PRESSURE ESTIMATES:	13162.	187.	11661.	158.	1501.	29.
JEFFERSON DR							
	SALMONID STREAM	5553.	82.	5415.	80.	138.	2.
	SALMONID LAKE	4151.	57.	4082.	56.	69.	1.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	221.	4.	221.	4.	0.	0.
	UNDESIG LAKE MGMT	0.	0.	0.	0.	0.	0.
	DRAINAGE PRESSURE ESTIMATES:	9925.	143.	9718.	140.	207.	3.
KOOTENAI DR							
	SALMONID STREAM	9652.	137.	8201.	109.	1451.	28.
	SALMONID LAKE	8760.	118.	8356.	108.	404.	10.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	44.	1.	44.	1.	0.	0.
	UNDESIG STRM MGMT	201.	4.	132.	3.	69.	1.
	UNDESIG LAKE MGMT	450.	5.	450.	5.	0.	0.
	DRAINAGE PRESSURE ESTIMATES:	19107.	265.	17183.	226.	1924.	39.

Table 10. Angling pressure in angler days by drainage by water type for the 1989 "winter" angling season October '89 through April '90

DRAIN	WATER TYPE	TOTALS PRESSURE	TOTALS TRIPS	RESIDENTS PRESSURE	RESIDENTS TRIPS	NONRESIDENTS PRESSURE	NONRESIDENTS TRIPS
LITTLE MISSOURI DR							
	SALMONID STREAM	0.	0.	0.	0.	0.	0.
	SALMONID LAKE	44.	1.	44.	1.	0.	0.
	NONSALMONID STREAM	44.	1.	44.	1.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	0.	0.	0.	0.	0.	0.
	UNDESIG LAKE MGMT	0.	0.	0.	0.	0.	0.
	DRAINAGE PRESSURE ESTIMATES:	88.	2.	88.	2.	0.	0.
MADISON DR							
	SALMONID STREAM	20020.	295.	16534.	237.	3486.	58.
	SALMONID LAKE	8385.	113.	5934.	77.	2451.	36.
	NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
	NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
	UNDESIG STRM MGMT	0.	0.	0.	0.	0.	0.
	UNDESIG LAKE MGMT	0.	0.	0.	0.	0.	0.
	DRAINAGE PRESSURE ESTIMATES:	28405.	408.	22468.	314.	5937.	94.
MARIAS DR							
	SALMONID STREAM	1776.	19.	1734.	17.	42.	2.
	SALMONID LAKE	11207.	113.	11186.	112.	21.	1.
	NONSALMONID STREAM	1377.	22.	1377.	22.	0.	0.
	NONSALMONID LAKE	3650.	48.	3650.	48.	0.	0.
	UNDESIG STRM MGMT	499.	6.	499.	6.	0.	0.
	UNDESIG LAKE MGMT	175.	2.	175.	2.	0.	0.
	DRAINAGE PRESSURE ESTIMATES:	18684.	210.	18621.	207.	63.	3.
MILK DR							
	SALMONID STREAM	1291.	20.	1291.	20.	0.	0.
	SALMONID LAKE	6767.	94.	6767.	94.	0.	0.
	NONSALMONID STREAM	3298.	46.	3298.	46.	0.	0.
	NONSALMONID LAKE	3050.	41.	3029.	40.	21.	1.
	UNDESIG STRM MGMT	0.	0.	0.	0.	0.	0.
	UNDESIG LAKE MGMT	1091.	18.	1091.	18.	0.	0.
	DRAINAGE PRESSURE ESTIMATES:	15497.	219.	15476.	218.	21.	1.
LOWER MISSOURI DR							
	SALMONID STREAM	5068.	83.	4539.	58.	529.	25.
	SALMONID LAKE	5637.	99.	5157.	92.	480.	7.
	NONSALMONID STREAM	6671.	96.	6671.	96.	0.	0.
	NONSALMONID LAKE	8527.	111.	8437.	109.	90.	2.
	UNDESIG STRM MGMT	44.	1.	44.	1.	0.	0.
	UNDESIG LAKE MGMT	1234.	16.	1234.	16.	0.	0.
	DRAINAGE PRESSURE ESTIMATES:	27181.	406.	26082.	372.	1099.	34.

Table 10. Angling pressure in angler days by drainage by water type for the 1989 "winter" angling season October '89 through April '90

DRAIN WATER TYPE	TOTALS PRESSURE	TOTALS TRIPS	RESIDENTS PRESSURE	RESIDENTS TRIPS	NONRESIDENTS PRESSURE	NONRESIDENTS TRIPS
UPPER MISSOURI DR						
SALMONID STREAM	46252.	607.	45653.	602.	599.	5.
SALMONID LAKE	78837.	965.	77704.	948.	1133.	17.
NONSALMONID STREAM	103.	2.	103.	2.	0.	0.
NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
UNDESIG STRM MGMT	250.	5.	250.	5.	0.	0.
UNDESIG LAKE MGMT	794.	10.	794.	10.	0.	0.
DRAINAGE PRESSURE ESTIMATES:	126236.	1589.	124504.	1567.	1732.	22.
MUSSELSHELL DR						
SALMONID STREAM	3754.	59.	3408.	54.	346.	5.
SALMONID LAKE	4756.	60.	4756.	60.	0.	0.
NONSALMONID STREAM	74.	1.	74.	1.	0.	0.
NONSALMONID LAKE	345.	6.	345.	6.	0.	0.
UNDESIG STRM MGMT	0.	0.	0.	0.	0.	0.
UNDESIG LAKE MGMT	772.	10.	585.	9.	187.	1.
DRAINAGE PRESSURE ESTIMATES:	9701.	136.	9168.	130.	533.	6.
ST MARY DR						
SALMONID STREAM	0.	0.	0.	0.	0.	0.
SALMONID LAKE	3991.	43.	3991.	43.	0.	0.
NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
NONSALMONID LAKE	0.	0.	0.	0.	0.	0.
UNDESIG STRM MGMT	0.	0.	0.	0.	0.	0.
UNDESIG LAKE MGMT	0.	0.	0.	0.	0.	0.
DRAINAGE PRESSURE ESTIMATES:	3991.	43.	3991.	43.	0.	0.
SUN DR						
SALMONID STREAM	589.	11.	589.	11.	0.	0.
SALMONID LAKE	6992.	98.	6971.	97.	21.	1.
NONSALMONID STREAM	0.	0.	0.	0.	0.	0.
NONSALMONID LAKE	310.	4.	310.	4.	0.	0.
UNDESIG STRM MGMT	0.	0.	0.	0.	0.	0.
UNDESIG LAKE MGMT	800.	9.	800.	9.	0.	0.
DRAINAGE PRESSURE ESTIMATES:	8691.	122.	8670.	121.	21.	1.
LOWER YELLOWSTONE DR						
SALMONID STREAM	434.	8.	413.	7.	21.	1.
SALMONID LAKE	265.	5.	265.	5.	0.	0.
NONSALMONID STREAM	15326.	201.	14126.	190.	1200.	11.
NONSALMONID LAKE	5880.	84.	3293.	40.	2587.	44.
UNDESIG STRM MGMT	77.	1.	77.	1.	0.	0.
UNDESIG LAKE MGMT	411.	6.	411.	6.	0.	0.
DRAINAGE PRESSURE ESTIMATES:	22393.	305.	18585.	249.	3808.	56.

Table 10. Angling pressure in angler days by drainage by water type for the 1989 "winter" angling season October '89 through April '90

DRAIN	WATER TYPE	TOTALS PRESSURE	TOTALS TRIPS	RESIDENTS PRESSURE	RESIDENTS TRIPS	NONRESIDENTS PRESSURE	NONRESIDENTS TRIPS
UPPER YELLOWSTONE DR							
	SALMONID STREAM	56260.	847.	50758.	719.	5502.	128.
	SALMONID LAKE	20714.	296.	18962.	266.	1752.	30.
	NONSALMONID STREAM	4077.	43.	3682.	39.	395.	4.
	NONSALMONID LAKE	380.	7.	380.	7.	0.	0.
	UNDESIG STRM MGMT	116.	1.	116.	1.	0.	0.
	UNDESIG LAKE MGMT	599.	9.	599.	9.	0.	0.
	DRAINAGE PRESSURE ESTIMATES:	82146.	1203.	74497.	1041.	7649.	162.
TOTAL							
	SALMONID STREAM	226863.	3244.	208626.	2878.	18237.	366.
	SALMONID LAKE	251619.	3233.	239533.	3021.	12086.	212.
	NONSALMONID STREAM	30970.	412.	29375.	397.	1595.	15.
	NONSALMONID LAKE	25866.	350.	23168.	303.	2698.	47.
	UNDESIG STRM MGMT	2511.	39.	2373.	37.	138.	2.
	UNDESIG LAKE MGMT	10349.	133.	9678.	125.	671.	8.
	STATEWIDE PRESSURE ESTIMATES:	548178.	7411.	512753.	6761.	35425.	650.

DISCUSSION

SCOPE OF ANGLING PRESSURE

The statewide angling pressure survey was conducted from March, 1989 through February, 1990. Estimates of pressure by residents and nonresidents were for licensed anglers only. This would encompass anglers 12 years of age and older. Spence (1971) found that the unlicensed angler (ages 2- 14) comprised 9% of the pressure on Rock Creek near Missoula. Peterson (1970) found that the unlicensed angler accounted for 21% and 19% of the total number of anglers on Big Spring Creek near Lewistown during 1968 and 1969 respectively. On the Bighorn River near Hardin, Stevenson (1975) found that the unlicensed angler accounted for 14.2% and 15.8% of the total number of anglers during 1972 and 1973 respectively. Fredenberg (1984) found that 10% of the anglers on Bighorn Lake and 13% of the anglers on the Yellowtail Afterbay were unlicensed. The 1975 National Fishing and Hunting Survey showed that 23.8% of the anglers nationwide were between the ages of 9 and 17. It appears that the unlicensed angler makes up between 9% to 21% of the fishing pressure depending on the type of water being fished.

Some angling pressure was obtained on Indian reservations and National Parks within Montana. This pressure was incidental to other fishing trips and only included those anglers that had purchased a Montana fishing license. Since national parks and reservations require different licensing, a complete pressure estimate of waters within those regions was not obtained.

ACCURACY

SAMPLING

Samples were drawn and questionnaires sent to the selected anglers as soon as possible. This was usually 15-20 days after the wave being sampled had ended (see discussion under Methods for details). Since license dealers are not required to remit copies of licenses sold until the 10th of the following month, the samples may not contain all the eligible anglers for a given period. The months of April through September are most affected by this procedure, since license sales naturally curtail after September. This means of obtaining a sample may skew the pressure if license dealers from a given area don't remit their licenses in a timely manner. At the present time, there is no way to estimate the extent, if any, of this bias.

PRESSURE

To determine the accuracy of the survey, results were compared to on-site creel census that were conducted during the approximate same time frame. Willow Creek Reservoir showed a use figure of 7,535 angler days (Vincent, personnal communique), while the Statewide survey showed 8,527 angler days (a 11.6% difference). Since no variance was associated with the creel census estimate, no significant difference test could be performed. The Willow Creek creel census was conducted from October, 1988 through September, 1989. The surveys overlapped for

the months of March, 1989 through September, 1989. This may account for some of the discrepancy encountered.

No significant difference was found between the survey results and on-site creel census for rivers for the statewide angling mail surveys conducted from 1982 through 1985 (McFarland, 1989). When both surveys were conducted simultaneously on lakes and reservoirs, the results again agreed (McFarland, 1989). The same methodology was used in this survey as was used in those conducted from 1982 through 1985.

RETURN RATES

Return rates (# of respondents / [# of surveys sent - nondeliverables] * 100) were calculated for every wave by residency. Return rates were calculated with and without the follow-up phone calls of resident nonrespondents (Table 11). The average total return rates for residents and nonresidents was 62.8% and 68.2% respectively. Without the telephone calls of nonrespondents the average return rate dropped to 59.9% for residents. Nonresidents remained the same since no telephone calls were made to nonresidents.

Table 11. Return rates by residency with and without phone follow-ups for the 1989 statewide angling survey.

	Total Return Rates		Return Rates w/o Phone	
WAVE	Resident	Nonresident	Resident	Nonresident*
1	62.3	72.7	62.3	72.7
2	55.9	65.1	55.9	65.1
3	56.7	58.1	56.7	58.1
4	53.6	58.3	53.6	58.3
5	56.9	65.5	55.9	65.5
6	61.2	66.8	56.4	66.8
7	64.8	70.1	59.7	70.1
8	64.8	72.9	60.6	72.9
9	68.2	71.1	61.6	71.1
10	69.7	76.1	64.1	76.1
11	68.4	74.5	64.7	74.5
12	70.7	82.1	67.6	82.1
99		53.2		53.2

*Nonresident nonrespondents were not telephoned.

NONRESPONSE BIAS

Telephone calls were made to a random sample of nonrespondents to ascertain if their fishing was different from those who responded to the mail survey. The average phone respondent was 1.6 times more likely to have fished which was significantly higher than than mail respondents (t-value= 5.481, 7 d.f. p-value < .001). The range, from wave to wave, was 1.2 times for July to 2.2 times as likely to fish for November.

It is felt that this bias, of not responding to the mail survey, is caused by the complexity and detail required on the questionnaire form when a respondent has fished. Having to remember the species, number

caught, number kept, and hours fished is forcing those that have fished not to take the time and effort to fill out the form. Table 12 shows the percent of respondents that fished for those waves where both the mail and phone surveys were conducted.

Table 12. Percent respondents that fished by mail and telephone by wave.

Wave	Mail Survey	Telephone Survey
5	36.9	44.7
6	28.7	42.8
7	21.5	28.4
8	12.1	22.6
9	6.2	13.7
10	7.5	12.5
11	9.5	11.2
12	10.2	15.1

The next survey questionnaire should be designed such that only the most important data is ascertained. All questions regarding catch rates, species of fish caught, and hours fished should be dropped.

NUMBER OF LICENSED ANGLERS VS PRESSURE

The number of resident anglers from 1982 to the present has been increasing for the period 1982 to 1985 and them steadily decreasing (Table 13). The number of nonresident anglers during this same period decreased initially and then increased so that overall, the total number of anglers remained fairly static.

Table 13. Number of licensed anglers from 1982 through 1989 by residency.

Year	Resident Anglers	Nonresident Anglers
1982	216,689	119,293
1983	217,483	116,875
1984	232,485	102,843
1985	236,455	106,304
1986	235,403	100,456
1987	233,111	103,936
1988	219,299	108,471
1989	216,412	114,254

Comparing statewide angling use from the mail survey versus number of anglers shows little or no correlation for residents, while nonresidents seem to have some association between number of anglers and the amount of use exerted (Charts 5 & 6). The nonresident fishing pressure is more closely associated with number of anglers because the 2-day nonresident angler provides the majority of use for the nonresidents.

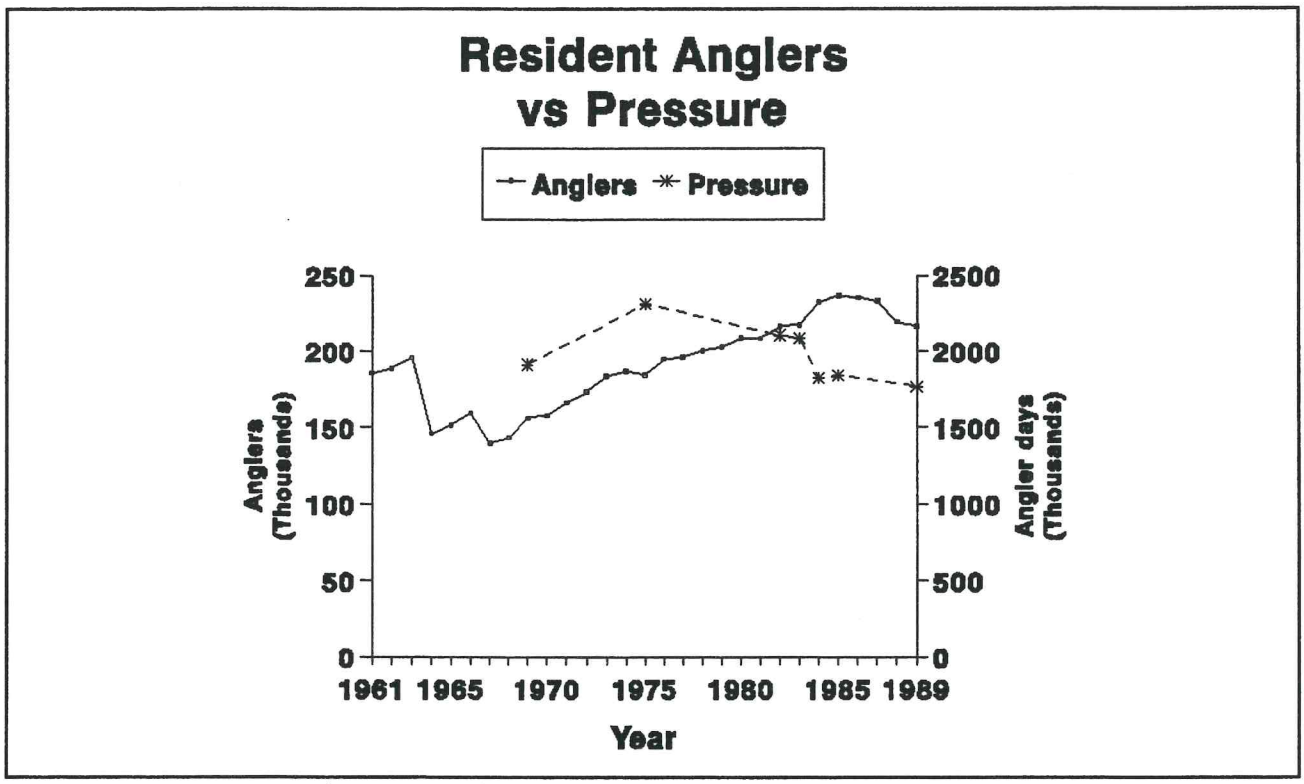

Chart 5. Statewide angling pressure versus number of anglers for residents from 1961 to 1989.

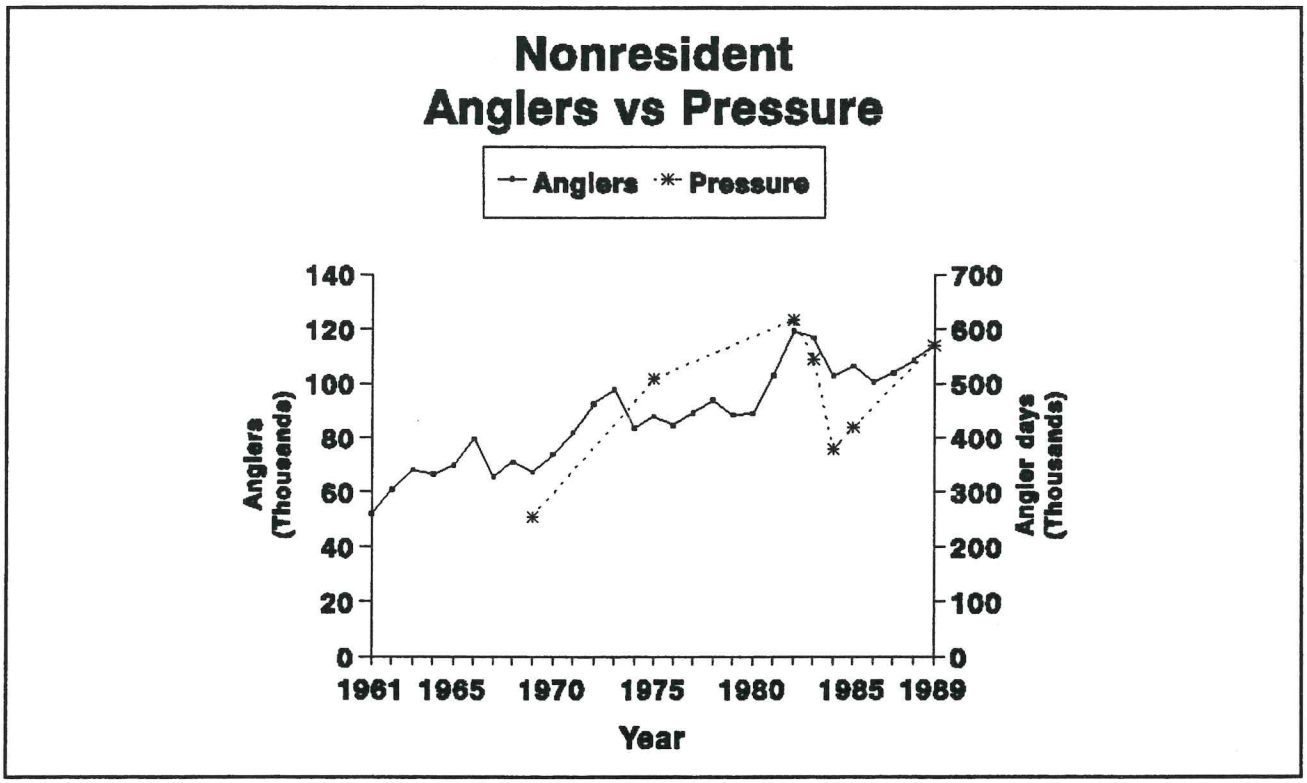

Chart 6. Statewide angling pressure versus number of anglers for nonresidents from 1961 to 1989.

CONCLUSIONS AND RECOMMENDATIONS

The statewide angling pressure mail survey continues to provide invaluable data on individual bodies of water as well as statewide estimates. The survey accurately estimates the angling use when compared to on-site creel censuses that are available.

Future surveys should concentrate on obtaining only the angling pressure data. All questions in regards to catch rates, fish species caught and kept, and hours fished should be eliminated. This will help to reduce the nonresponse bias.

If not cost prohibitive, future questionnaires should be sent so that the returns are anonymous. This could be done by bar-coding all outgoing questionnaires and making sure that the appropriate questionnaire goes in the correct envelope. This could help increase response rates and would also simplify the process of tracking all returns.

It is recommended that the survey continue to be conducted every other year. This will provide long term trend data.

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APPENDIX A

Examples of questionnaires

Montana Department of Fish, Wildlife & Parks

Dear Angler:

We are conducting a survey sent twice a month to a random sample of people selected from a list of persons with fishing licenses. This survey provides important data to help determine fishing pressure on the lakes and streams of Montana. By providing us with this vital information, you will be assisting us in properly managing Montana's fish population.

We have chosen this random sample survey method because it would be very expensive and time consuming to monitor everyone who fishes Montana's waters. This survey requests only your fishing activities for a specific period, and all information you provide will be held in strict confidence. Because this survey is sent every month to a random sample of license holders, there is a slight chance you may receive this survey again. If you do, please note that each survey requests your fishing activity for a different period. We appreciate your continued cooperation in returning survey information at your earliest convenience.

EVEN IF YOU DID NOT FISH OR CATCH ANY FISH, PLEASE FILL OUT AND RETURN THIS QUESTIONNAIRE.

THANK YOU FOR YOUR ASSISTANCE.

Sincerely,

Pat Graham
Fisheries Division Administrator

Bob McFarland
Fisheries Survey Supervisor

PG:BM:jh

Encl.

Montana Department of Fish, Wildlife & Parks

Dear Angler:

We recently mailed you a request for information on your fishing in Montana. As you may recall, we are conducting a survey sent once a month to a random sample of individuals selected from a list of persons with fishing licenses. This survey provides important data to help determine fishing pressure on the lakes and streams of Montana. By providing us with this vital information, you will be assisting us in properly managing Montana's fish population.

We have chosen this random sample survey method because it would be very expensive and time consuming to monitor everyone who fishes Montana's waters. This survey requests only your fishing activities for a specific month and all information you provide will be held in strict confidence. Because this survey is sent out monthly to a random sample of license holders, there is a slight chance you may receive this survey again. If you do, please note that each survey requests your fishing activity for a different month. We appreciate your continued cooperation in returning survey information at your earliest convenience.

If you have already mailed your reply, please accept our thanks and disregard this reminder.

EVEN IF YOU DID NOT FISH OR CATCH ANY FISH, PLEASE FILL OUT AND RETURN THIS QUESTIONNAIRE.

THANK YOU FOR YOUR ASSISTANCE.

Sincerely,

Pat Graham

Pat Graham
Fisheries Division Administrator

Bob McFarland

Bob McFarland
Fisheries Survey Supervisor

PG:BM:jh

Encl.

Montana Department of Fish, Wildlife & Parks

FISHING USE AND HARVEST SURVEY

DID YOU FISH IN MONTANA
DURING THE MONTH OF APRIL 1989?

☐ YES If yes, total number of days fished _____.
PLEASE CONTINUE BELOW:

☐ NO If no, stop here and return form.

ENTER EACH DAY AND EACH WATER FISHED ON A SEPARATE LINE. (Your fishing only!)

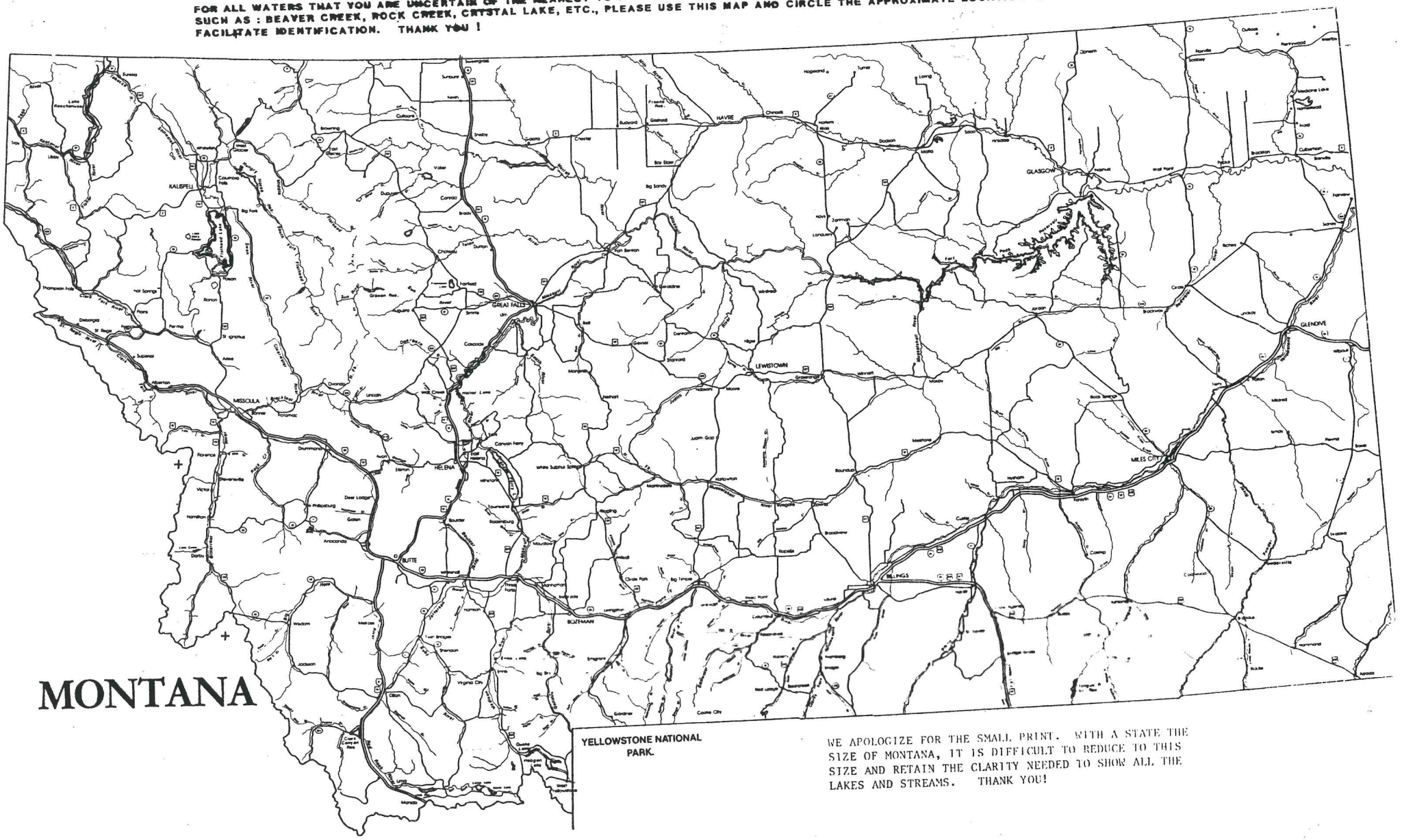
	DATE FISHED	TOTAL HOURS FISHED PER DAY	NAME OF LAKE/STREAM	NEAREST TOWN AND/OR POINT OF ACCESS OR LANDMARK	FISH SPECIES	NUMBER CAUGHT	NUMBER KEPT	FISH SPECIES	NUMBER CAUGHT	NUMBER KEPT	ICE (I) BOAT (B) SHORE(S)	WAS MAIN PURPOSE OF TRIP TO FISH (Y OR N)	ROUND TRIP DISTANCE
EXAMPLE	APR 15	4	Madison River	Grey Cliff Fishing Access	Brown Tr.	5	2	Rainbow Tr.	1	1	S	Y	50
	APR												
	APR												
	APR												
	APR												
	APR												
	APR												
	APR												
	APR												
	APR												
	APR												
	APR												

THANK YOU FOR YOUR COOPERATION!

THIS INFORMATION WILL BE HELD IN STRICT CONFIDENCE AND WILL BE USED FOR MANAGEMENT PURPOSES ONLY.

PLEASE DO NOT REMOVE LABEL

FOR ALL WATERS THAT YOU ARE UNCERTAIN OF THE NEAREST TOWN OR LOCATION OR THE NAME IS COMMON AND CAN BE CONFUSED WITH ANOTHER SUCH AS : BEAVER CREEK, ROCK CREEK, CRYSTAL LAKE, ETC., PLEASE USE THIS MAP AND CIRCLE THE APPROXIMATE LOCATION YOU FISHED TO HELP FACILITATE IDENTIFICATION. THANK YOU !



WE APOLOGIZE FOR THE SMALL PRINT. WITH A STATE THE SIZE OF MONTANA, IT IS DIFFICULT TO REDUCE TO THIS SIZE AND RETAIN THE CLARITY NEEDED TO SHOW ALL THE LAKES AND STREAMS. THANK YOU!

Montana Department of Fish, Wildlife & Parks

FISHING USE AND HARVEST SURVEY

DID YOU BUY A MONTANA FISHING LICENSE BETWEEN MARCH 1989 AND FEBRUARY 1990?

☐ YES If yes, total number of days fished _____.

TYPE OF LICENSE PURCHASED.....
☐ NON-RESIDENT SEASON
☐ 2-DAY--HOW MANY DID YOU PURCHASE FOR YOUR USE _____?

☐ NO If no, stop here and return form.

ENTER EACH DAY AND EACH WATER YOU FISHED IN MONTANA ON A SEPARATE LINE. (Your fishing only!)

DATE FISHED	TOTAL HOURS FISHED PER DAY	NAME OF LAKE/STREAM	NEAREST TOWN AND/OR POINT OF ACCESS OR LANDMARK *	FISH SPECIES	NUMBER CAUGHT	NUMBER KEPT	FISH SPECIES	NUMBER CAUGHT	NUMBER KEPT	ICE (I) BOAT (B) SHORE(S)	WAS MAIN PURPOSE OF TRIP TO FISH (Y OR N)	ROUND TRIP DISTANCE
EXAMPLE												
7/22/89	5	Madison River	Greycliff FAS	BrownTr.	2	1	Rainbow	1	1	B	Y	850
/ /												
/ /												
/ /												
/ /												
/ /												
/ /												
/ /												
/ /												
/ /												

*IF UNSURE, USE MAP ON BACK. USE ADDITIONAL SHEETS, IF NECESSARY

THANK YOU FOR YOUR COOPERATION!

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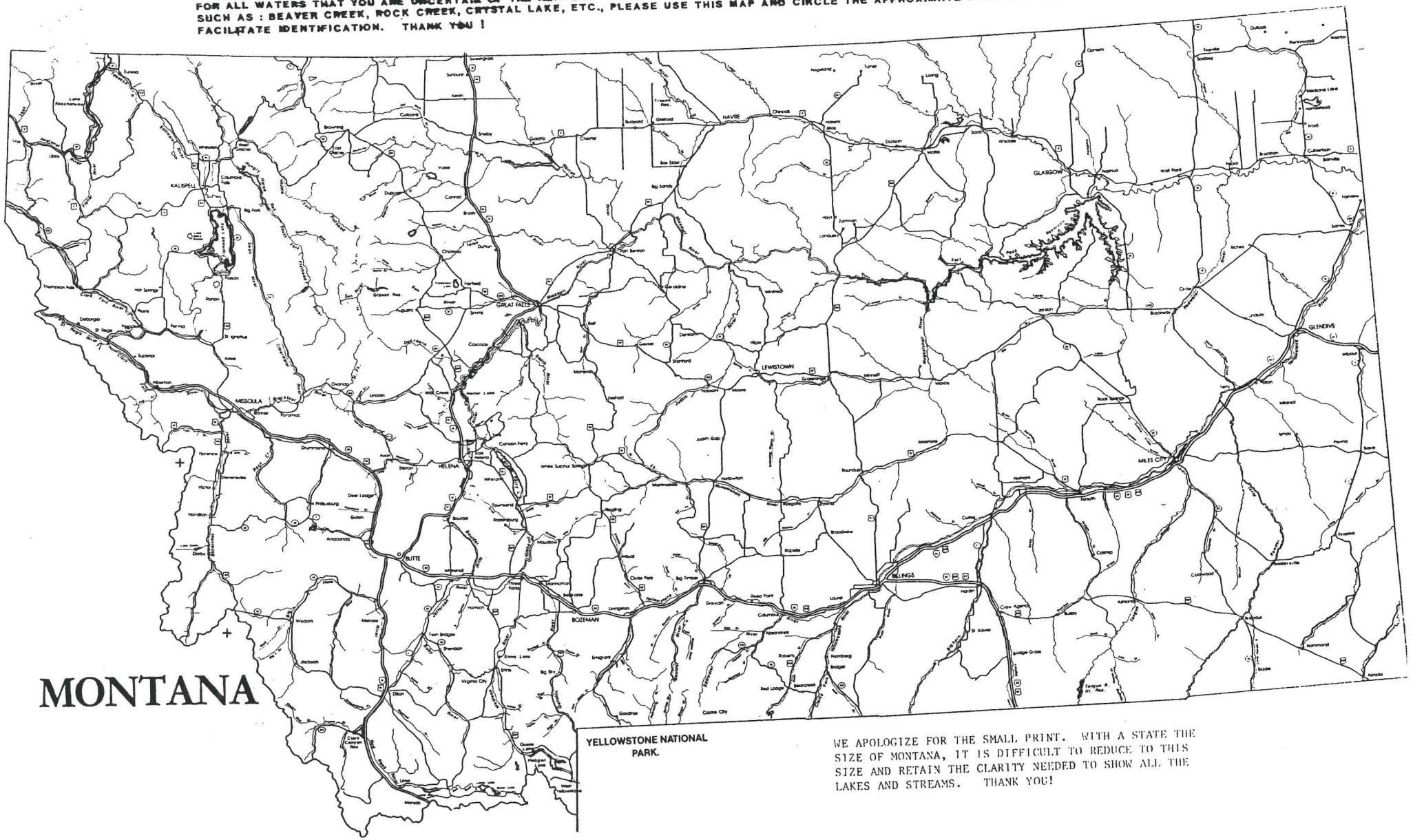

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APPENDIX B
Boundaries of waters broken into sections