16-2500

MONTANA DEPARTMENT OF FISH AND GAME

FISHERIES DIVISION

MISSOURI RIVER-FORT PECK RESERVOIR PADDLEFISH STUDY

INTRODUCTION

Paddlefish are native to Montana, but received little recognition until the early 1960's. Historical records show that paddlefish were taken as early as 1920 and 1921. The first authentic record of paddlefish for Montana consisted of fish taken in the Milk River near Glasgow in 1946 (Brown, 1951).

The earliest snagging reports originate from the Yellowstone River. The actual catch and extent of this activity is unconfirmed. In 1962, a large run of paddlefish occurred in the Yellowstone River which initiated significant snagging activity for this species. Fishing pressure and interest in this species has increased greatly since that time. Popular fishing sites now exist in the Yellowstone River below the Intake Diversion Dam, Missouri River above Fort Peck Reservoir, and Dredge Cut area below Fort Peck Dam.

OBJECTIVES

The primary objective of this study was to provide information and recommendations for the Charles M. Russell National Wildlife Range Master Plan and subsequent decisions on the Missouri River, Fort Peck Reservoir and adjacent land for the continued survival of a healthy population of this unique species in accordance with Task items 3a.-d. of Cooperative Agreement No. 14-16-0006-78-917. Task item 3e. will be prepared following input from all agencies involved.

Fishing pressure reportedly has increased considerably in recent years in the Missouri River above Fort Peck Reservoir. In 1973 studies were implemented to evaluate paddlefish harvest and fishing pressure in this area. These studies were also conducted in 1974, 1975, and again in 1977 (Berg, 1977).

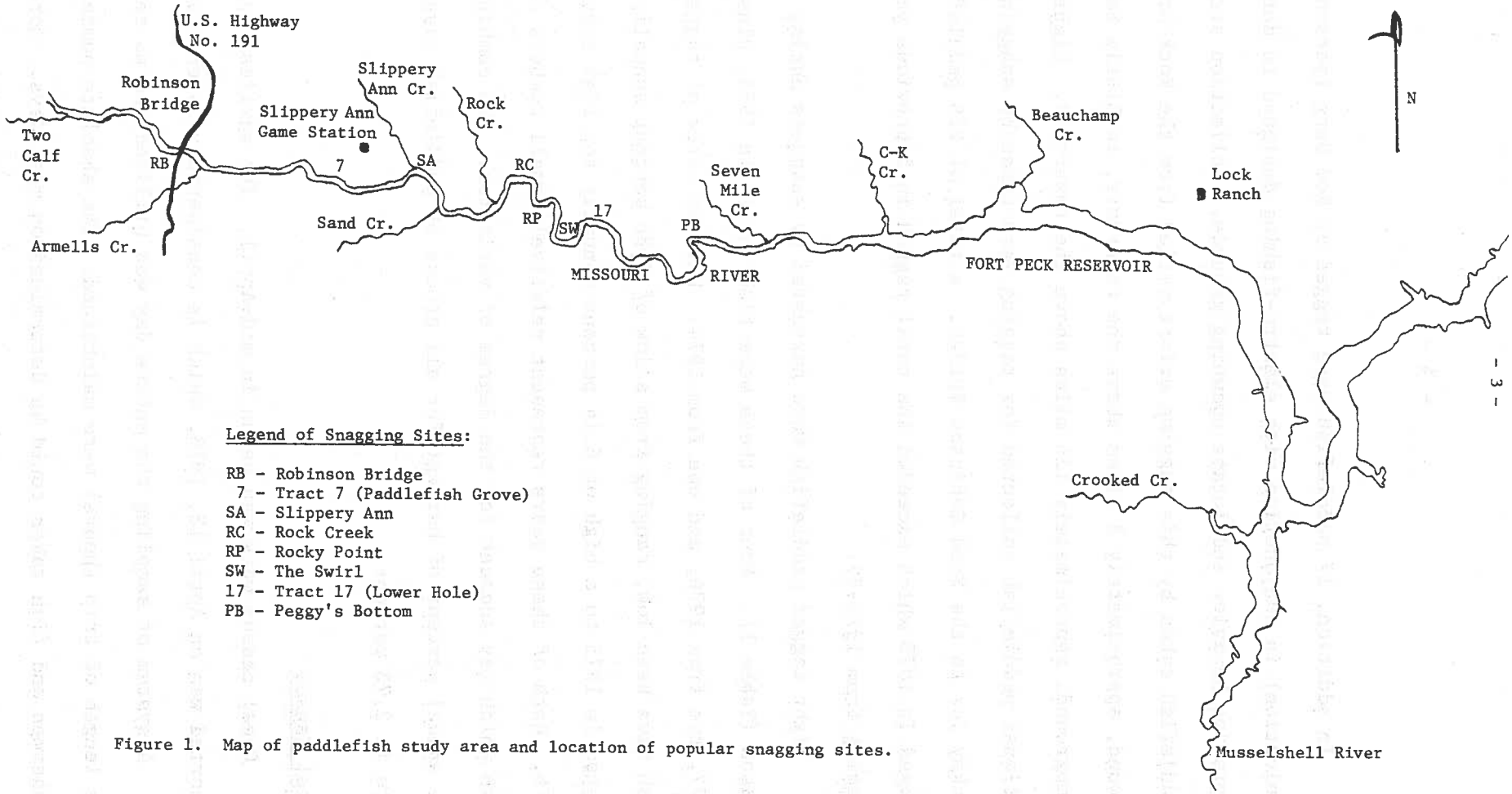
Efforts to evaluate the rate of paddlefish harvest in this study area partially rely on angler return of tagged fish. However, with existing manpower and funding, sufficient numbers of fish for tagging have not been collected in the past. A portion of this study was designed to tag greater numbers of paddlefish and subsequently improve harvest data.

RESULTS

Tagging

Tagging efforts began on May 12, 1978, utilizing large-mesh gill nets varying from 3- to 5-inch square mesh. All nets were fished in the reservoir segment between the Lock Ranch and Beauchamp Bay (Figure 1). Most nets were rigged to float in an effort to avoid capture of other species. Tags used were circular, numbered monel or plastic attached to the lower jaw. Netting was scheduled to commence immediately following ice-out. However, due to unusually deep winter snow and extensive drifting, roads were impassable during the spring thaw and netting was delayed.

A total of 191 paddlefish were tagged by gill netting. Netting would have been more productive if initiated earlier following ice-out. Paddlefish catches were good initially, but declined rapidly which presumedly was due to upstream movement related to high river flows.



Legend of Snagging Sites:

RB - Robinson Bridge
7 - Tract 7 (Paddlefish Grove)
SA - Slippery Ann
RC - Rock Creek
RP - Rocky Point
SW - The Swirl
17 - Tract 17 (Lower Hole)
PB - Peggy's Bottom

Figure 1. Map of paddlefish study area and location of popular snagging sites.

In addition, 17 paddlefish were tagged by Rod Berg (personal communication) in conjunction with electro-fishing designed to determine migration behavior and locate spawning grounds. Collection sites for paddlefish taken by this tagging effort varied from the Rock Creek campground, approximately 8 miles above the reservoir, to Little Sandy Creek campground, approximately 126 miles above the reservoir. Eighteen additional paddlefish collected for tagging were taken by snagging from Turkey Joe to the Fred Robinson Bridge. A total of 226 paddlefish were tagged in 1978 which exceeded the total tagged in 5 previous years of tagging from 1973-77.

Eight tagged paddlefish were harvested by snaggers during the 1978 season (Table 1). Four of these were fish tagged in 1978, plus one from 1977, two from 1976, and one from 1974. Harvest rates of tagged paddlefish have been low, ranging from a low of 0.86 percent annually for fish tagged in 1975 to a high of 6.14 percent annually for fish tagged in 1976. Both of these years represent relatively small numbers of tagged fish which may account for the degree of variation. The combined average annual percent of harvest for all groups of paddlefish tagged to date is 2.73 percent.

Creel Census

Creel census work was begun in mid-April. The earliest snagging reported was on April 13, 1978, which is considerably later than normal.

A system of sampling the entire day was utilized and no records on the length of trip (hours) were maintained. The absolute number of fishermen and fish taken could be determined on most days. More difficulty was encountered obtaining completed records on boat fishermen.

Table 1. A summary of paddlefish tagging and harvest data from the Missouri River and Fort Peck Reservoir, 1973-78. The actual tag return rate given in parenthesis was derived by adjusting for previous harvest of tagged fish.

Year	Number Tagged	Number Tagged Paddlefish Harvested							Percent Harvest	Average Annual Percent Harvest[1/]
		1973	1974	1975	1976	1977	1978	Total		
1973	45	0	1 (2.22)	1 (2.27)	0	1 (2.36)	0	3	6.85	1.14
1974	55	-	3 (5.56)	0	1 (1.92)	1 (1.96)	1 (2.00)	6	11.44	2.29
1975	29	-	--	0	0	1 (3.45)	0	1	3.45	0.86
1976	23	-	--	--	1 (4.35)	1 (4.55)	2 (9.52)	4	18.42	6.14
1977	61	-	--	--	--	4 (6.56)	1 (1.75)	5	8.31	4.15
1978	226	-	--	--	--	--	4	4	1.77	1.77

1/ Obtained by averaging the actual tag return rates.

In previous studies, attempts to gather information on hours fished provided unreliable results. Due to the length of fishing trip and erratic fishing activity, information provided by fishermen was not judged to be accurate. It was found that most fishermen contacted greatly over-exaggerated the actual time spent fishing. Estimates of fishermen and fish taken for non-creel days (usually weekdays with light fishing pressure) were made on the basis of preceding and following creel census days.

Total fishing pressure was 2,112 man-days in 1978 (Table 2). Use appears to be increasing, but weather and flood conditions have interfered with access and fishing pressure has been affected. Flooding in 1975 and 1978 greatly restricted snagging activity. A road slide and muddy roads in 1978 restricted access to popular snagging sites such as "Tract 17" and the "Swirl" (Figure 1). The primary boat access at Kipp Park was also restricted in 1978 when the ramp was covered 5 feet deep by silt for a portion of the snagging season. Also, in 1978 rain and mud generally raised havoc with fishermen throughout much of the snagging period. Bank snagging difficulties due to the elements were reflected by a significantly higher number and percent of boat fishermen in 1978.

The total paddlefish harvest in 1978 was estimated to be 342 fish. This is the lowest harvest recorded since records have been maintained. Fishing success expressed as the catch/fisherman/day also declined and was the lowest recorded to date. The restrictive limit (one paddlefish daily) implemented during the 1978 season did not appear to curtail harvest due to the generally poor fishing success during the latter part of the season. The period of greatest fishing pressure occurred over the

3-day Memorial Day weekend which produced 522 snaggers and a harvest of only 59 fish. The greatest single day concentration of snaggers was 198 which occurred on May 28, Sunday of the Memorial Day weekend. This is the greatest single-day number of snaggers recorded to date.

Table 2. A summary of fishing pressure, paddlefish harvest, and catch rates during the spring 1973-78.

Year	Total Fishermen Man-Days			Paddlefish Harvested			Catch/Fisherman/Day		
	Bank	Boat	Total	Bank	Boat	Total	Bank	Boat	Overall
1973	984 (64.9%)	532 (35.1%)	1,516	290 (62.1%)	177 (37.9%)	467	0.29	0.33	0.31
1974	1,422 (63.1%)	831 (36.9%)	2,253	396 (62.2%)	241 (37.8%)	637	0.28	0.29	0.28
1975	916 (61.8%)	566 (38.2%)	1,482	180 (46.7%)	205 (53.3%)	385	0.20	0.36	0.26
1977	1,429 (56.5%)	1,096 (43.4%)	2,526	322 (48.3%)	344 (51.7%)	666	0.23	0.31	0.26
1978	699 (33.1%)	1,413 (66.9%)	2,112	135 (39.6%)	207 (60.4%)	342	0.19	0.15	0.16

In 1977, Berg reported a harvest of 666 paddlefish which is the highest found since studies have been initiated. Berg also conducted electro-fishing census work to determine the extent of upstream paddlefish migration. Small numbers of fish were found a few miles above the Fred Robinson Bridge. Apparently low flows contributed to a low degree of migration, but were sufficient to attract fish into the general snagging area which resulted in a longer exposure period to snagging. In

1978, electro-fishing by Berg revealed significant numbers of paddlefish migrated 80 to 145 miles upstream from Fort Peck Reservoir. This undoubtedly was partially responsible for the lower harvest and catch rate in 1978.

Bob Watts, Montana Department of Fish and Game biologist from Lewistown, documented unusual paddlefish behavior as cited below.

> "During the week of May 22 through May 26 I was working in the breaks and staying nights at Rocky Point. A severe storm on the night of the 23rd dropped 1.5-2 inches of rain and I was stuck at Rocky Point for most of the week.
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> "As background, the river level was high but constant on the 22nd and 23rd. By the morning of the 24th it had come up 18 inches, maybe 2 feet. The 2 bottoms at Rocky Point were under water and the main channel was running a continuous column of trees, logs and other debris that was 50-60 yards wide.
>
> "From about 7:30-8:30 AM I tried paddlefishing below the cabins but the water was unfishable. I did not see any paddlefish. I walked to the smaller, shallower hole above the cabins and probably got there about 9:30. At that time paddlefish were visible on the surface, some within a few feet of shore. I hooked a black female from the surface and she towed in like a log, never submerging. She didn't struggle, not even on the shore. I held her up and sticks, cones, grass and other debris flowed from her mouth, as if she had been swimming with her mouth open and into the current.
>
> "At that time I made my only actual count. Thirty paddlefish were visible on the surface within easy casting distance of where I stood. Dozens of others were upstream and down. All were oriented upstream, dorsal fin and top of tail out of the water and drifting downstream with the current. Some never submerged, but I'd guess most were on top about 80% of the time. They were from bank to bank, not concentrated in any particular areas. A conservative estimate of 1000 fish drifted by in the next 1.5 hours. There may easily have been 1500.
>
> "I hooked about 30 within 10-15 feet of shore. None of the ones I landed had tags (thought there might be problems with a shocker upstream). None except the first were full of debris. I usually had a choice of 5 or more within 10 feet whenever I wanted to hook another and I selected the

very large females. None of the ones I landed were ripe (thought it might be some type of spawning activity). Most put up a good struggle although 3 or 4 towed in like logs, as if exhausted.

"I decided to go to the truck for tags and it probably took about an hour to walk the mile through the mud and back. The movement was all over when I returned. The crest of high water was also gone, as there was no longer a continuous column of debris.

"My best guess as to what I observed is that the fish were under severe stress and exhausted.

"The river dropped about 2 feet by AM of the 25th and I didn't see or hook any fish."

The exact cause and origin of this problem is not known. Heavy rains in the Highwood Mountains which produced extremely high flows in Arrow Creek (10 miles upstream from the Judith River) may have been responsible. Additional reports of fish in stress were received from fishermen at the Robinson Bridge. It is not known if some mortality occurred.

Length and weight data was obtained from 134 paddlefish harvested; 76 (56.7%) males and 58 (43.3%) females (Table 3). Paddlefish were selected at random and by availability for measuring. Therefore, the above sex ratio does not indicate relative abundance of the sexes in the harvest. A total of 243 paddlefish examined during the creel census period produced a sex ratio of 63.0 percent males and 37.0 percent females.

Male paddlefish averaged 55.3 inches (range 40.0 - 64.0 inches) in total length and 38.2 pounds (range 11.0 - 64.0 pounds) which was similar to size from previous years. Female paddlefish had an average total length of 67.7 inches (range 57.0 - 73.0 inches) and weighed 87.9 pounds

(range 55.0 - 132.0 pounds). Female fish harvested were slightly larger in size than recorded from previous years. Fifteen (25.9%) of 58 females measured weighed 100.0 pounds or more. This compares to 12.5 percent 100.0 pounds and over in 1977, 6.3 percent in 1975, 10.3 percent in 1974, and 6.5 percent in 1973. The higher frequency of larger females in the 1978 catch is difficult to explain; however, the small sample sizes utilized for calculations could be partially responsible for this variation.

Table 3. A summary of paddlefish size data from the Missouri River above Fort Peck Reservoir, 1965-78.

	Females			Males		
Year	No.	Avg. Length	Avg. Weight	No.	Avg. Length	Avg. Weight
1965	13	67.0	81.5	21	55.4	36.4 1/
1966	36	64.0	74.4	30	53.3	32.1
1970	7	70.2	77.0	2	58.5	44.0
1971	10	66.7	85.7	1	57.0	44.0
1973	46	66.2	76.1	50	54.9	35.0
1974	58	65.3	74.5	67	55.0	32.8
1975	63	65.7	74.8	56	55.9	34.6
1977	96	66.5	78.3	135	56.9	39.4
1978	58	67.7	87.9	76	55.3	38.2

1/ Based on 24 fish.

Angler residence was obtained for 1,936 fishermen comprised of 1,764 (90.5%) residents and 168 (9.5%) nonresidents. Fisherman residence is summarized as follows:

Residents

1.	Billings	346	18.	Harlem	21	35.	Mobridge	7
2.	Great Falls	189	19.	Miles City	21	36.	Ft. Benton	6
3.	Lewistown	182	20.	Dillon	20	37.	Geraldine	6
4.	Livingston	135	21.	Absorkee	18	38.	Hays	6
5.	Missoula	124	22.	Drummond	17	39.	Hungry Horse	6
6.	Jordan	97	23.	Hinsdale	15	40.	Saco	6
7.	Bozeman	59	24.	Anaconda	13	41.	Denton	4
8.	Deer Lodge	50	25.	Acton	10	42.	Froid	4
9.	Helena	44	26.	Malta	10	43.	Roundup	4
10.	Butte	39	27.	Colstrip	9	44.	Townsend	4
11.	Laurel	36	28.	Melstone	9	45.	Park City	3
12.	Bridger	35	29.	Red Lodge	9	46.	Utica	3
13.	Harlowton	33	30.	Cooke City	8	47.	Chinook	2
14.	Glasgow	30	31.	Kalispell	8	48.	Hardin	2
15.	Roy	30	32.	Stanford	8	49.	Martinsdale	2
16.	Roberts	29	33.	West Glacier	8	50.	Whitehall	2
17.	Havre	28	34.	Cut Bank	7			

Nonresidents

1.	Wyoming	103	3.	Oregon	24	5.	California	1
2.	Idaho	38	4.	Michigan	2			

Miscellaneous Sampling

In conjunction with paddlefish tagging, gill nets and frame traps were utilized to determine early spring abundance and species composition in the upper portions of Fort Peck Reservoir. Similar sampling has been conducted in the lower reservoir and Big Dry Arm; however, very little sampling has been conducted in the upper reservoir.

Two experimental gill nets 125 feet x 6 feet with 3/4- to 2-inch square mesh were fished overnight south of the Lock Ranch. Goldeye dominated the catch in both net sets comprising 89.3 and 74.6 percent of the catch (Table 4). Sauger were second in abundance comprising 8.6 and 14.1 percent of the catch.

Table 4. A summary of two 125-foot experimental gill net catches south of the Lock Ranch, Fort Peck Reservoir, 1978.

Species	Number	Avg. Length (inches)	Avg. Weight (pounds)	% Comp.
Set No. 1				
Goldeye	83	--	--	89.3
Shorthead redhorse	8	--	--	8.6
Sauger	2	--	--	2.1
Set No. 2				
Crappie sp.	1	9.5	0.46	1.4
Carp	2	15.3	1.75	2.8
Goldeye	53	11.6	0.55	74.6
Freshwater drum	1	12.0	0.80	1.4
River carpsucker	2	10.3	0.51	2.8
White sucker	1	13.2	1.00	1.4
Shorthead redhorse	1	13.0	0.80	1.4
Sauger	10	12.5	0.56	14.1

Frame traps used were 4 feet x 6 feet with 1-inch square mesh. Two traps were fished for only short duration in the vicinity of Beauchamp Bay. The overall catch in these traps was good (Table 5). Several species were represented in moderate abundance. Most noteworthy was the good catch of northern pike, sauger and crappie sp. The catch for these species was significantly higher than comparable sampling in the lower reservoir or Big Dry Arm. In contrast, the walleye catch was low.

More extensive gill netting and trapping was planned, but inclement weather and the frequency of high winds greatly restricted available time.

STUDY TASKS AND DISCUSSION

a. Initial creel limits for paddlefish consisting of two fish daily and two in possession were implemented July 1, 1965, when the Legislature designated the paddlefish as a game fish species. This limit has remained in force since 1965, but was further restricted to one fish daily and two in possession effective May 20, 1978.

This restrictive season was adopted in 1977 on the Yellowstone River in anticipation of intensive harvest associated with low flows which might concentrate fish at Intake Dam. Fishermen accepted this restriction well and it was then adopted statewide in 1978.

Harvest rates of tagged paddlefish in the Slippery Ann area have remained low and data acquired to date indicate no over-harvest is occurring. The average annual percent of harvest for all paddlefish (439) tagged to date is 2.73 percent, which is very low. The size of paddlefish harvested has remained relatively constant which

Table 5. A summary of the catch in two frame traps fished near Beauchamp Bay, Fort Peck Reservoir, 1978.

Species	Number	Avg. Length (inches)	Avg. Weight (pounds)	% Comp.
South Shore--48 Trap Hours				
Rainbow trout	1	20.2	3.55	0.5
Yellow perch	3	8.5	0.30	1.5
Crappie sp.	58	9.6	0.57	28.9
Northern pike	38	28.6	5.44	18.9
Burbot	1	30.5	3.29	0.5
Carp	57	--	--	28.4
Goldeye	10	12.1	0.63	5.0
Freshwater drum	2	12.6	0.93	1.0
White sucker	1	15.0	1.33	0.5
Sauger	27	15.6	1.05	13.4
Walleye	3	16.2	1.41	1.5
North Shore--29 Trap Hours				
Crappie sp.	42	10.2	0.62	25.0
Northern pike	20	29.1	5.36	11.9
Channel catfish	1	20.8	3.25	0.6
Carp	49	--	--	29.2
Goldeye	14	11.7	0.51	8.3
Freshwater drum	3	12.3	0.84	1.8
River carpsucker	4	14.0	1.41	2.4
Smallmouth buffalo	2	22.9	6.83	1.2
Shorthead redhorse	2	11.5	0.49	1.2
Sauger	30	13.9	0.70	17.9
Walleye	1	19.3	2.02	0.6

is another indication that the population can withstand present levels of harvest. Additionally, no decline in the catch of trophy-sized (100 pounds and over) fish has been found. Therefore, no additional restrictions are recommended for the harvest of paddlefish in the Missouri River above Fort Peck Reservoir.

In 1979 the Department of Fish and Game will pursue legislation for authority to issue permits for taking paddlefish and charge a fee for such permits. Under this system the Department also may limit the number of permits each fisherman could purchase annually. If future harvest warrants restrictions, this system, if approved by the Legislature, will provide adequate protection.

b. Occasionally complaints regarding over-crowding are heard from fishermen. This usually involves individuals that fished the area initially during the discovery period of this unique fishery. Most of the fishermen accept present levels of fishing pressure and adjust to it satisfactorily. On a few weekend days each season, usually when total pressure approaches 150 fishermen per day, some bank snagging sites such as Tract 17 and Tract 7 (Figure 1) do become congested but complaints are few; therefore, it appears unnecessary to regulate or redistribute use at present levels of fishing pressure.

It is common for bank fishermen to view some boat fishermen with disfavor due to presumed fish disturbance created by boat traffic. Boat fishermen on occasion contribute to these animosities when they persist in boat snagging at favored bank snagging sites. One serious confrontation between boat and bank fishermen

occurred a few years ago; however, the situation at present does not warrant restriction of boat fishing activities.

c. Early snagging is concentrated in the lower pools immediately upstream from Fort Peck Reservoir as fish begin to migrate. As the migration of paddlefish extends upstream, fishermen follow and therefore distribute themselves throughout the area. By late May the lower pools utilized early are almost totally devoid of fishermen.

At present levels of harvest and fishing pressure, bank snagging sites appear to be adequate and no major changes are recommended. Bank snaggers now have relatively limited access to the river which occurs largely on the north bank. The primary fishing area contains approximately 46 miles of bank, but only 1 to 2 miles are utilized for bank snagging. Many potential snagging sites exist with no vehicle access; however, development of additional sites does not appear to be necessary. Improved road access to existing facilities would contribute to greater public use, and would have no serious impact on paddlefish harvest with the existing level of fishing pressure. Any attempt to restrict areas would merely contribute to over-crowding in other areas.

Although boat fishermen have access to the entire river, early season fishing pressure by boats is curtailed due to excessive river distance to be travelled from the only suitable boat access at James Kipp State Park. Development of improved boat access downstream would contribute to increased utilization of the area and provide a service to a segment of the fishermen. However, this access is not

needed since some fishermen utilize smaller boats which can be launched without developed facilities.

Immediately following ice-out, sauger fishing at times is excellent. Good populations of channel catfish also inhabit the area, as well as lesser numbers of walleye and northern pike. However, existing road conditions often do not permit reliable access east of Camp Charlie. Improved access roads would contribute to better utilization of these species which now receive little fishing pressure.

d. Greater numbers of tagged fish would provide more reliable harvest information. However, the present number of tagged fish available for study should be adequate to evaluate harvest. The need for additional tagging cannot be determined until existing marked fish are exposed to several additional years of fishing.

The greatest information gaps involve frequency of spawning and recruitment of young fish into the population. Studies being conducted upstream by Berg should determine instream flow levels required for paddlefish spawning. However, to date no means has been found for determining survival and abundance of young fish available for recruitment. Such information is extremely valuable for determining allowable harvest rates and projecting population replacement rates. Age data collected over a period of years would serve as an indicator; however, this method is after-the-fact and does not permit the desired management approach.

Future creel census studies are recommended to determine

changes in fishing pressure and harvest. It does not appear necessary, however, to collect creel data annually. Creel monitoring studies conducted once every three years should be sufficient to provide suitable trend information. If fishing pressure and harvest increase significantly, annual creel census work may become necessary.

TASKS SUMMARY

3a. *Formulating Fishing Regulations:* The low rate of paddlefish exploitation occurring at present by snaggers does not warrant any change in existing fishing regulations.

3b. *Improving the Quality of the Fishing Experience:* Occasionally some bank snagging sites become congested, but it appears unnecessary to regulate or redistribute pressure at this time. Some bank fishermen complain about disturbances caused by boat fishermen, but no restriction of boat fishing activities is warranted.

3c. *Opportunities to Increase or Decrease Public Use:* Present campground sites appear to be adequate. Improved road access to existing facilities would contribute to greater public use, and would have no serious impact on paddlefish harvest with the existing level of fishing pressure.

3d. *Areas that Need Further Investigation:* The number of tagged paddlefish available for study should be adequate to evaluate harvest. The greatest information gaps involve frequency of spawning

and determining abundance of young fish available for recruitment which is needed to evaluate allowable harvest and population replacement rates. Unless fishing pressure increases significantly, creel monitoring studies conducted once every three years should be sufficient to determine trends in harvest and fishing pressure.

LITERATURE CITED

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