Middle Missouri River
Native Species Creel Census

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Abstract

A creel census was conducted on the Middle Missouri River from April 6 through June 30 of 2002. The total pressure for this period was 5,379 angler-days (AD). Anglers from 42 of Montana's 56 counties participated as well as others from 15 states, British Columbia and South Korea. The sauger catch rate was 0.14 fish/Angler-day (f/AD) and sauger were harvested at a rate of 0.04 f/AD. Fishermen using over-night setlines had catch rates twice those of non-users. Only 195 sauger were harvested along with 142 walleye. The new fish regulations "saved" a maximum of 133 sauger from being harvested. Paddlefish fishing pressure and harvest was the highest ever recorded. Sixty-eight tag returns were recovered. Sturgeon were caught in low numbers and no adult pallid sturgeon were observed being incidentally snagged or caught. One juvenile tagged pallid was reported. Channel catfish were caught in good numbers and were highly sought after. Recommendations for further study are presented.

Background and Need

There is currently much concern over the apparent decline of native sauger populations in the Missouri River as well as other river systems in Montana. Limiting factors have yet to be identified but angler over-harvest has been suggested as a possible causative agent. There is no current information on angler harvest of sauger in the Middle Missouri River prior to this creel census.

Likewise, pallid sturgeon have occasionally been caught or incidentally snagged, along with the more numerous shovelnose sturgeon during the paddlefish snagging season. There is little data reflecting the rate of occurrence of incidental hooking of pallid sturgeon or on the level of compliance with existing regulations imposed to protect pallid sturgeon. The last creel information obtained for shovelnose and pallid sturgeon in this area was collected in 1994.

Objectives and Degree of Attainment

1. ***1.*** Determine fishing pressure and harvest rates for sauger, paddlefish, shovelnose sturgeon and channel catfish. Collect harvest information on additional species of interest such as walleye, northern pike, burbot etc. ***Objective accomplished, data presented.***

2. Determine age structure of harvested sauger, walleye and catfish. ***Objective accomplished, data presented.***

3. Collect tag return information from sturgeon, sauger, walleye and paddlefish. ***No shovelnose sturgeon tags were reported but a single colored latex injected VI tag was reported from a small pallid sturgeon. Six tagged sauger and four tagged walleye were observed. Sixty-eight tagged paddlefish were observed. All information from these fish was directed to the biologist responsible for the respective database.***

4. Confirm survival and identify families of young pallid sturgeon stocked in 1998 using PIT tag readers. ***No young pallid sturgeon were handled for identification.***

5. Confirm extent of accidental snagging or incidental catches of pallid sturgeon and use any such opportunity to tag additional new fish. ***No confirmed adult pallids were reported snagged or caught by fishermen during the study period. Only one report of a juvenile pallid sturgeon caught on hook and line was received.***

6. Provide an increased presence in the area and observe compliance with fishing regulations**. *Overall compliance was good to excellent.***

7. Identify timing of sauger spawning run and peak harvest period in the event seasonal closures are ever contemplated. ***Objective accomplished, data presented.***

8. Develop, and distribute to anglers, sturgeon, paddlefish and sauger information in order to educate about on-going studies and increase awareness of the needs of native fish species. ***Individual brochures for these three species were designed, printed and distributed to approximately 2,500 anglers. Additionally, hundreds were distributed through local tackle shops, gas stations and restaurants.***

Procedures

The creel census was designed to run from April 1 through June 30. However, ice did not go out on the river until April 6, which became the first day of the creel. The creel continued through June 30. The study area encompassed the reach from Fred Robinson Bridge downstream to Peggy's Bottom, a distance of 22 river-miles. Two creel clerks surveyed the area, usually together, but often individually. Two additional volunteers were pressed in to service over the three-day Memorial Day weekend due to the large influx of anglers. Information received from game wardens, biologists, BLM and C.M. Russell Game Range employees was also used. Boat fishermen who launched within the area were interviewed even if they fished out of the study reach. The creel clerks attempted to interview everyone on the river each day. For the most part, access is limited to a single road on the north shore and few fishermen can escape notice. A few sites on the south shore were surveyed from a boat launched at Rock Creek. There are approximately eight sites where fishermen can camp and fish and most parties stay for several days. On the few days when no creel clerk was on duty, it was relatively easy to "rebuild" the activity log for the missed day from fishermen interviews the following day. The close proximity of the campsites and the fact that most fishermen are quite gregarious allowed for a great exchange of information. In other words, by talking with camping fishermen, it was possible to determine how many fishermen came and went, what they caught and where they were from. Only angler-days were tabulated, angling hours were not recorded. An angler-day was defined as one angler who fished or snagged in a 24 hour day, regardless of the amount of time spent fishing. Survey cards were distributed or deposited on windshields of vehicles. Drop boxes were provided. The creel clerk inquired as to residence, number in party, whether a boat was used and

whether or not anglers were snagging for paddlefish. Fishermen were asked if they used overnight setlines, how many of each species were caught, released and/or kept and what was the primary species being fished for. When possible, fish were measured to the nearest .10 inch and .01 pound. Eye-fork (body) length measurements were taken for paddlefish and fork-length measurements for sturgeon. Spines were taken from walleye, sauger and catfish and jaw sections were taken from paddlefish for aging. Spines were sectioned on an Isomet saw and viewed under a scope with reflected light. The clerks carried PIT tag readers to identify any previously tagged pallid sturgeon and were prepared to PIT tag any new fish they encountered. Pamphlets and brochures developed for sturgeon, sauger and paddlefish were distributed freely to fishermen.

General Creel Results and Discussion

During the three-month creel period 1,610 parties accounted for 5,379 angler-days pressure. Sixty-two percent of the pressure occurred in May. Fishermen representing 42 of Montana's 56 counties angled here as well as fishermen from 15 other states, British Columbia, and Korea. Forty-six percent of the fishermen used a boat for at least part of their trip. Thirty-six percent of anglers used overnight setlines. Average party size was 3.3 anglers/party and mean trip length was 2.4 days. A total of 4,934 fishermen were interviewed for "species-sought-after" preference. Eighty-six percent listed paddlefish as the primary fish they were after followed by walleye/sauger at 12% (Table 1). For preference purposes, walleye and sauger were combined as most fishermen did not care which of these similar species they caught. Though the majority of fishermen were primarily snagging for paddlefish, with few exceptions, they all actively fished for other species with poles and/or setlines.

Table 1. Primary species fished for by angler-day each month.

Species	April	May	June	Total
Paddlefish	377	2744	1150	4271
Walleye/Sauger	299	255	24	578
Ch. Cat	35	27	13	75
Burbot	2	0	0	2
N. Pike	2	1	0	3
SN Sturgeon	0	0	3	3
Other	0	0	2	2

Sauger/Walleye

The first sauger and walleye were taken by anglers on April 13. Catch rates increased for sauger until the end of April then tapered off until the third week of May when catches were negligible. Walleye were caught at lower, but stable rates, until the catch rate dropped off in late May. River flows were low and static during the spawning season. Catch-rates for walleye and sauger, as related to flows, are illustrated in Figure A.

The sauger catch-rate for the creel period was 0.14 fish/angler-day (f/AD) and the harvest rate 0.04 f/AD. A total of 749 sauger were caught during the creel period of which 195 or 26% of the fish were kept. The harvest rate for fishermen who used overnight setlines (0.06 f/AD) was double that of those who didn't use overnight setlines (0.03 f/AD). However, at the low catch rates the number of additional fish taken was small. Setline fishermen did not appear to have any trouble releasing unwanted or over-limit sauger in good shape. The average size of the sauger harvested during the creel period was 17.2 inches and 1.52 pounds (Table 2). The largest sauger recorded from interviews was 30.0 inches and 7.30 pounds.

Table 2. Average length and weight of sauger taken during the creel period, April-June, 2002.

	#caught	#kept	xL in.	(range)	xWT lbs.	(range)
April	416	92	16.9	(13.1-26.1)	1.55	(.50-6.80)
May	330	100	17.5	(11.0-30.0)	1.50	(.35-7.30)
June	3	3	14.8	(14.5-15.0)	0.99	(.93-1.04)
TOTALS	749	195	17.2	(11.0-30.0)	1.52	(.35-7.30)

A new, restrictive sauger limit was imposed on the Middle Missouri River immediately prior to the creel census. The limit was reduced from a combined daily walleye/sauger limit of five fish to a combined walleye/sauger limit of five fish, only one of which could be a sauger. An analysis of party catches indicated the new limit potentially affected 22% of the parties that caught sauger. Though "party limits" are unlawful in Montana it is a very common practice to "pool the catch" and it is almost impossible to prohibit or enforce individual limits under these conditions. Therefore, for limit/harvest analysis, the party limit was considered as the norm and used in all calculations. The overall sauger harvest reduction, assuming parties would keep all the sauger they were allowed, was 41%. However, the reduction only amounted to a maximum of 133 fish being returned. This was considered a maximum reduction, as 22% of the parties that caught sauger voluntarily reduced their limit. These returned fish may also have been replaced by walleye in their limit.

The walleye catch rate for the creel period was 0.034 f/AD and the harvest-rate 0.028 f/AD. Catch rates were low and very few walleye were returned to the water. A total of 182 walleye were caught and 142 (78%) were harvested. The average size of walleye taken was 16.7 inches and 1.87 pounds (Table 3). The largest walleye taken was 30.5 inches and 9.70 pounds.

Table 3. Average length and weight of walleye taken during the creel period, April-June, 2002.

	# caught	# kept	xL in.	(range)	xWT lbs.	(range)
April	75	52	18.9	(12.5-30.5)	2.73	(1.00-9.70)
May	103	86	15.5	(11.6-27.7)	1.39	(0.50-7.25)
June	4	4	14.8	(14.3-15.2)	1.01	(0.92-1.06)
TOTALS	182	142	16.7	(11.6-30.5)	1.87	(0.50-9.70)

Sauger and walleye spines were taken at random from harvested fish in the creel for ageing purposes. A total of 108 (55%)sauger were sampled from the 195 fish harvested . A total 78(55%)walleye were sampled for ageing from the catch of 142 fish. Accuracy in ageing of sauger and walleye >9 years of age was considered poor, so all fish age 10 and older were combined. The most common sauger year-class harvested was age six and the most common walleye year-class age 4. If fishermen kept fish, in the ratio they naturally occur in the two populations, then a rather normal age distribution was exhibited in the creel (Figure B).

Figure B. Age distribution of sauger and walleye randomly sampled from the catch on the Middle Missouri River April-June, 2002.

Paddlefish

Total snagging pressure was 4,702 angler-days in 2002 (Figure C). Fishing pressure was high despite extremely low flows throughout the normal snagging season and minimal movement of fish into the area. High flows were experienced later in the spawning season and fishing was better later in the spring than is usually found under a more typical runoff scenario. Spring weather conditions and river flows often dictate the amount of use this area receives. The total paddlefish harvest in 2002 was 536 fish. The creel period in 2002 was extended three weeks longer than the historical creel period and rising stream flows occurred later than normal. The high pressure and catch is indicative of these two events. Snagger interviews indicated fish were released at a rate of 20-30%. Historical data indicates snaggers are more inclined to release fish as catch rates increase.

Figure C. Snagging pressure and total harvest as determined by creel census on the Missouri River above Ft.Peck Reservoir, 1973-02.

Berg (1981) noted that significant upstream movement of paddlefish did not occur until flows reached 14,000 cubic feet per second (CFS) at the Virgelle gauging station. The 14,000 cfs flow in considered to be a "trigger" flow for spawning paddlefish. The trigger flow was not reached in 2002 until June 13.

Sixty-eight tagged paddlefish were reported during the creel period. Tag return data indicates a low rate of harvest for this paddlefish population as summarized in Table 4. The average annual rate of harvest over the period 1976-02 has varied from 0.5% to 2.7%.

Year	No. Tagged	No. Tags Returned In 2002	Total No. Tags Returned	% Harvest	Avg. Annual % Harvest
1977	60	0	8	13.3	0.5
1978	224	1	41	18.3	0.7
1979	10	0	4	40.0	1.7
1980	33	0	13	39.4	1.7
1983	2	0	1	50.0	2.5
1986	13	0	5	38.5	2.3
1992	29	0	5	17.2	1.6
1993	434	8	65	15.0	1.5
1994	499	12	72	14.4	1.6
1995	456	1	28	6.1	0.8
1996	281	9	37	13.2	1.9
1997	483	8	35	7.3	1.2
1998	368	11	28	7.6	1.5
1999	380	13	23	6.1	1.5
2000	88	2	7	8.0	2.7
2001	13	0	0	0.0	0.0
2002	221	3	3	1.4	1.4

Table 4. A summary of paddlefish tagging and harvest data from the Missouri River and Fort Peck Reservoir, 1977-02. Percent of harvest was derived by adjusting for previous harvest of tagged fish.

Length and weight data was obtained from 383 paddlefish harvested; 224 males and 159 females and compared to past data from harvested fish (Table 5).

Table 5. A summary of paddlefish size data from harvested fish on the Missouri River above Fort Peck Reservoir, 1965-02.

	Females		Males	
Year	No.	Avg. Weight	No.	Avg. Weight
1965	13	82	21	36
1966	36	74	30	32
1970	7	77	2	44
1971	10	86	1	44
1973	46	76	50	35
1974	58	75	67	33
1975	63	75	56	35
1977	96	78	135	39
1978	58	88	76	38
1986	101	76	167	34
1991	168	60	192	32
1992	124	71	86	35
1993	137	73	199	33
1994	241	69	140	28
1995	204	66	348	31
1996	278	68	161	31
1998	122	68	86	33
2000	124	65	144	33
2002	159	67	224	31

Total-length measurements are no longer used on paddlefish because of an unacceptable level of accuracy due to morphological variation caused by tail and paddle erosion or damage. Body-length or eye-fork length is the accepted standard measurement currently used. Body-length is defined as the distance between the anterior portion of the eye and the caudal fin fork. Paddlefish were selected at random and by availability for measuring. Paddlefish examined during the creel census period indicated a sex ratio of 59% males and 41% females. Only one of the females harvested in 2002 weighed 100 pounds or greater, however, several fish exceeding 100 pounds were reportedly caught and released.

Paddlefish dentaries were collected from harvested fish to assist in determining the age structure of the Fort Peck Reservoir stock. Jaw sections were collected and sent to the University of Idaho for sectioning and ageing. Results of the ageing will be presented in a later report.

Angler residence was obtained from 4,702 snaggers. Five-percent of the fishermen were nonresidents. Anglers from 42 of Montana's 56 counties utilized the fishery as well as fishermen from 15 other states and representatives from British Columbia and Korea. Angler use by residence is summarized as follows:

Montana Fishermen (angler-days) by county seat

1. Butte	28	20. Glasgow	45	39. Baker	0
2. Great Falls	488	21. Shelby	0	40. Big Timber	43
3. Billings	961	22. Hardin	27	41. Circle	0
4. Missoula	196	23. Roundup	121	42. Ekalaka	0
5. Helena	44	24. Chinook	281	43. Townsend	3
6. Bozeman	551	25. Virginia City	0	44. Harlowton	60
7. Kalispell	288	26. Conrad	0	45. Terry	0
8. Lewistown	492	27. Sidney	4	46. Phillipsburg	3
9. Broadus	0	28. Deer Lodge	20	47. White Sulphur	6
10.Red Lodge	152	29. Forsyth	44	48. Chester	5
11.Malta	204	30. Anaconda	2	49. Livingston	52
12.Havre	168	31. Choteau	27	50. Jordan	5
13.Hamilton	21	32. Columbus	131	51. Boulder	83
14.Miles City	20	33. Hysham	0	52. Wibaux	0
15.Polson	45	34. Plentywood	0	53. Ryegate	8
16.Glendive	15	35. Thompson Falls	0	54. Superior	3
17.Wolf Point	0	36. Stanford	20	55. Winnett	5
18.Dillon	2	37. Scobey	0	56. Libby	142
19.FT. Benton	23	38. Cut Bank	1		

Non-Resident Fishermen (angler-days)

Wyoming	110	Colorado	10
Idaho	12	Nevada	20
Michigan	4	Oklahoma	2
Iowa	3	Texas	7
Washington	19	Minnesota	10
Wisconsin	11	North Dakota	11
South Dakota	25	Virginia	3
California	8	British Columbia	4
		S.Korea	1

Sturgeon

The total shovelnose sturgeon catch was 69 fish, of which only 32 were harvested. The harvested fish ranged in size from 2.75 –6.80 pounds and averaged 4.90 pounds. The total harvest of shovelnose sturgeon during the same creel period in 1992, 1993, and 1994 was 88, 77, and 67 respectively (Backes et al. 1992,1993,1994). Very few fishermen listed sturgeon as the species they were primarily after. Though reports of pallid sturgeon being caught are always circulating among fishermen, there was no evidence to suggest any adult pallids were correctly identified or landed. One latex colored VI tag was reported from a juvenile pallid caught near Armell's Creek.

Channel Catfish

Channel catfish were the third most sought after fish and were taken in good numbers. A total of 456 catfish were caught and 378 or 83% were kept. The harvested fish ranged in weight from 0.50 pounds to 22.5 pounds. Average weight of catfish over the creel period was 7.4 pounds. Pectoral spines were taken from 219 (58%)of the 378 fish harvested for ageing. The oldest fish was aged at 23 years but the year-class mode was age 10. A rather normal age distribution appears when the age frequency is graphed (Figure D).

Figure D. Age distribution of channel catfish found in the creel in the Middle Missouri River, 2002.

Other Species of Interest

Only 12 northern pike were caught throughout the creel period and every one of them was kept. Thirty-five burbot were caught and 28 were kept. Large numbers of goldeye were taken but no record of numbers was kept. Other species caught regularly were: freshwater drum, common carp, stonecat, and flathead chub.

Recommendations

A key objective of this study is to help determine if fishermen harvest is affecting the sauger population in the Missouri River and if restrictive sauger limits are warranted, therefore it is important to conduct the creel census several more times over the next few years in order to determine how various spring stream flows may affect the catch. The spring of 2002 presented rather abnormal flow conditions with very low flows early and high flows after most fish had spawned. Fishing pressure usually drops off rapidly, in most years, after the first week of June due to lower catch rates and the onslaught of the mosquito and gnat season. The creel census could probably be run to the second week of June, instead of the end of June, without sacrificing key data.

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