MICRA

Mississippi River Basin Paddlefish Research Coded-Wire Tagging Project

1997 Annual Report

Mississippi Interstate Cooperative Resource Association
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Joanne M. Grady and Greg A. Conover
November 1998

Main Cover Photo: Biologist John Pitlo and Snag-Caught Paddlefish, photo courtesy of D. Wiess, Iowa Department of Natural Resources.

Top Left Cover Photo: Louisiana biologists and paddlefish, photo courtesy of Bobby Reed, Louisiana Department of Wildlife & Fisheries.

Top Right Cover Photo: Iowa biologists check paddlefish rostrum for coded-wire tag, photo courtesy of John Pitlo, Iowa Department of Natural Resources.

Bottom Right Cover Photo: South Dakota biologists with 150 pound paddlefish, photo courtesy of Cliff Stone, South Dakota Department of Game, Fish and Parks.

Bottom Left Cover Photo: Iowa Biologist tags paddlefish rostrum with coded-wire tag, photo courtesy of John Pitlo, Iowa Department of Natural Resources.

ACKNOWLEDGMENTS

This project was made possible by the generous donations of time and money provided by each of the participating agencies. A study of this magnitude could not be accomplished without the combined efforts of all involved. MICRA would like to thank Cabela's, Coleman, Miller Net and Twine, Plano Tackle Company, and SeaArk Boat Company for their generous donations of gifts for the reward and recovery aspect of this program.

PREFACE

The Mississippi Interstate Cooperative Resource Association (MICRA) was officially sanctioned by state fishery chiefs, in cooperation with the American Fisheries Society and the United States Fish and Wildlife Service, in 1989, for improving fisheries management in interjurisdictional rivers of the Mississippi River Basin. Not surprisingly, paddlefish, which were historically distributed throughout most of the major tributaries in the Basin, were the first species mentioned as a candidate for interjurisdictional management. Paddlefish was the logical choice because of their migratory nature of being in one state's jurisdiction today and up or downstream several hundred miles a few weeks later and in another state. It only made sense to create an unselfish, joining of forces and funding, to manage those species which do not lie entirely within any single state or entity's jurisdiction.

The first opportunity to study paddlefish within the Mississippi River Basin, under MICRA guidance, began in March 1995. Eighteen states and United States Fish and Wildlife Service personnel from three Regions began tagging adult and hatchery reared fingerlings to better understand their basic life history parameters. By late 1997, the number of states participating in the study grew to 22 and one additional state along the upper Ohio River is contemplating joining the study. After three years of study, over 6,000 wild, adult paddlefish and over 1,000,000 hatchery fingerlings carry binary coded wire tags. Tag returns are increasing each year, and preliminary information indicates that these amazing fish are highly migratory in nature, as suspected, and may well be more effectively managed interjurisdictionally rather than state by state. We are hopeful that as more adult paddlefish are tagged and as hatchery stocked paddlefish mature and begin entering the sport and commercial harvest, new and progressive management schemes can be developed for these important big river fish. This report summarizes information collected through 1997.

Kim Graham
MICRA Project Coordinator
October 1998

ABSTRACT

The Mississippi Interstate Cooperative Resource Association (MICRA) planned, organized, and initiated a long-term, multi-state, multi-jurisdictional paddlefish study to assess the status of paddlefish stocks throughout the Mississippi River Basin in 1994. Two previous Interim reports contained information regarding fish tagging efforts in 1995 (Oven and Fiss 1996) and tag reading and database construction (Bettoli and Brennan 1997). This report summarizes progress made through 1997. MICRA participants participated in 420 sampling trips in 1996 and 1997 resulting in about 10,400 hours of effort. Biologists captured, tagged, and released 2,455 wild paddlefish in 1996 and 2,244 fish in 1997. More hatchery reared-paddlefish were released to date in 1997 (127,743) than in 1996 (113,306). The total number of hatchery paddlefish released by MICRA cooperators is 437,022. Through January 1997, 701 paddlefish tagged with coded wire tags have been recaptured. Dossiers on each recaptured paddlefish were completed and provided to MICRA cooperators. Care and maintenance of the paddlefish databases were transferred from Tennessee Technological University to the U.S. Fish and Wildlife Service in March 1998. Changes in datasheet protocols were made after consultation with MICRA cooperators and are presented in Appendix B.

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INTRODUCTION

The Mississippi Interstate Cooperative Resource Association (MICRA) launched a unique basin-wide study in the spring of 1995 under a $200,000 Federal Aid Administrative Funding cooperative agreement. This multi-state, multi-year coded wire tagging effort was designed to assess paddlefish (*Polyodon spathula*) stocks throughout the Mississippi River Basin. Long-term study goals are to assess paddlefish abundance, habitat use, distribution, movements, extent of harvest and exploitation by stock. This is precedent setting in that nothing of this magnitude has ever been attempted on an inland, freshwater fishery. The study will further understanding of the habitat requirements and population status of paddlefish across the Mississippi River Basin.

Twenty-two of MICRA's 28 member states have participated in the study by tagging wild-caught or hatchery-raised paddlefish according to procedures outlined in Oven (1995) and in Oven and Fiss (1996). The objectives of this document are to summarize wild fish sampling and tagging efforts, hatchery stocking activities, and tag recovery data for 1996 and 1997. This document also reports on changes to the study's data management system.

DATA MANAGEMENT

The MICRA Paddlefish Database and Tag Reading Center were transferred from Tennessee Technological University (TTU) to the U.S. Fish & Wildlife Service in March 1998. In preparation for this transfer, staff from the Service's Carterville and Columbia Fishery Resource Offices trained in coded wire tag reading and database manipulation at TTU in the fall of 1997 and at Marion, IL in the spring of 1998 to become the Regional Tag Coordinators (RTCs). Close collaboration with TTU during the transition process provided insight into the strengths and weaknesses of the existing databases and

protocol. MICRA's Paddlefish/Sturgeon Subcommittee met in Chattanooga, TN in May, 1998 with the RTCs to discuss the project protocol and datasheets in detail. Several changes were made to project datasheets which included the addition, deletion, and recoding of several variables. The new datasheet forms and protocol are in Appendix B. The RTCs have worked on database proofing, database corrections, recapture dossiers, presentations to MICRA and the National AFS meeting, and the data for this report. The RTCs have identified the need to create paddlefish creel and harvest databases as the first step to future population and exploitation estimates. The RTCs are also working with GIS staff from the U.S. Fish & Wildlife Service and the USGS Biological Resources Division to create a Mississippi River Basin base map for ArcView mapping of paddlefish locations.

All datasheets and recaptured coded-wire tags received through January 31, 1998 have been processed, entered into the database, and included in this report. Some 1997 data has been received since the data was compiled for this report and is therefore not included. As a result, 1997 data represents current numbers and are not final totals. For future reporting, January 31st will continue to serve as the deadline to have data included in the annual report. Participants are encouraged to not wait and submit all data just prior to the annual deadline. At a minimum, data should be submitted quarterly.

SAMPLING EFFORT

State and federal agencies in 17 states conducted 216 sampling trips in 1996. Thirteen agencies conducted 204 trips in 1997. Sampling was conducted using an assortment of gear types including gillnets, hobbled gillnets, trammelnets, electrofishing, and snagging. Sampling effort occurred throughout the year with the highest paddlefish catch occurring in the spring and early summer (Figure 1). MICRA crews appear to have made an extensive effort to spread sampling efforts more evenly across the calendar year. While 70% of all sampling trips were made in April through June in 1995, this number dropped to 45% in 1996 and to 28% in 1997. Increased sampling efforts outside of the spring spawning season will aid MICRA in determining paddlefish habitat use throughout the year.

The spring congregation of paddlefish below large river dams may explain why tailwater zones accounted for 29% of the sampling effort in both 1996 and 1997 (Figure 2). Sampling in main channel areas increased from 13% in 1995 to 34.7% in 1997. MICRA crews have made tremendous progress in coding datasheets. Missing stratum data dropped from 12% in 1995 to 1% in 1997.

Nets (gillnets, hobbled gillnets, and trammel nets) were fished 5731 hours in 1996 and 4418 hours in 1997. Netting was the most common technique used to sample paddlefish. Indiana exerted the most netting effort in both 1996 and 1997 (Table 1). CPUE averaged about 3.8 fish/hour in 1996 and 10.1 fish/hour in 1997. These numbers were skewed by Nebraska's CPUEs of 37.5 fish/hour in 1996 and 95 fish/hour in 1997 (Table 1). Nebraska's extraordinarily high CPUEs are a result of netting congregating paddlefish in the Gavins Point Dam tailwaters. Average CPUE, without Nebraska's effort, increased from 1.5 fish/hour in 1996 to 2.6 fish/hour in 1997.

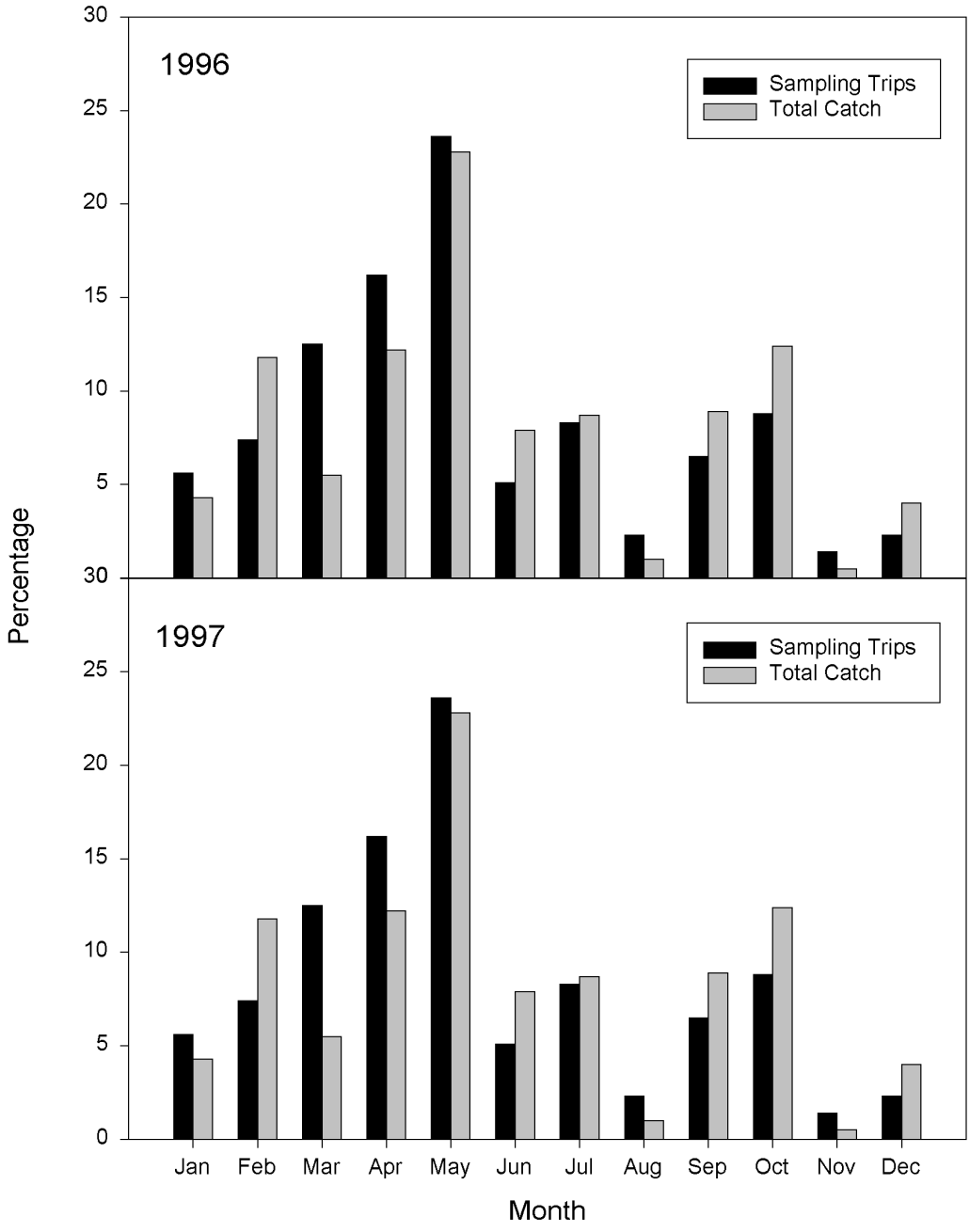


Figure 1. Percent of sampling trips and percent of total catch of paddlefish by month in 1996 and 1997.

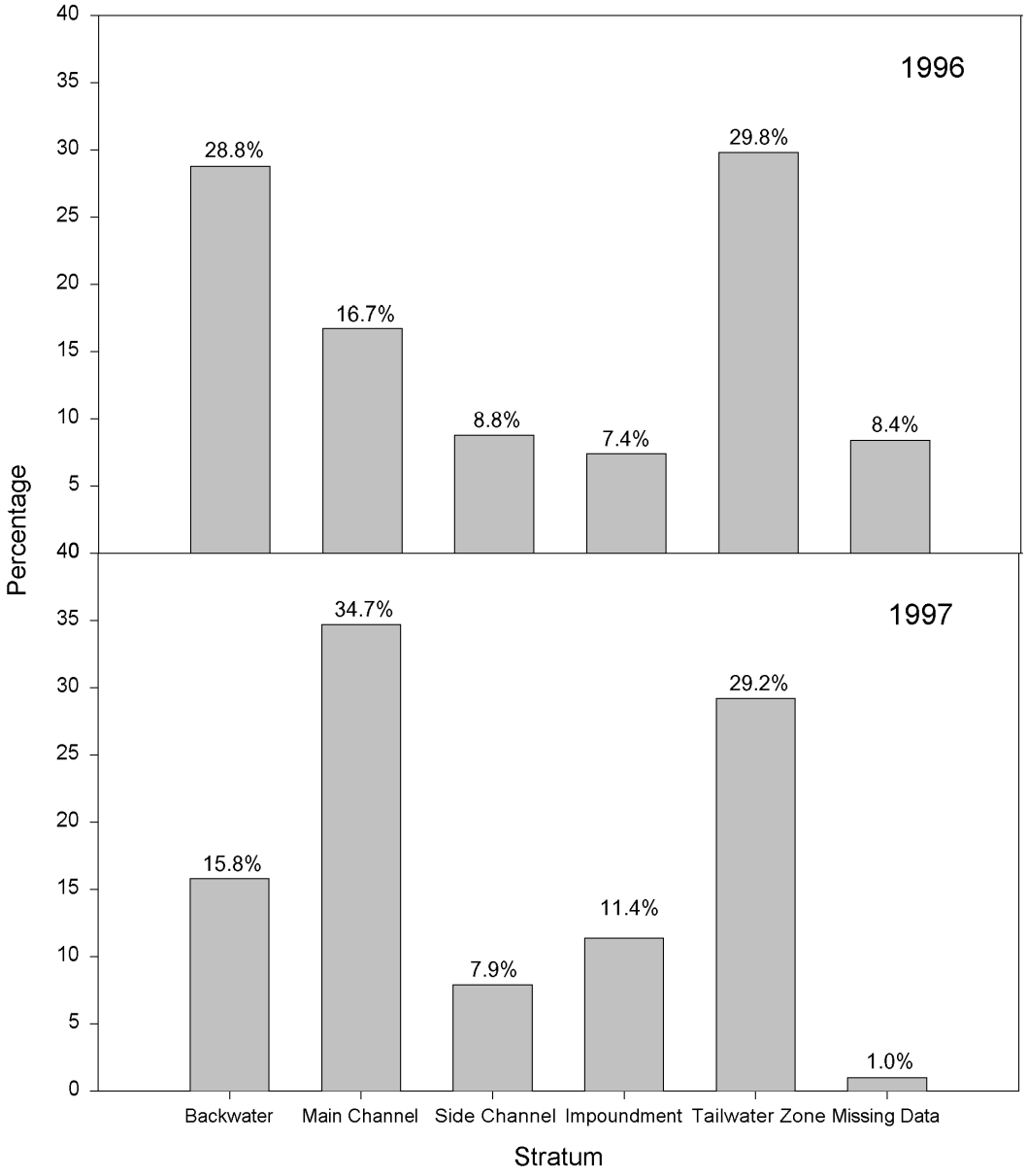


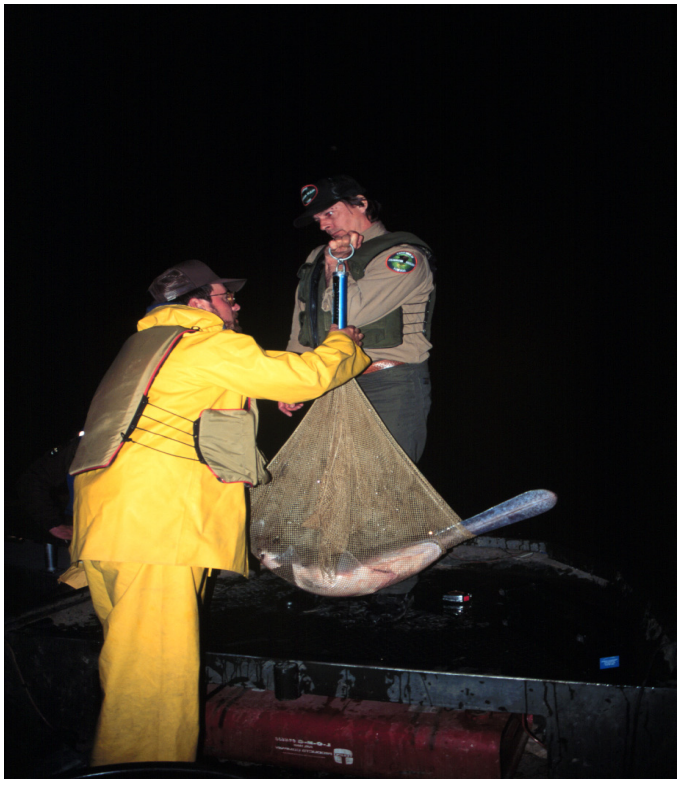
Figure 2. Percent of total sampling trips by stratum type in 1996 and 1997.

Table 1. Netting effort by MICRA cooperators in 1996 and 1997. This table includes gillnets, hobbled gillnets, and trammel nets.

State	1996				1997			
	# nets	Total Catch	Total Hours	Fish/hr	# nets	Total Catch	Total Hours	Fish/hr
AR	20	29	301.58	0.10				
IA	4	4	unknown	---	27	44	73.33	0.60
IL	64	355	138.27	2.57	102	309	96.87	3.19
IN	156	376	2016.38	0.19	98	258	1433.1	0.18
KY	86	82	558.43	0.15				
LA	42	173	246.05	0.7	57	147	325.18	0.45
MN	26	9	87.75	0.1				
MO	2	4	42.67	0.09	28	26	14.25	1.82
MS	15	18	341.25	0.05				
NE	75	474	12.63	37.53	72	584	6.15	94.96
OH	183	90	325.83	0.28	84	103	174.83	0.59
OK	32	36	1006.0	0.04	47	144	841.83	0.17
PA	63	0	30.75	0				
SD	54	325	42.88	7.58	10	355	22.92	15.48
TN	174	69	262.9	0.26	53	15	80.7	0.19
TX	72	29	311.15	0.09	533	6	1306.85	0.01
WI	4	66	6.42	10.28	22	163	41.68	3.91
WV					2	6	unknown	---
total	1072	2139	5730.94	3.75*	1135	2160	4417.69	10.1*

*Average CPUE.

Ohio River biologist pulling paddlefish trammelnet / Greg Conover, USFWS



Gillnets were the most common net used in 1996 while more hobbled gillnets were set in 1997 (Table 2). Although CPUE varied between net types and mesh sizes, trammel nets provided the largest average CPUE in both years. At first glance, these rates are largely influenced by Nebraska's trammel netting efforts in the Gavins Point Dam tailwaters. (Nebraska fished 70 3-inch trammel nets in 1996 and 72 nets in 1997.) However, trammel net average CPUEs without Nebraska's effort (1996-2.27 fish/hour, 1997-0.72 fish/hour) still exceed the average rates for both gillnets and hobbled gillnets (Table 2).

South Dakota also sampled paddlefish at Gavins Point Dam with 3.5-inch hobbled gillnets in 1997 resulting in a CPUE of 15.4 fish/hour (Table 2). Two other high CPUE rates can be credited largely to Illinois. Four-inch hobbled gillnets set in the Wabash River near New Harmony and Harmony Dam Island resulted in a CPUE of 15.41 fish/hour in 1997 (Table 2). Illinois sampled the Mississippi River below Melvin Price Dam (Lock & Dam 26) in 1996 with 3.25-inch gillnets and caught 18 fish in under 1.5 hours.

Louisiana Biologist, Bobby Reed releasing a recaptured paddlefish. photo courtesy of Louisiana Department of Wildlife and Fisheries

Table 2. Catch per unit effort of individual mesh sizes of trammel nets, gillnets, and hobbled gillnets used to collect paddlefish in 1996 and 1997.

Net Type	Mesh Size (inch)	1996				1997			
		# nets	# hrs	# fish	fish/hr	# nets	# hrs	# fish	fish/hr
TRAMMEL	3	81	74.5	562	7.54	97	35.8	639	17.85
	3.25	6	18.6	39	2.10				
	3.5					37	78.6	116	1.48
	4	3	15.8	43	2.72	19	28.4	15	0.53
	5	1	5	10	2.0	15	12.2	2	0.16
	Total	91	113.9	654	*5.74	168	155	772	*4.98
GILLNETS	2	21	10.3	1	0.1				
	3	50	90.9	124	1.36	5	0	8	--------
	3.25	2	1.3	18	13.85				
	3.5	29	22.1	22	1.0				
	4	91	820.8	60	0.07	46	409.3	76	0.19
	5	414	3663.0	693	0.19	114	872.6	314	0.36
	6	8	83.8	17	0.2	4	4	3	0.75
	Total	615	4692.2	935	*0.20	169	1285.9	401	*0.31
HOBBLED	3	4	55.5	2	0.04				
	3.5	10	165.8	2	0.01	10	22.9	353	15.41
	4	3	66.5	7	0.10	29	20	161	8.05
	5	352	600	222	0.37	738	2795.1	343	0.12
	6	11	35.7	15	0.42				
	8					7	128.4	116	0.90
	Total	380	923.5	248	*0.27	784	2966.9	973	*0.33
TOTAL		1086	5729.6	1837	*0.32	1121	4407.3	2146	*0.49

*Numbers reflect group averages and not totals.

Five MICRA cooperators sampled 109 paddlefish by electrofishing in 1996 (Table 3). Indiana surpassed the other MICRA states in electrofishing effort in 1996 and was the only agency to electrofish paddlefish in 1997. Individual electrofishing runs should be recorded as sampling efforts per the Sampling Effort Datasheet protocol in Appendix B.

Table 3. Electrofishing effort and paddlefish catch by MICRA cooperators in 1996 and 1997.

State	1996				1997			
	# of Runs	Total Catch	Total Hours	Fish/hr	# of Runs	Total Catch	Total Hours	Fish/hr
IA	1	1	unknown	---				
IL	8	52	6.25	8.32				
IN	36	53	10.08	5.26	2	57	2.25	25.33
KY	1	2	unknown	---				
TN	1	1	2.78	0.36				

Four agencies sampled 219 paddlefish by snagging in 1996. Iowa led the efforts in snagging with almost 200 rod-hours in 1996 and 96 rod-hours in 1997 (Table 4).

Table 4. Snagging effort and paddlefish catch by MICRA cooperators in 1996 and 1997.

State	1996				1997			
	# of Attempts	Total Catch	Total Rod-	Fish/ Rod-hr	# of Attempts	Total Catch	Total Rod-	Fish/ Rod-hr
IA	41	202	199.25	1.01	27	127	96.25	1.32
KY	1	7	unknown	---				
LA	1	3	14.0	0.21				
TN	2	7	9.5	0.74				

Iowa Biologists landing paddlefish below Red Rock Dam / John Pitlo, Iowa DNR

Paddlefish Body Lengths

Note: The following analyses assume that the sampling efficiency of a certain mesh size is not influenced by location in the basin, habitat type sampled, time of year, or other variables.

Body length of paddlefish collected in nets, electrofishing and snagging ranged from 165 to 1370 mm in 1996 and from 35 to 1550 mm in 1997 (Figure 3). Body lengths overlapped across gear types. Analysis of variance (ANOVA) was used with accompanying Duncan multiple range test and Tukey studentized range test to determine if differences in mean body length existed between gear types. Similar to fish collected in 1995, fish collected by snagging in 1997 were generally smaller (df = 2, F =

20.91, P>0.0001) than fish collected by nets and electrofishing (Table 5, Figure 3). Mean body length of paddlefish collected in nets in 1996 was significantly larger than paddlefish collected by snagging and electrofishing (df = 2, F = 224.82, P > 0.0001). Netting, which includes gillnets, hobbled gillnets, and trammel nets, generally collected the largest number of fish and the widest range of fish lengths in both 1996 and 1997 (Table 5). As the majority of paddlefish were collected in nets, these numbers may be due more to sample size than to gear efficiency. Paddlefish appear to be susceptible to sampling gears at 400 mm in length, however, smaller fish were collected by electrofishing in 1996 and by netting in 1997 (Figure 3).

Table 5. Mean lengths of paddlefish collected by netting, electrofishing, and snagging in 1996 and 1997.

Gear	1996						1997					
	N	Mode	Mean Length	Standard Deviation	Range	Duncan Group	N	Mode	Mean Length	Standard Deviation	Range	Duncan Group
Netting	2165	850	776.6	151.9	165-1370	A	2153	900	762.7	222.9	35-1550	A
Electrofishing	109	300	581.0	267.1	168-1031	B	57	900	803.1	132.6	419-1070	A
Snagging	266	650	592.2	148.4	386-1120	B	127	600	639.0	105.9	375-1150	B

Efforts to examine the potential relationship between net mesh sizes and captured paddlefish body lengths were largely hampered by sample size. Although paddlefish were collected in a range of mesh sizes in all net types, one mesh size generally was responsible for the majority of fish caught. Three-inch mesh trammel nets caught the largest number of paddlefish, the largest mean body length of fish, and the widest range of paddlefish lengths in both 1996 and 1997 (Table 6). Five-inch mesh gillnets collected the largest number of paddlefish, the largest mean body length, and the widest range of paddlefish body lengths in 1996 and 1997 (Table 7).

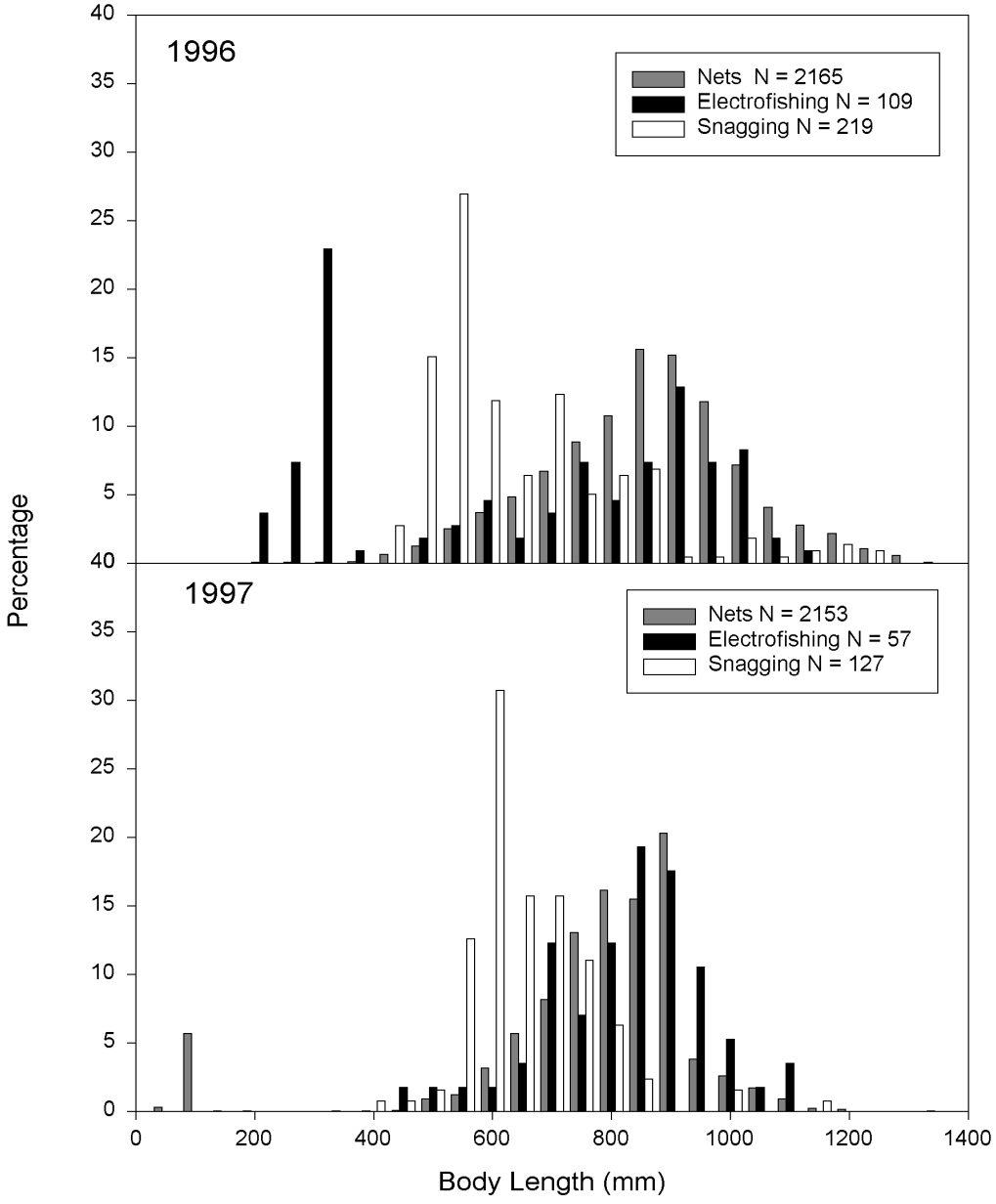


Figure 3. Percent frequency of paddlefish body lengths collected by netting, electrofishing, and snagging in 1996 and 1997.

Table 6. Mean body lengths of paddlefish collected by trammel nets in 1996 and 1997.

Mesh Size (inch)	1996				1997			
	N	Mean	Standard Deviation	Range	N	Mean	Standard Deviation	Range
3.0	562	743.2	174.9	165-1221	639	789.1	144.7	63-1290
3.25	39	637.7	111.1	443-912				
3.5					116	366.8	325.0	35-1016
4.0	43	666.4	92.8	498-857	15	728.8	70.2	596-845
5.0	10	623.3	141.0	360-780	2	717.5	20.5	703-732

*See Appendix A for graphs of paddlefish body lengths.

Table 7. Mean lengths of paddlefish collected by gillnets in 1996 and 1997.

Mesh Size (inch)	1996				1997			
	N	Mean Length (mm)	Standard Deviation	Range	N	Mean Length (mm)	Standard Deviation	Range
2					1	546.0	---	---
3	124	741.0	183.7	337-1173	8	593.8	69.2	546-756
3.25 inch	18	600.2	127.2	410-820				
3.5	22	795.6	114.5	545-1105				
4	60	764.7	110.0	380-892	76	770.4	140.9	406-1050
5	693	802.0	122.4	330-1370	314	783.70	123.6	398-1060
6	17	777.2	119.4	532-970	3	759.7	23.4	739-785

*See Appendix A for graphs of paddlefish body lengths.

Similar to the other gears, the largest mean paddlefish body length and the widest range of paddlefish body lengths occurred in the hobbled gillnet mesh size (5.0-inch) with the largest paddlefish sample in 1996. Paddlefish catch was more equally distributed over mesh sizes in 1997 (Table 8). Although the widest range of fish lengths was found in 3.5-inch mesh, the largest mean body length was in the largest mesh size (8.0-inch) as one might intuitively expect.

Table 8. Mean lengths of paddlefish collected by hobbled gillnets in 1996 and 1997.

Mesh Size (inch)	1996				1997			
	N	Mean Length (mm)	Standard Deviation	Range	N	Mean Length (mm)	Standard Deviation	Range
3	2	620.0	84.9	560-680				
3.5	2	675.0	21.2	660-690	353	800.7	149.0	35-1210
4	7	584.1	97.0	472-710	161	772.2	88.0	470-970
5	222	809.5	139.4	390-1175	343	728.8	335.7	49-1205
6	15	664.7	118.8	530-910				
8					116	945.6	169.7	510-1550

*See Appendix A for graphs of paddlefish body lengths.

Paddlefish Condition

Paddlefish crews also recorded the physical condition of the fish. Damaged or missing rostrums were noted in 9.4% of all paddlefish collected in 1996 and in 8.6% of the fish collected in 1997. Rostrum damage is a concern as it may affect tag retention. Rostrum damage rates varied across states (Table 9). Other injuries, including tumors and skeletal abnormalities were found in 3.3% of all paddlefish collected in 1996 and 4.0% of fish collected in 1997. Injury rates varied from 0 to 12% across states (Table 9). Lamprey scars (small, large, and multiple codes) were found on 4.8% of all paddlefish

collected in 1996 and 7.7% of 1997 fish. (These numbers do not include rasp abrasions). In general, lamprey scar rates are higher in Ohio River Basin and Upper Mississippi River Basin states (Table 9).

Table 9. Physical condition of paddlefish collected by MICRA cooperators in 1996 and 1997. Paddlefish with lamprey scars, rostrum damage, and other injuries are presented as percentages of each state's total catch (N).

State	1996				1997			
	Lamprey Scars %	Rostrum Damage %	% Other Injuries	N	Lamprey Scars %	Rostrum Damage %	% Other Injuries	N
AR	24.1	10.3	0	29	---	---	---	---
IA	3.4	5.8	1.9	207	2.9	5.3	0	170
IL	1.5	9.8	1.5	407	14.5	5.8	2.9	310
IN	2.8	4.4	6.1	429	0	4.8	4.8	315
KY	23.2	8	2.2	138	---	---	---	---
LA	0.5	9.2	2.7	185	0	15.3	1.8	170
MN	44	0	11	9	---	---	---	---
MO	0	0	0	5	0	30.8	0	26
MS	0	0	8.7	23	---	---	---	---
NE	0	9.7	4.4	474	51.5	10.3	2.4	584
OH	45.6	15.6	6.7	90	0	3.9	4.9	103
OK	0	27.8	0	72	0	2.1	2.8	144
SD	0	0	0	0	0	14.9	12.4	355
TN	0	11.7	1.2	325	0	0	0	15
TX	0	13	3.9	77	41.7	16.7	0	6
WI	10.3	13.8	6.9	29	0	4.3	9	163
WV	13.2	9.2	3.9	76	0	0	0	6
TOTAL	4.8	9.4	3.3	2575	7.7	8.6	4.0	2367

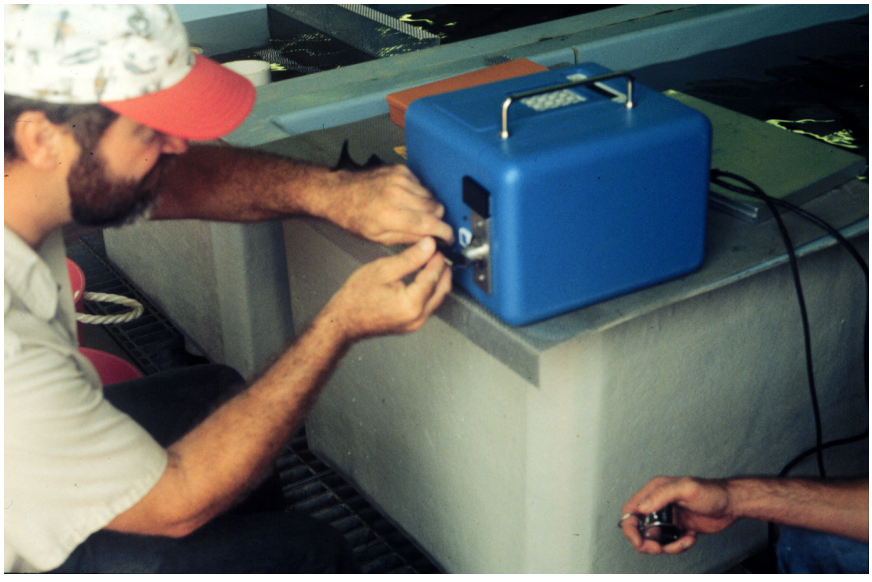
PADDLEFISH CODED-WIRE TAGGING EFFORTS

The number of states releasing hatchery-reared coded-wire tagged paddlefish in 1997 decreased for the second straight year. However, 5 states coded-wire tagged and released 127,743 hatchery-reared paddlefish in 1997, an 11% increase from 1996 (Table 10). Since the study was initiated in 1995, 437,022 hatchery-reared paddlefish have been coded-wire tagged and released. An additional 576,757 hatchery-reared paddlefish were coded-wire tagged and released between 1988 and 1994 as part of stocking programs in place before the MICRA project. A total of 1,013,779 hatchery-reared paddlefish have been coded-wire tagged and released by 11 basin states.

Table 10. Hatchery releases of coded-wire tagged paddlefish from 1988-1994 and MICRA coded-wire tagged paddlefish from 1995 - 1997.

STATE	1988-1994	1995	1996	1997	1988-1997
AR	--	--	707	--	707
KS	16,930	6,485	--	--	23,415
LA	--	351	2,265	--	2,616
MO	--	27,011	19,323	--	46,334
ND	--	9,093	--	--	9,093
OK	11,814	2,013	112	10,282	24,221
PA	--	8,806	6,577	13,208	28,591
SD	188,161	28,934	12,436	--	229,531
TN	--	5,816	--	5,390	11,206
TX	359,852	107,463	69,909	97,453	634,974
WV	--	1	1,977	1,410	3,388
TOTAL	576,757	195,973	113,306	127,743	1,013,779

Paddlefish/Sturgeon Subcommittee Chair Kim Graham tagging paddlefish at Blind Pony Hatchery in Missouri./ Jim Milligan, USFWS



Louisiana Biologist Bobby Reed tagging hatchery raised paddlefish / Bobby Reed, LDWF

Biologists in 14 states captured, tagged, and released 2,244 wild paddlefish in 1997. Numbers decreased slightly from 1996 totals when biologists in 16 states coded-wire tagged 2,455 paddlefish. A total of 6,470 wild paddlefish have been tagged by biologists in 18 states since the MICRA project was initiated in 1995 (Table 11).

Table 11. Number of wild paddlefish captured, coded-wire tagged, and released by MICRA cooperators.

STATE	1995	1996	1997	1995 - 1997
AR	15	24	--	39
IL	132	405	299	836
IN	245	428	310	983
IA	13	202	167	382
KS	--	4	--	4
KY	221	154	--	375
LA	--	177	170	347
MN	5	9	--	14
MO	158	5	25	188
MS	--	17	20	37
NE	366	436	561	1363
OH	6	89	102	197
OK	--	--	72	72
SD	305	347	353	1005
TN	288	60	21	369
TX	--	27	1	28
WV	--	--	6	6
WI	17	71	137	225
TOTAL	1,772	2,455	2,244	6,470

PADDLEFISH RECAPTURES

MICRA participants have recaptured a total of 701 coded-wire tagged paddlefish. Data could not be recovered from 22 recaptures because of errors associated with the recovery or processing of coded-wire tags (Table 12). Comparisons of wild-tagged and hatchery-released recaptures were made from the remaining 679 coded-wire tag returns.

Table 12. Coded-wire tag recovery and processing errors resulting in lost data.

Year	No Tag Present	Tag Lost	Unreadable Tag	Unmatched Tag Code	Batchcode 0-0-25	Total
1995	4	--	--	--	--	4
1996	4	3	1	--	--	8
1997	3	--	--	4	3	10
TOTAL	11	3	1	4	3	22

MICRA participants recaptured 235 paddlefish in 1997, 14% fewer than in 1996 (Table 13). Wild recaptures increased 19% in 1997 (n = 109) and have increased each year of the paddlefish project (Table 14). Hatchery recaptures decreased 35% in 1997 (n = 116) and were the fewest of all project years (Table 14).

Table 13. All coded-wire tagged paddlefish recaptured by MICRA cooperators through 1997.

STATE	1994	1995	1996	1997	TOTAL
IA	--	--	3	6	9
IL	--	1	8	5	14
IN	--	1	11	29	41
KS	--	4	5	3	12
KY	--	--	--	6	6
LA	--	--	--	3	3
MO	--	--	3	4	7
NE	--	2	45	89	136
OH	--	--	2	15	17
OK	--	4	6	14	24
SD	--	175	182	60	417
TN	--	3	2	2	7
TX	2	--	4	1	7
WV	--	--	--	1	1
TOTAL	2	190	274	235	701

Table 14. Number of wild coded-wire tagged paddlefish and hatchery-reared, coded-wire tagged paddlefish recaptured by MICRA cooperators.

STATE	Wild Tagged Fish				Hatchery Tagged Fish				
	1995	1996	1997	Total	1994	1995	1996	1997	Total
IA	--	3	6	10	--	--	--	--	--
IL	1	8	5	14	--	--	--	--	--
IN	1	11	28	40	--	--	--	--	--
KS	--	--	--	--	--	4	8	--	12
KY	--	--	4	4	--	--	--	--	--
LA	--	--	3	3	--	--	--	--	--
MO	--	3	3	6	--	--	--	--	--
NE	--	9	24	33		2	35	63	100
OH	--	2	14	16	--	--	--	--	--
OK	--	--	--	--	--	4	5	11	20
SD	27	49	20	96	--	144	127	40	311
TN	3	2	2	7	--	--	--	--	--
TX	--	1	--	1	2	--	3	1	6
WV	--	--	--	--	--	--	--	1	1
TOTAL	32	88	109	229	2	154	178	116	450

A total of 450 hatchery-released paddlefish have been recaptured through 1997. The majority (98%) of these fish were stocked prior to 1995 (Table 15). Recaptures of hatchery-released paddlefish with MICRA coded-wire tags (those stocked since 1995) should noticeably increase over the next few years as these younger cohorts recruit to sampling gears.

Table 15. Number of hatchery-reared, coded-wire tagged paddlefish released from 1988 through 1997 and the number of recaptured fish from each year-class.

RELEASE YEAR	NUMBER RELEASED	NUMBER RECAPTURED
1988	22,212	1
1989	18,364	6
1990	19,183	280
1991	93,002	84
1992	165,746	11
1993	99,284	10
1994	158,966	49
1995	195,973	7
1996	113,603	--
1997	127,743	2
TOTAL	1,014,076	450

Biologists only collected 27% of the 701 coded-wire tag returns, while recreational anglers account for nearly two-thirds of all recaptures (Table 16). The fact that 73% of all coded-wire tag returns came from recreational and commercial fishermen emphasizes the importance of MICRA's angler reward program.

Table 16. Number of wild and hatchery coded-wire tagged paddlefish recaptured by biologists and recreational and commercial fishermen.

	1994	1995	1996	1997	TOTAL
BIOLOGIST	2	13	78	96	189
RECREATIONAL	--	173	180	110	463
COMMERCIAL	--	4	16	29	49
TOTAL	2	190	274	235	701

PADDLEFISH MOVEMENTS

Movement data was available for all the recaptured paddlefish, except the 22 that had coded-wire tag processing errors. Two-thirds of the paddlefish recaptured through 1997 made notable movements. Ninety-three percent of these movements were made by hatchery-released fish. Notable movements by wild-tagged paddlefish were first observed in 1996 and increased in 1997 (Figure 4).

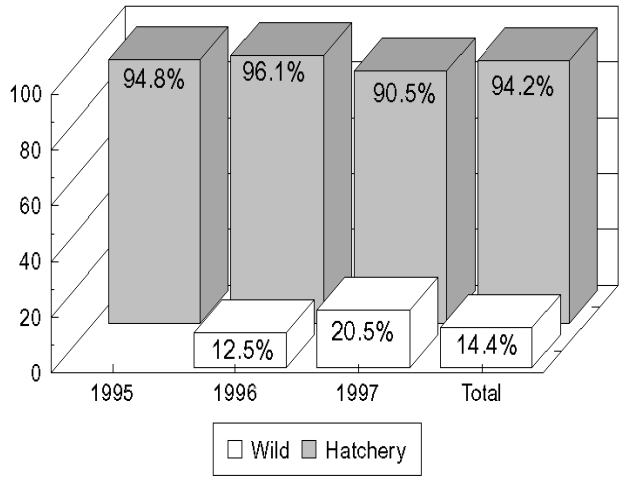


Figure 4. Percent of recaptured paddlefish that have made notable movements.

Twenty-two (10%) recaptured wild-tagged paddlefish moved between backwaters and the mainstem river. Eighteen paddlefish tagged in Hovey Lake, a seasonally flooded oxbow lake, were recaptured in tailwater reaches on the Ohio River after moving upriver past one or two dams (Figure 5). While the majority of movements were out of backwaters, 3 paddlefish were recaptured after moving into backwater lakes or oxbows. Hoxmeier and DeVries (1997) found that oxbows in the lower Alabama River functioned as preferential nursery habitat for juvenile paddlefish, but suggested that oxbows may not be an important habitat for adult paddlefish. The movements of MICRA wild-tagged paddlefish from main channel to oxbow habitat indicates that the zooplankton rich waters of oxbows may serve as important habitat for adult, as well as juvenile paddlefish.

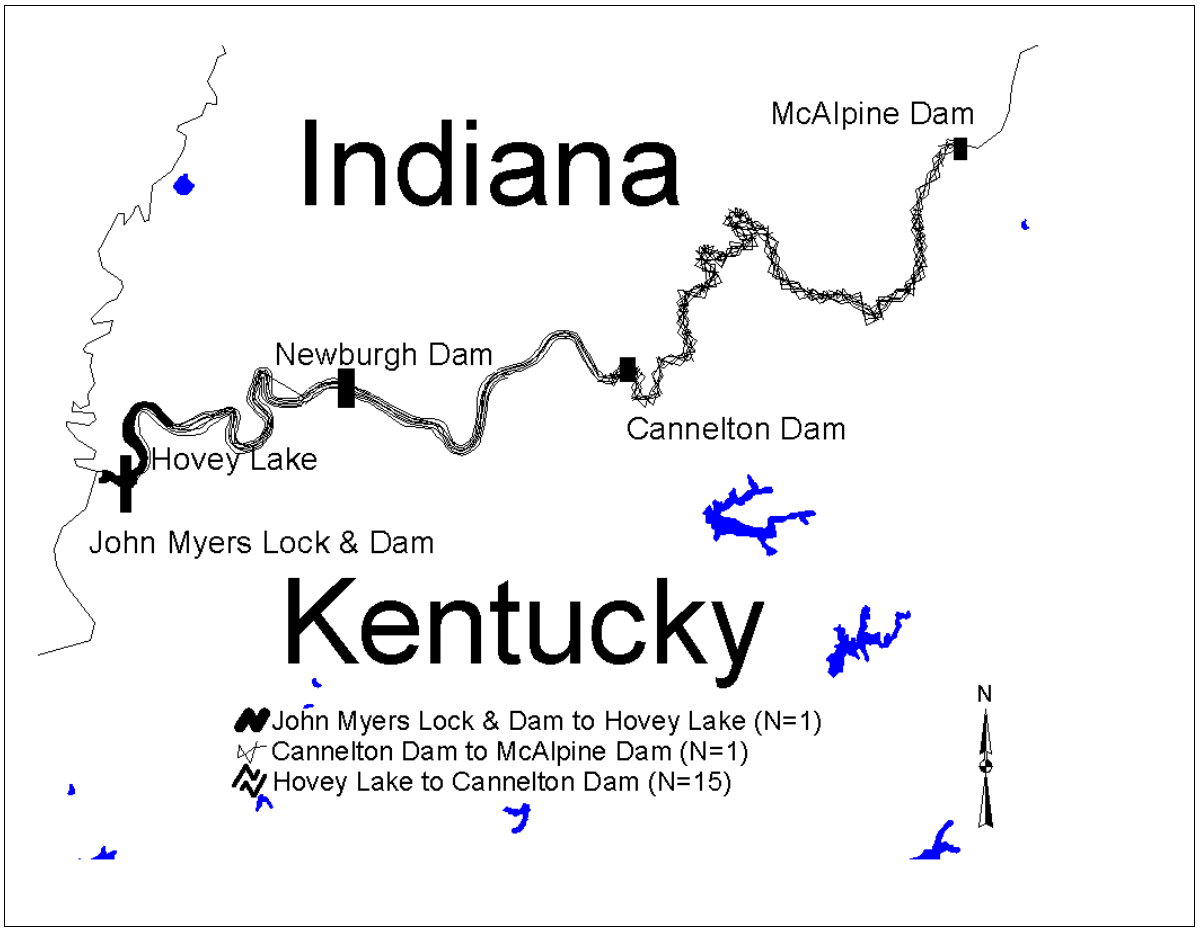


Figure 5. Movements of wild coded-wire tagged paddlefish in the Ohio River Basin through 1997.

Both wild-tagged and hatchery-released paddlefish made interpool movements, however the extent and direction of these movements were nearly opposite. Eleven percent of wild-tagged and 94% of hatchery-released paddlefish recaptured through 1997 have made interpool movements. All but two wild-tagged fish moved into upper pools (Table 17), while all but one hatchery-released fish moved downriver (Table 18).

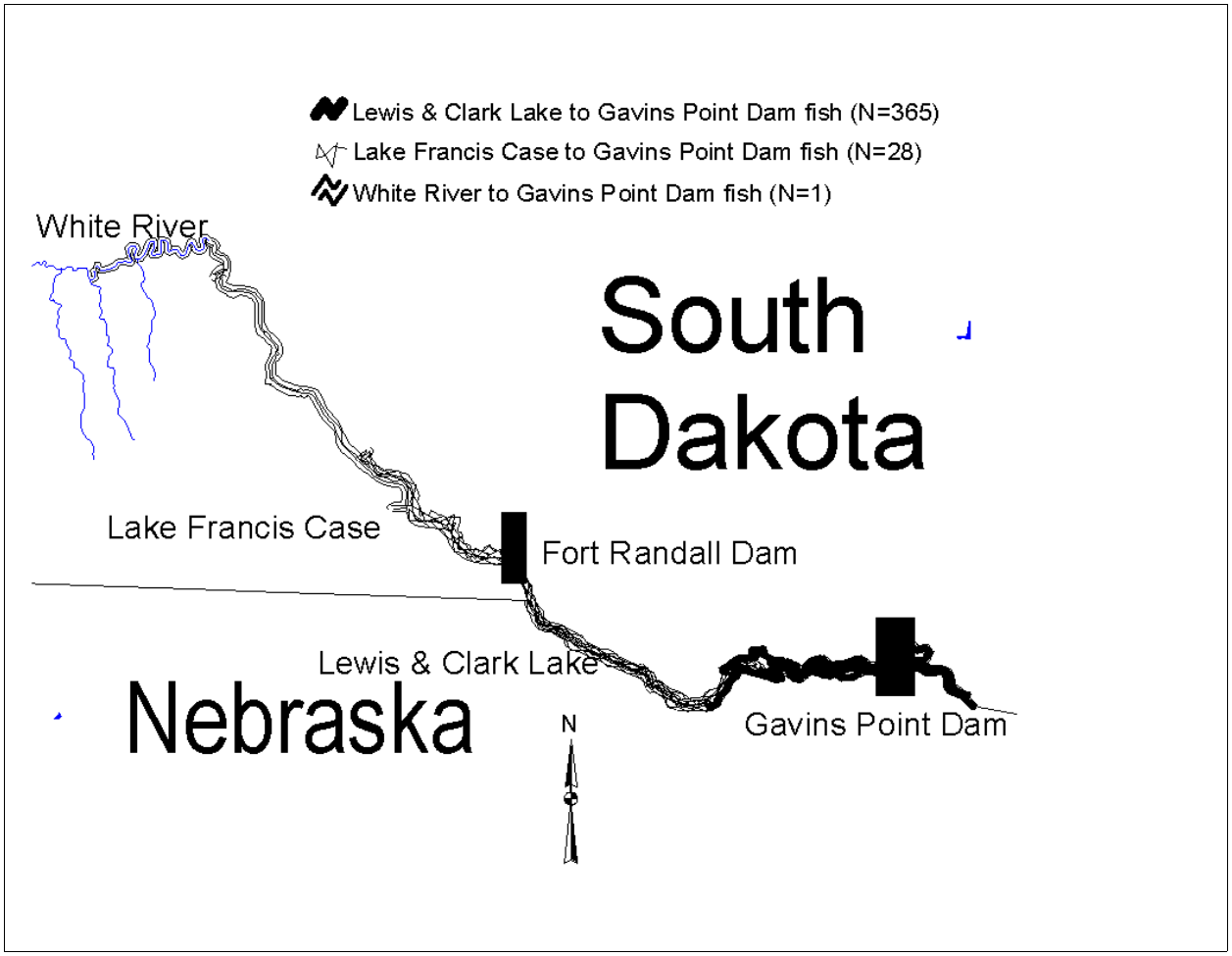
Table 17. Interpool movements by wild-tagged paddlefish recaptured through 1997.

Number of Paddlefish	Release Location	Recapture Location	Number of Dams Passed	Direction of Movement	Months at Liberty
1	Hovey Lake	Cannelton Dam	1	Upriver	23
4	Hovey Lake	Cannelton Dam	1	Upriver	22
3	Hovey Lake	Cannelton Dam	1	Upriver	9
2	Hovey Lake	Cannelton Dam	1	Upriver	8
3	Hovey Lake	Cannelton Dam	1	Upriver	7
2	Hovey Lake	Cannelton Dam	1	Upriver	6
3	Hovey Lake	McAlpine Dam	2	Upriver	5
1	Cannelton Dam	McAlpine Dam	1	Upriver	13
2	Uniontown Dam	Cannelton Dam	2	Upriver	11
1	Uniontown Dam	Hovey Lake	1	Upriver	17
1	Wabash River	Hovey Lake	1	Upriver	6
1	Lock & Dam 26	Swan Lake	1	Upriver	5
1	Swan Lake	Lock & Dam 26	1	Downriver	7
1	Niobrara River	Gavin's Point	1	Downriver	18

Paddlefish stocked by South Dakota between 1988 and 1994 into the upper Missouri and White Rivers and recaptured below the Fort Randall (n = 2) and Gavin's Point Dams (n = 394) accounted for 88% of all hatchery recaptures and 94% of the interpool movements made by hatchery releases (Figure 6). Of the remaining 26 recaptured hatchery paddlefish which made notable movements, 22 were stocked by Kansas into Tuttle Creek Reservoir on the Blue River, 14 of which were recaptured in the tailwaters of Gavin's Point Dam. These 14 fish moved downriver nearly 150 miles and passed

three dams before reaching the Missouri River, then migrated nearly 450 miles up the Missouri River to Gavin's Point Dam (Figure 7).

Figure 6. Movements of hatchery-raised fish released into the White River, South



Dakota and upper Missouri River reservoirs.

Table 18. Interpool movements by hatchery-released paddlefish recaptured through 1997.

Number of Paddlefish	Release Location	Recapture Location	Number of Dams Passed	Direction of Movement	Months at Liberty
365	Lewis & Clark Reservoir	Gavin's Point Dam	1	Downriver	60 - 96
28	Lake Francis Case	Gavin's Point Dam	2	Downriver	24 - 72
2	Lake Francis Case	Fort Randall Dam	1	Downriver	15 - 39
1	White River	Gavin's Point Dam		Downriver	28
14	Tuttle Creek Reservoir	Gavin's Point Dam	3	Downriver	23
3	Tuttle Creek Reservoir	Milford Dam Spillway	2	Downriver	22
2	Tuttle Creek Reservoir	Smokey Hill River	2	Downriver	6
1	Tuttle Creek Reservoir	Rocky Ford Dam	2	Downriver	61
2	Tuttle Creek Reservoir	Tuttle Creek Spillway	1	Downriver	48
1	Angelina River	Neches River	1	Downriver	72
1	Gallopolis Pool, Ohio River	Racine Lock, Ohio River	1	Upriver	<1

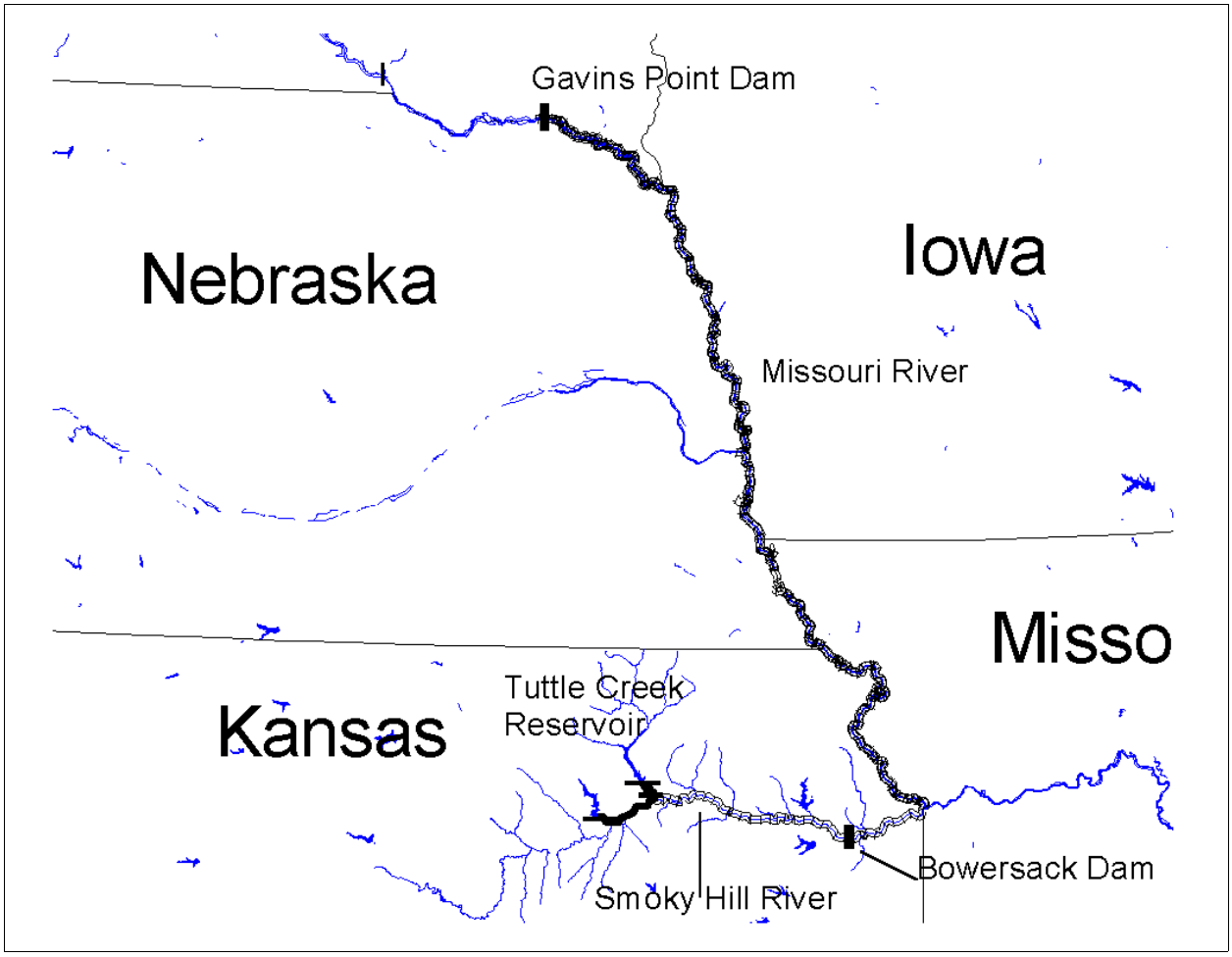


Figure 7. Movements of hatchery-raised fish released into Tuttle Creek Reservoir, Kansas.

Several wild-tagged paddlefish made long-range movements in open portions of the Mississippi and Missouri Rivers before being recaptured below dams (Table 19). Two paddlefish tagged below Gavin's Point Dam were recaptured below Bagnel and Melvin Price (Lock & Dam 26) Dams and five fish which were tagged in tailwater reaches below Gavin's Point, Bagnell, Melvin Price, and Reelfoot Dams, were all recaptured in the tailwaters of the Kaskaskia River lock and dam (Figures 8 and 9). Three of these fish were tagged in the Missouri River sub-basin and were later recaptured in the Mississippi

River sub-basin. The middle Mississippi River between the mouth of the Missouri and Ohio Rivers may serve as a hub to paddlefish moving throughout the Basin. Relatively little biologist sampling effort has been conducted in the middle Mississippi River and nearly all recaptures from this area have been collected by commercial fisherman. The significance of the relatively few paddlefish recaptured in this area warrants intensified sampling effort in the middle Mississippi and lower Missouri and Ohio Rivers. Increased sampling effort and data collection in these areas of the Basin will greatly increase our ability to draw conclusions about paddlefish movement between sub-basins.

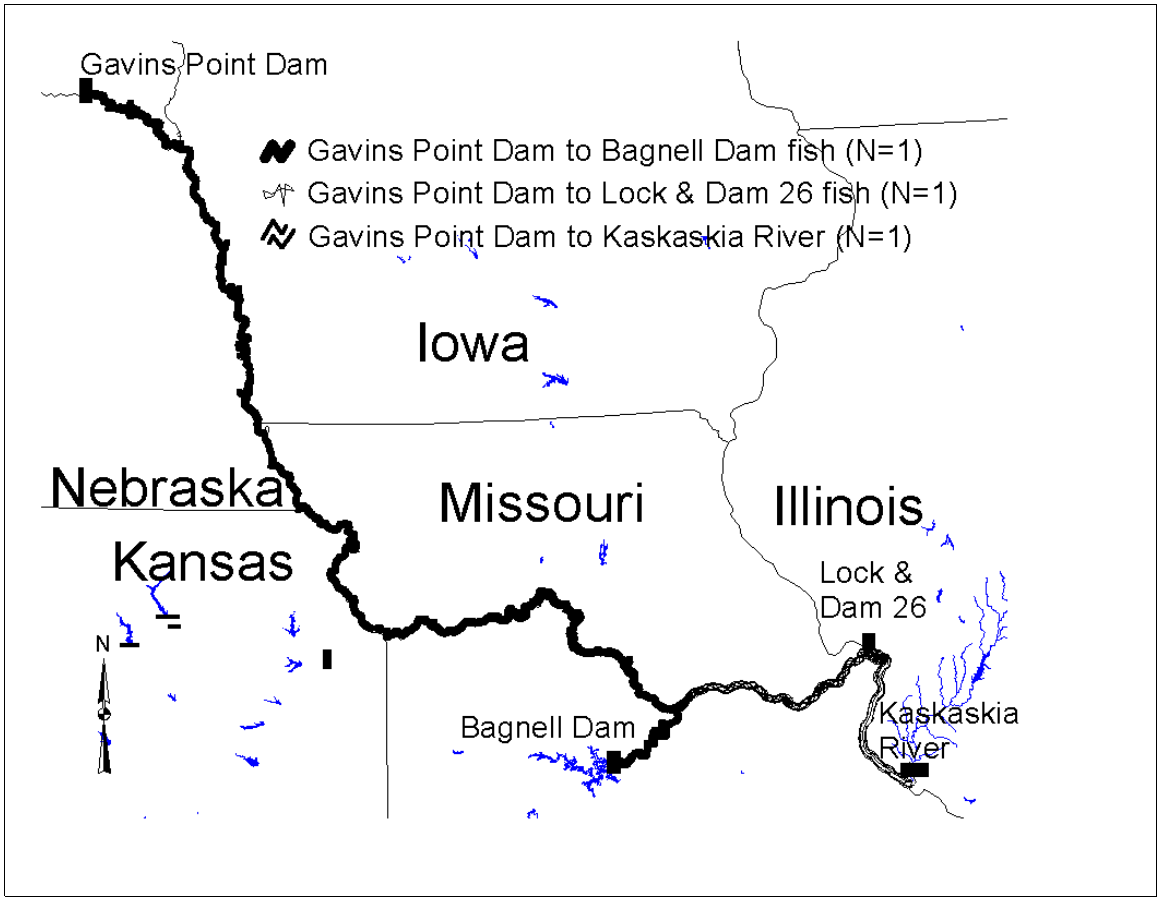


Figure 8. Movements of wild paddlefish tagged below Gavins Point Dam.

Nearly all paddlefish that made long-distance or interpool movements were collected below dams. Although paddlefish have moved both upstream and downstream past mainstem dams, the large number of fish collected below dams throughout the Basin suggests that paddlefish movements may often be limited.

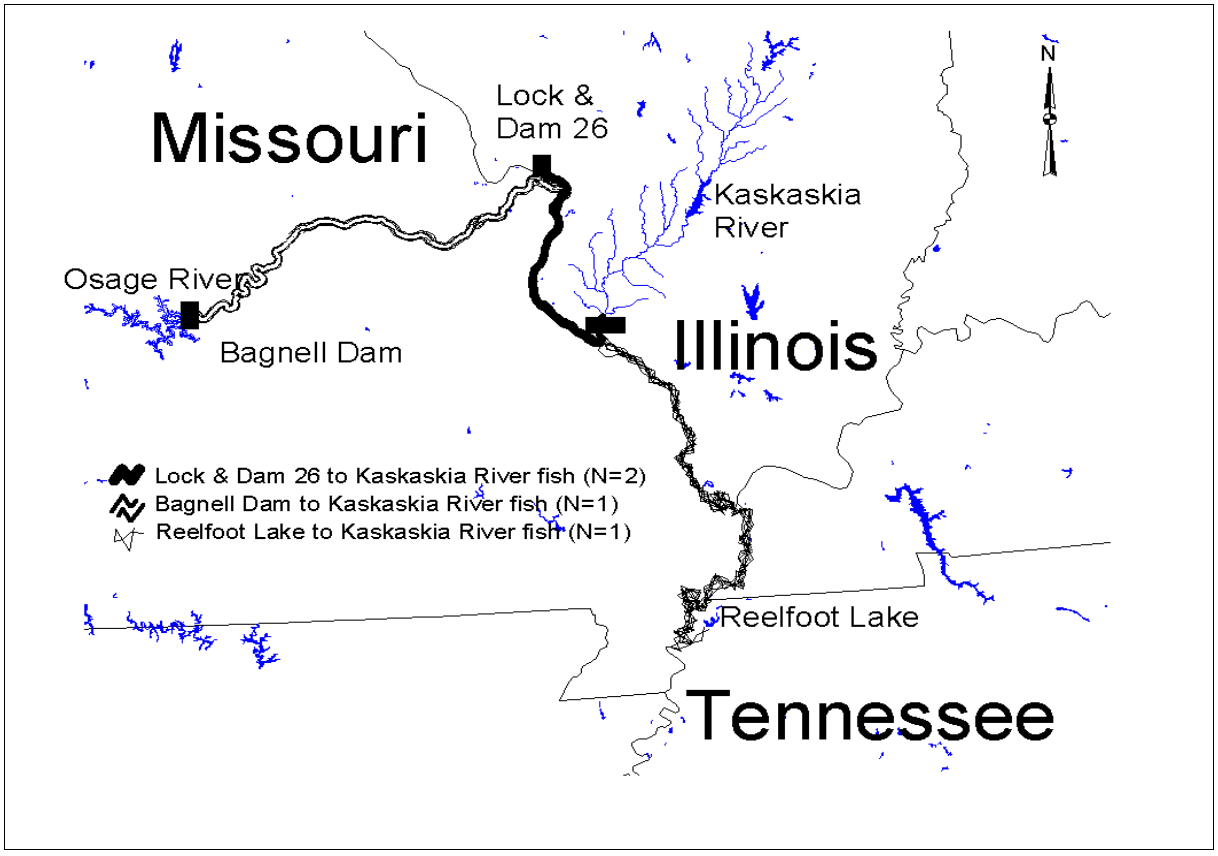


Figure 9. Movements of wild caught fish which were recaptured in the Kaskaskia River.

Table 19. Notable long-range movements in open portions of the Mississippi and Missouri Rivers by recaptured wild-tagged paddlefish.

Number of Paddlefish	Release Location	Recapture Location	Minimum Miles Traveled	Direction of Movement	Months at Liberty
1	Gavin's Point	Lock & Dam 26	817	Downriver	7
1	Gavin's Point	Bagnell Dam	763	Downriver	9
1	Gavin's Point	Kaskaskia River	889	Downriver	20
1	Bagnell Dam	Kaskaskia River	218	Downriver	21
2	Lock & Dam 26	Kaskaskia River	84	Downriver	2
1	Reelfoot Dam	Kaskaskia River	275	Upriver	21

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APPENDIX A

Paddlefish Body Length Graphs

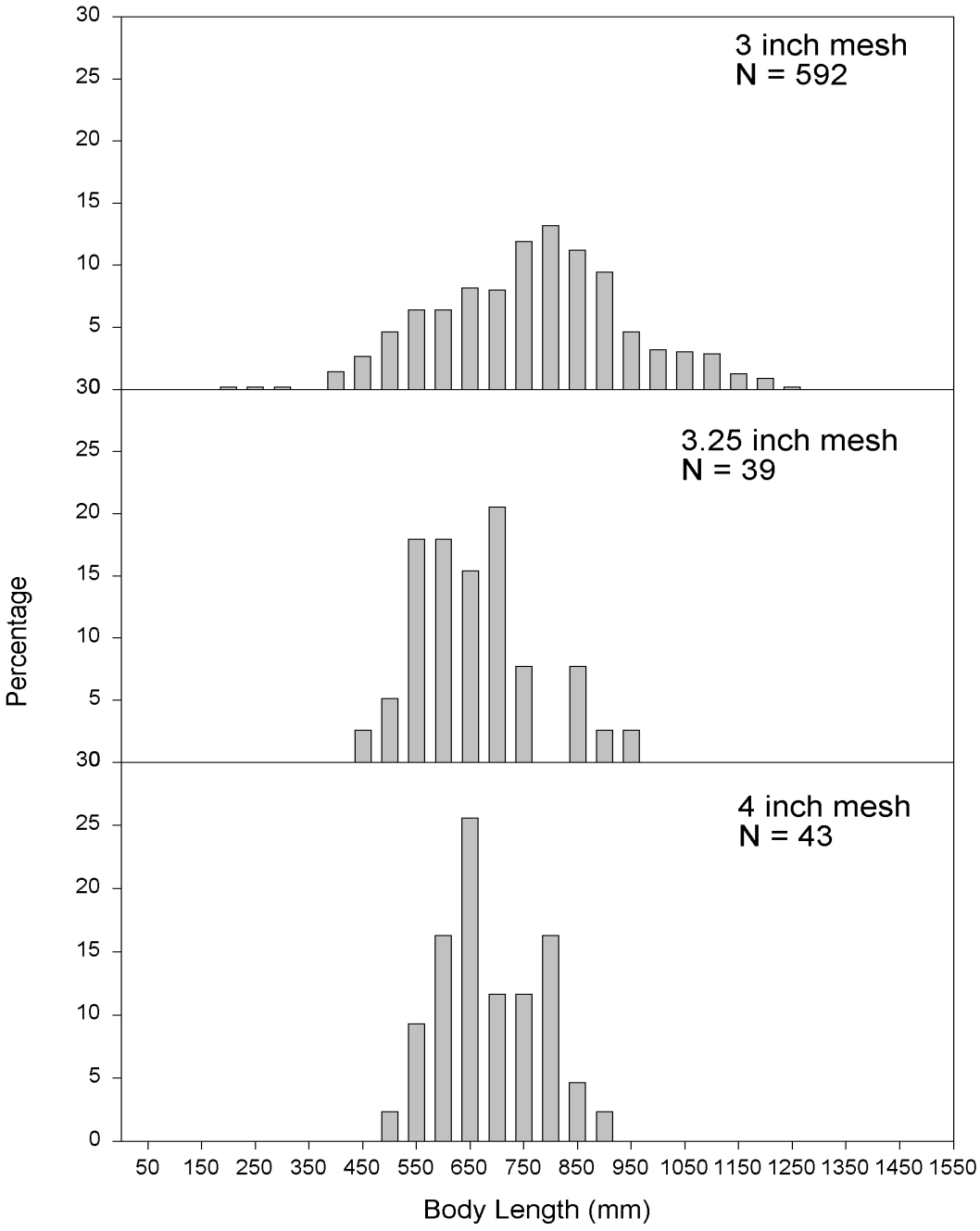

Figure A1. Percent frequency of paddlefish collected by trammel nets in 1996.

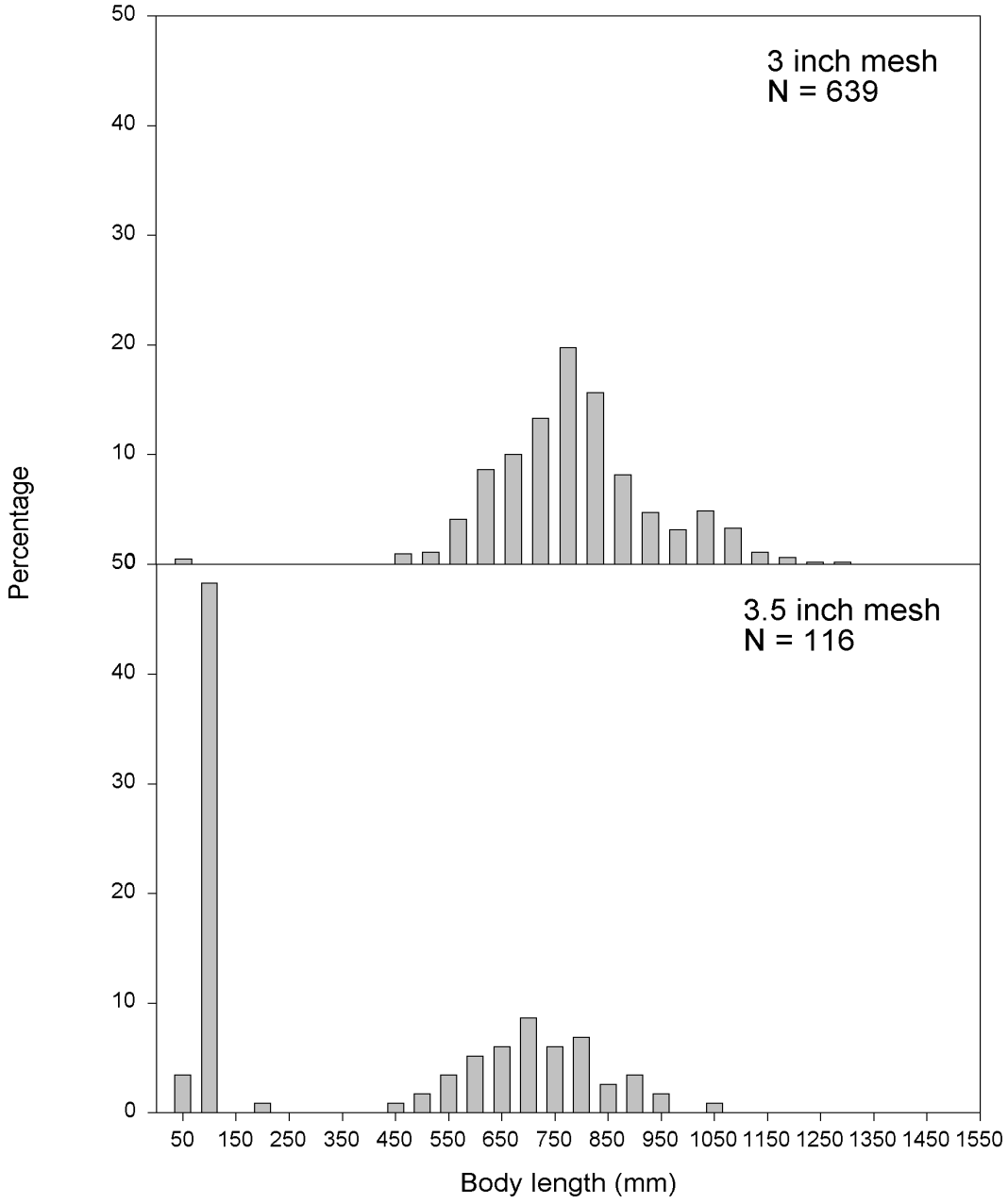

Figure A2. Percent frequency of paddlefish collected by trammel nets in 1997 (Note change in scale from similar graphs).

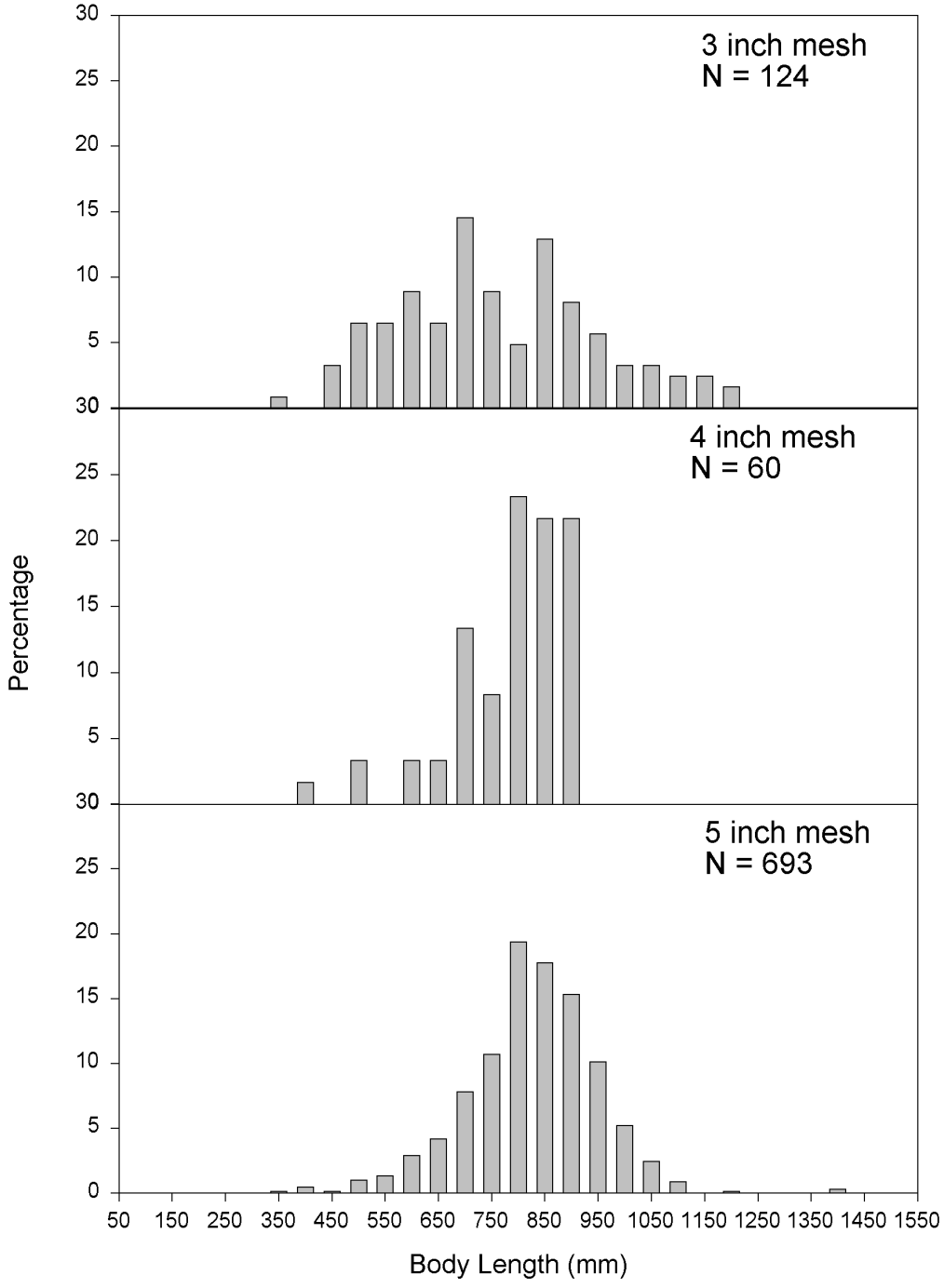

Figure A3. Percent frequency of paddlefish collected in gillnets in 1996.

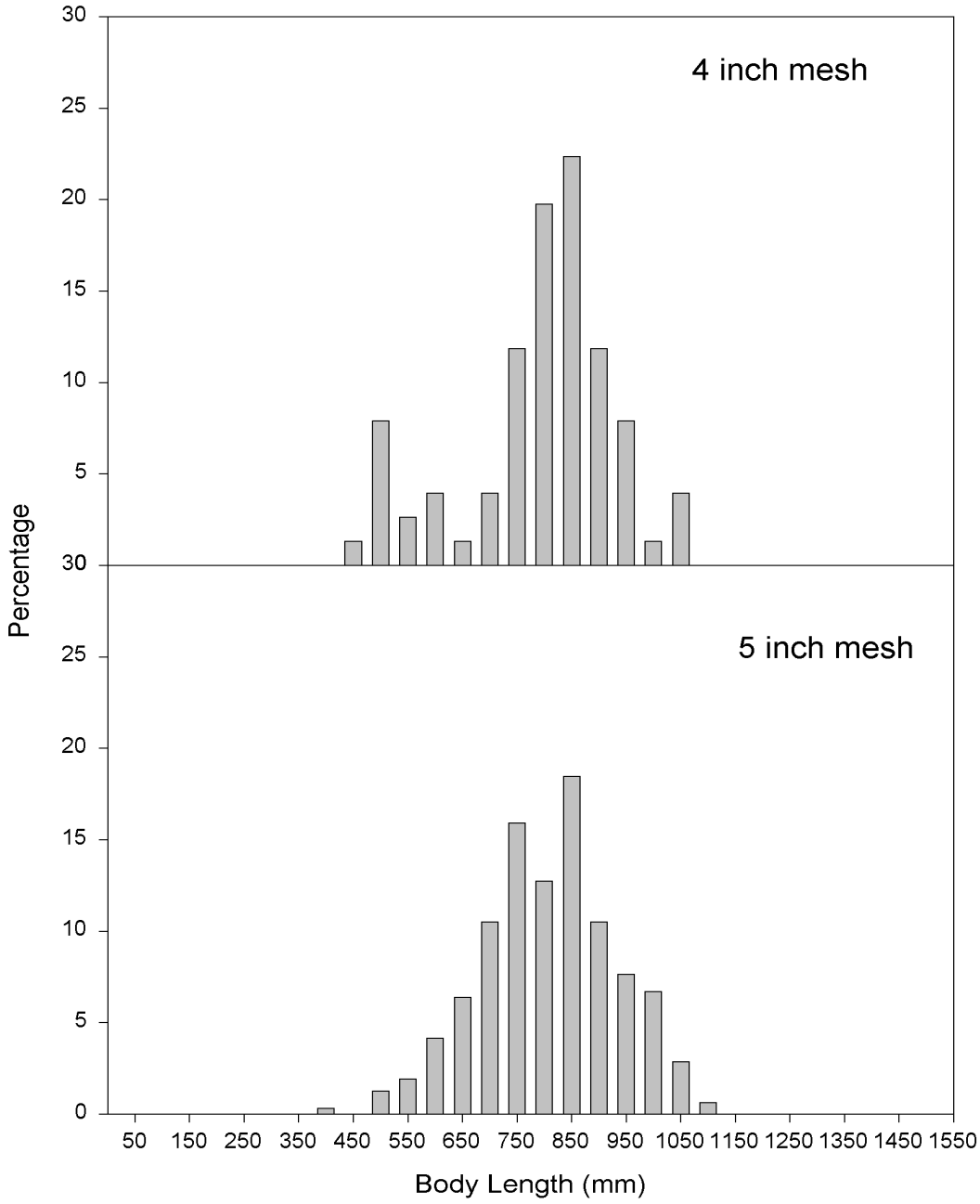

Figure A4. Percent frequency of paddlefish collected in gillnets in 1997.

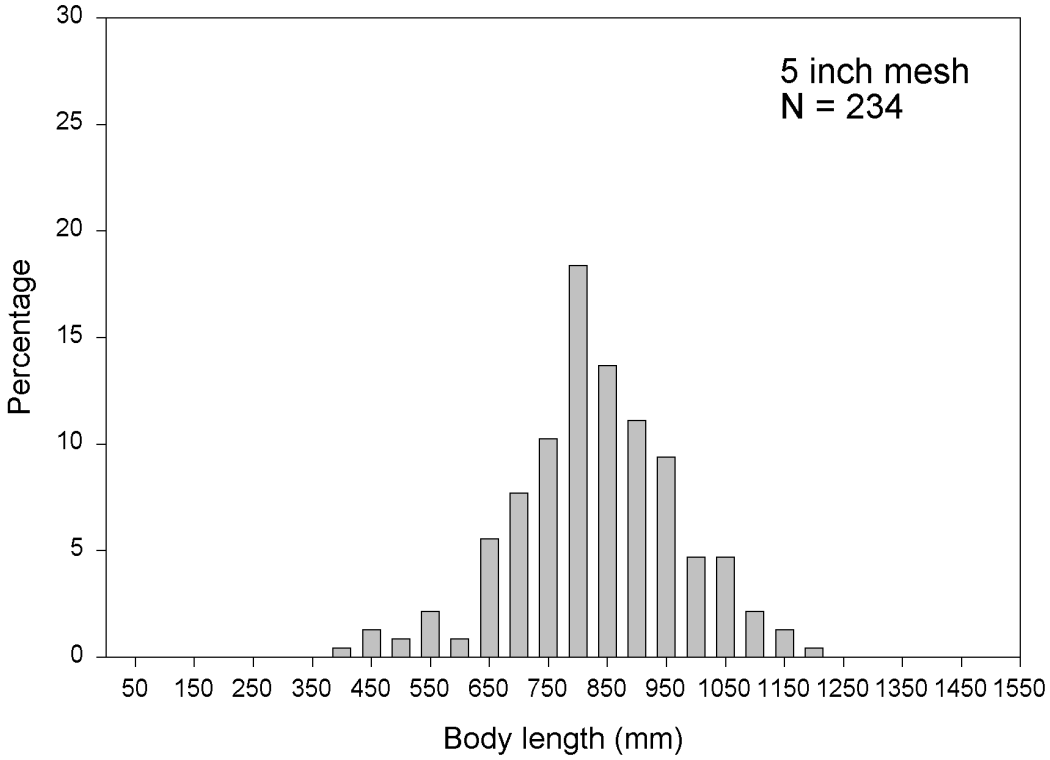

Figure A5. Percent frequency of paddlefish collected by hobbled gillnets in 1996.

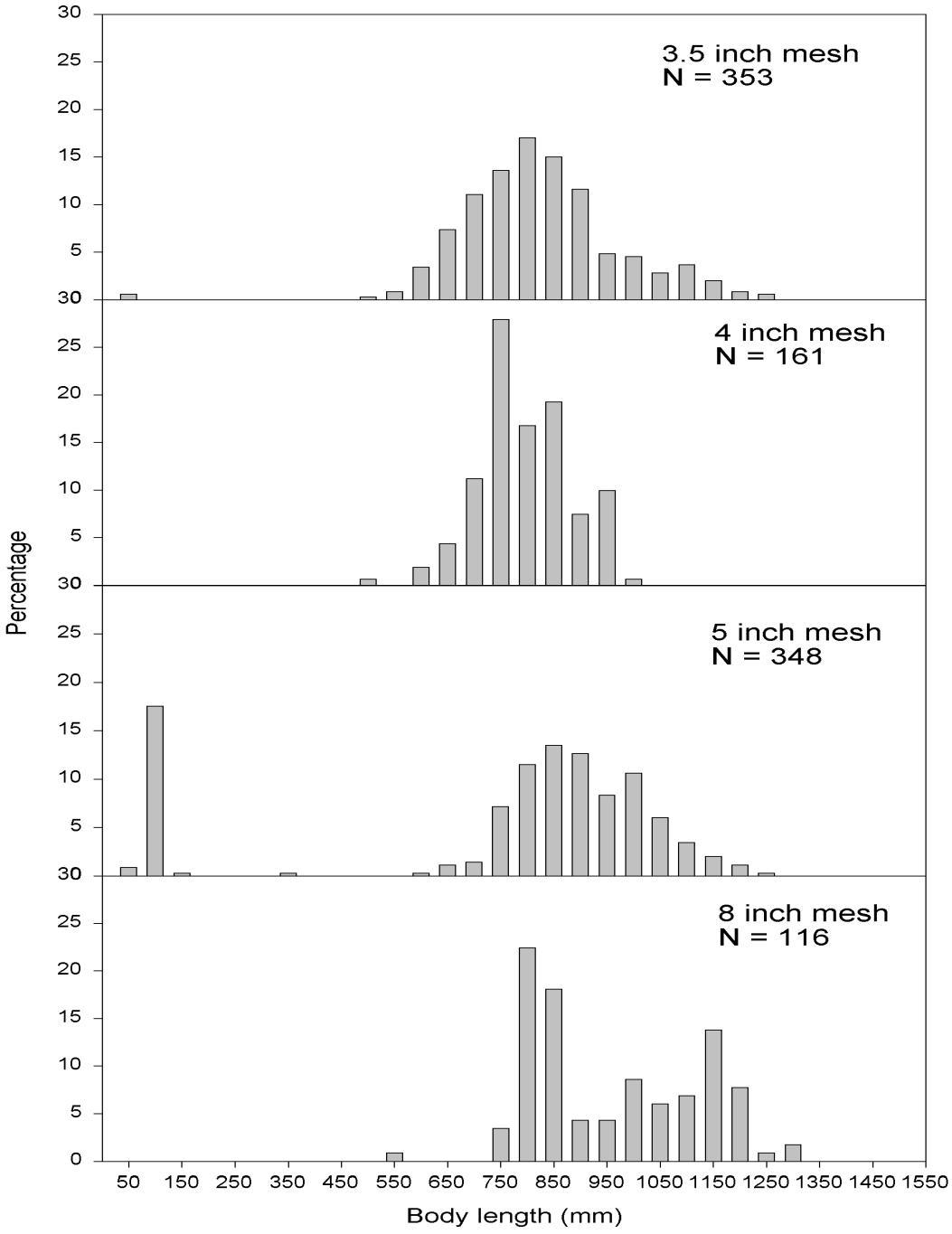

Figure A6. Percent frequency of paddlefish collected by hobbled gillnets in 1997.

APPENDIX B

MICRA Paddlefish Coded Wire Tagging Project Protocol

MICRA Paddlefish Coded Wire Tagging Project Protocol
(Revised 08/98)

Paddlefish Data Sheets and Coding Instructions

Correct and complete recording of data is absolutely essential to the success of all MICRA efforts. Conversely, failure to comply with data recording procedures compromises the mission of the MICRA paddlefish tagging study and results in unrecoverable waste of sampling efforts. Procedures for recording data are driven by the need for correct information and documentation of quality assurance and chain-of-custody information. Because information critical to future paddlefish management decisions is the primary product of the MICRA paddlefish/sturgeon subcommittee, it is essential that all data are properly recorded. All MICRA participants who collect data are expected to understand and comply with data recording procedures. If you are uncertain about any of the data recording protocol, please contact the RTCs before you begin collecting data.

Data collected during fish sampling are recorded on three data sheets: the *Paddlefish Collection Sheet*, the *Paddlefish Sampling Effort Sheet*, and the *Paddlefish Measurement/Tagging Sheet*. A collection is defined as a sampling trip consisting of a unique combination of location, time, and sampling gear. One *Paddlefish Collection Sheet* is completed for each collection location. This sheet is used to document detailed spatial and temporal data, key physical and chemical measurements, qualitative observations on local habitat characteristics and comments. One or more *Sampling Effort* and *Measurement/Tagging Data Sheets* are used to document gear specific sampling effort and fish catch data from each collection. All three data sheets were designed to optimize the mix of flexibility, capture of essential data, simplicity, visual clarity, and quality assurance objectives.

Data collected from hatchery tagging/stockings are recorded on the *Paddlefish Stock Identification Form*. A new form should be used with each batch of paddlefish tagged. Maintaining separate data sheets for each batch is paramount to the success of tracking different batches over time. At a minimum, paddlefish should be grouped into unique batches for each different combination of state, year, hatchery, release site, and release date.

Data should be recorded in waterproof ink or Number 2 pencil. Please write legibly. Record all data accurately. The project number should be identical on all three data sheets for any particular collection. Do not erase anything on the data sheets. If a recording error is made, please put a line through the error, and write your initials and the correct data adjacent to the error.

Changes Made to the Data Sheets

Several changes have been made to the data sheets since the previous study protocol (Oven 1995). These changes were made with the input of the project participants during and following the *Symposium on the Harvest, Trade and Conservation of North American Paddlefish and Sturgeon* in Chattanooga, TN in May 1998. The revised datasheets in this protocol take precedence over all previous versions and should be used exclusively for recording paddlefish data by January 1, 1999.

Collection Sheet:

1) **Each sampling trip should be given a unique project number.** This is important so that sampling effort can be broken out to identify changes in CPUE and habitat over time.

2) Site name has been broken out into a more complete format that will allow us to query data by the different fields. The correct basin name should be circled. Enter the name of the river (or tributary) you are working on and when applicable, enter the name of the impoundment, reservoir, or pool. Always enter the nearest river mile (see #3 below). Site names should be names commonly used by biologists, the COE, river maps, etc.

3) In order to code SAS to determine the distance a fish has moved, an approximate river mile is needed for each site. This means that for isolated backwater sites we will need an approximate river mile where these bodies would connect to the river during a water event that would allow the fish to travel between the backwater and the river. We also need to know the approximate number of miles a collection site is up a tributary to calculate movement distances.

4) Stratum codes were discussed at length and tabled before all decisions were finalized. The following decisions were reached: 1) impoundment would be moved to the pool/reservoir field to allow identification of strata within impoundments, 2) offshore/ shoreline is not needed as part of the backwater code, 3) wing dam and unstructured were eliminated from the main channel border codes because wing dams are listed later as an option under other structure, and 4) backwaters needed additional codes to distinguish between connected backwaters, isolated backwaters, and natural lakes. A given backwater lake should always be classified as either contiguous or isolated depending on the connectivity of the lake when the river is at “normal” flow conditions and not vary with the connectivity of the lake at the time of sampling. It was brought to our attention after the meeting that we need main channel and main channel border as two separate strata. We decided on the following strata: main channel, main channel border, side channel, tailwater zone, tributary mouth/confluence, contiguous backwater, isolated backwater, and natural lake.

5) There was also considerable discussion as to how to identify impoundments which restrict movement. Since this is a movement issue and not a description of habitat no changes were made to the data sheets in this respect. This will be addressed in the mapping of paddlefish movements. Each participant should supply maps of the rivers in his/her region and identify the location and types of significant blockages to paddlefish movements on the maps. This is important information we need to assess paddlefish movements so please make the time to get these maps prepared and sent in.

6) Location/map coordinate data fields have been updated so that we can plot reported coordinates as accurately as possible. Coordinate data should be provided for each sampling trip. If you are unable to provide coordinates, please include a detailed map with your data sheets so that your coordinates can be estimated. MICRA is considering purchasing GPS units for those participants that do not have one (contact Jerry Rasmussen). Mark the appropriate Method, Map Datum, and UTM Zone in the fields provided. Map datum and UTM Zone information is available in your GPS unit's programming menu and will not change unless you change it. Please check to see how your GPS unit records coordinates (L/L or UTM's) and which Map Datum and UTM Zone they are recorded in. The preferred method is UTM. The preferred map datum is NAD83/GRS80. Please contact the RTCs if you are unsure about these fields.

7) Structure has had a 5th option, 'unknown' added to predominate substrate. Please make sure that you always indicate a predominant substrate. There is a difference between an 'unknown' substrate and missing data from not selecting the appropriate choice.

8) Gaging Station has been added to Water Data. We need the gaging station name or number which was used to determine water elevation. This will allow us to determine what exactly the water elevation numbers mean.

Sampling Effort Data Sheet:

1) Changes were made to this sheet to make it more accommodating to sampling methods other than gill nets and trammel nets. Net number, net code, and net type have been changed to effort number, effort code, and effort type. Effort codes have been added for seine, dipnet, snagging, electrofishing, brood stock releases, and unknown (e.g. measurements taken from fish found dead).

2) **Effort numbers should never be repeated within the same project number**.

3) There may be a statistical advantage to identifying each time you run a net as an individual effort, but we know this is not always possible (nor agreed upon), therefore it is up to each individual biologist to determine 'units of effort' for their sampling. Be sure and break out each effort individually on the effort sheet. For example, the number of

rods when snagging and the number of runs when electrofishing should each be assigned a unique effort number so that the catch made by each can be identified on the paddlefish measurement/tagging data sheet.

5) **Mesh size should never be entered as a range of mesh sizes**. Each mesh size should be recorded on a separate line, but as the same effort number. This is frequently being recorded wrong and we are losing data as a result.

6) **Multiple nets tied together should be given only one effort number.** If they are different dimensions they should be recorded on separate lines, but as the same effort number. Multiple nets tied together as a single net should be recorded as are single nets with multiple mesh sizes (see #5 above).

7) Water depth has been split into minimum and maximum water depth as the previous protocol lacked a definition for water depth measurement.

Paddlefish Measurement/Tagging Sheet

1) Species column has been removed to make room for Jawtag Recap and Jawtag Mark columns.

2) Each individual effort identified on the *Sampling Effort Data Sheet* should be accounted for on the *Paddlefish Measurement/Tagging Sheet*. If there were no paddlefish collected by a specific sampling effort then 'No Fish' should be recorded next to the effort number in the fish number column.

3) The bar mesh column on this sheet indicates which size mesh a paddlefish was captured in for a net with multiple mesh sizes.

4) Body length should be measured from the front of the eye to the fork of the tail and recorded to the nearest millimeter. Since measurements differ when collected with a tape or with a bump-board, all measurements should be taken with a tape to standardize lengths.

5) Conversations following the meeting brought to the RTCs' attention that there is some confusion to the P/C codes. In particular, the latest version added a code (#6) to distinguish between rostrum damage and rostrum missing. Only a portion of the 1997 data included data sheets with this new code. These two codes have been recombined to the original single code (#4). **Code #5 has been added to indicate fish injured during sampling.** (Fish collected by snagging should receive this P/C code.) Code #6 is now "other". Describe "other" when selecting this P/C code.

6) Lamprey codes have been eliminated in favor of more quantitative data on the intensity of lamprey predation on paddlefish. Two new columns have been added: *Lamprey Attack Scars* and *Lamprey Attack Wounds*. All scars and wounds caused by lampreys should be enumerated and entered into the respective columns.

7) Jawtag recap and Jawtag mark have been added because of past and ongoing jawtagging efforts. Every effort is being made to include all available paddlefish tagging data in the database. If you capture a paddlefish with a jawtag, record the appropriate two-letter state abbreviation (use FW for Fish and Wildlife Service) and the jawtag number in the jawtag recap field. Do not remove the jawtag. Tag the paddlefish with a CWT before release. If a captured paddlefish does not have a jawtag, enter 'N'. If you tag a paddlefish with a jawtag, record the appropriate two-letter state abbreviation followed by the jawtag number in the Jawtag mark column. Tag the paddlefish with a CWT before release. If you do not mark the paddlefish with a jawtag enter 'N'.

Stock Identification Form

1) The most obvious change made to this form was a change in layout. Many fields were moved into table format to make the forms easier to fill while recording data and to read while entering data.

2) Brood source site and release site have been standardized with the collection site fields on the *Collection Data Sheet*. These fields now include river, impoundment/pool/reservoir, river mile, and site name.

3) At a minimum each combination of state, year, hatchery, release site, and release date should be reported on an individual *Stock Identification Form*. A new form should be used for each batch of paddlefish tagged. This will assure the highest quality of data and prevent the unnecessary loss of valuable information.

4) **Sequentially coded wire tags will now be used to tag all hatchery released fish. All hatchery stocked paddlefish should continue to be tagged with 1.5 length coded-wire tags.** Hatcheries will have the ability to create as many unique batch codes as needed by providing a reference tag before and after each batch of fish is tagged. This will eliminate the problem of lost data from the repeated use of standard batch codes. This would also provide hatchery managers the ability to identify any level of detail desired regarding released fish. For example, different tanks, feeding regimes, rearing temperatures, parental stocks, etc. can be uniquely coded by using sequential "batch" codes instead of standard batch codes.

5) **Two one-inch pieces of sequentially coded wire,** one piece removed before starting and one piece removed after finishing tagging**, should be included with each**

***Stock Identification Form*.** These reference tags are required to obtain the range of sequential codes that will identify recaptured paddlefish from each batch of fish.

6) **No hatchery-reared paddlefish should ever be released unless it has been coded-wire tagged**. The release of untagged hatchery paddlefish will bias future results.

7) The practice spools of batch-coded wire that each state received at the beginning of the study should be returned to the USFWS's Marion office ASAP.

Recapture Tags and Envelopes

All rostrums collected from commercial or sportfish harvested paddlefish should be accompanied by a recapture tag. All rostrum notches should be enclosed in a sealed envelope. Tags and envelopes from harvested fish should include the number of rostrums that were checked for tags. It is crucial to know the total number harvested and the percentage of those that held tags for later determination of exploitation estimates.

MICRA *PADDLEFISH RESEARCH* STATE _____ PROJECT NUMBER _____

COLLECTION SHEET SITE NAME _____

BASIN: Mississippi R. Missouri R. Ohio R. Gulf

1. HEADER

River	Impoundment/Pool/Reservoir	River Mile	Stratum[1]	Start Date mm/dd/yy	Finish Date mm/dd/yy	Start Time _ _ : _ _	Finish Time _ _ : _ _

[1]Stratum Codes: MC = main channel; MB = main channel border; SC = side channel; TZ = tailwater zone; TM = tributary mouth/confluence; BI = backwater, isolated; BC = backwater, contiguous; NL = natural lake

2. LOCATION / MAP COORDINATES

N/S Coordinates	E/W Coordinates	Method[2]	Map Datum[3] (GPS)	UTM Zone

[2] 1 = UTM (map) 2 = UTM (GPS) 3 = L/L (GPS) 4 = L/L (map)

[3] 1 = NAD 83 or GRS 80 2 = NAD 27 or CLARK 1866

3. STRUCTURE

Predominant Substrate (circle one number) 1 - silt 2 - silt/clay/little sand 3 - sand/some gravel 4 - gravel/rock 5 - unknown

Other Structure (circle all that apply) wing dam/dyke low-head dam/closing structure/weir revetment woody debris/snags flooded terrestrial inlet/outlet channel other_____

4. WATER DATA

Gaging Station	Water Elevation (m)	Secchi (cm)	Temperature (_ _._ C)	Conductivity (µS/cm)

COMMENTS:_____

Paddlefish Collection Sheet

Field Name	Description and Instructions
State	Two letter postal state abbreviation
Project Number	Assigned number used for each unique combination of location, time, and sampling gear. Project number should correspond with the *Paddlefish Sampling Effort Sheet* and *Paddlefish Measurement/Tagging Sheet* used in any given sampling event. The project number is the only way to relate the habitat and sampling effort data with the individual fish.
Site Name	Name of site sampled. Name should be one commonly used by biologists/COE/river maps/etc.
Basin	Circle one of the following options: Mississippi River Missouri River Ohio River Gulf Although the Ohio and Missouri Rivers are in the Mississippi River Basin, please identify the basin as Ohio or Missouri when working in these rivers.
1. Header	
River	Name of river in which sampling occurred.
Impoundment/Pool/Reservoir	Name of impoundment/pool/reservoir in which sampling occurred. i.e. Lewis & Clark Lake or Pool 24.
River Mile	Record river mile to nearest tenth, i.e. 102.3. If you use river kilometer please indicate by crossing out mile and writing in kilometer.
Stratum	Select 1 two-letter alphabetic habitat class description. MC = main channel MC = main channel border SC = side channel TZ = tailwater zone TM = tributary mouth/confluence BI = backwater, isolated BC = backwater, contiguous NL = natural lake

Start Date	Date on which collection started (e.g. date on which first net was set). Record in mmddyy format. (e.g. July 10, 1998 is recorded as 071098).
Finish Date	Date on which collection was completed (e.g. date on which last net was pulled). Record in mmddyy format. (e.g. July 10, 1998 is recorded as 071098).
Start Time	Record 2400-h (military) Central Standard Time at which a sample begins (e.g. the time that the first net is set) to the nearest minute. Examples: 1:45 pm is recorded as 13:45 and midnight is 00:00 of the new day.
Finish Time	Record 2400-h (military) Central Standard Time at which a sample is completed (e.g. the time that the last net is pulled) to the nearest minute. Examples: 1:45 pm is recorded as 13:45 and midnight is 00:00 of the new day.
2. Location/Map Coordinates	
N/S Coordinates	Record latitudinal (north/south) coordinates of the collection location. Units are specific to the location method; UTM Northing or degrees-minutes-seconds north latitude. For fixed sampling sites, this value should be measured using a GPS unit at least once when each site is marked and recorded.
E/W Coordinates	Record longitudinal (east/west) coordinates of the collection location. Units are specific to the location method; UTM Easting or degrees-minutes-seconds west longitude. For fixed sampling sites, this value should be measured using a GPS unit at least once when each site is marked and recorded.
Method	Specify the method used to acquire location data. Please circle one: 1 = UTMs reached from cross-reference between base map and site features. 2 = UTMs recorded from GPS device 3 = Latitude and longitude recorded from GPS 4 = Latitude and longitude recorded from cross-reference between base map and site features. Option #2 is the preferred method. Please program your GPS unit to record in UTMs if possible.

Map Datum	The map datum is the cartographic approximation of the spherocity of the globe. You should be able to locate the map datum your GPS unit is using in its setup menu. Enter one of the map datum options provided: 1 = NAD 83 or GRS 80 2 = NAD 27 or CLARK 1866 Option #1 is the preferred map datum. Please program your GPS unit to use this map datum if possible.
UTM Zone	Record the two-digit Global Positioning System (GPS) zone of the coordinate location. You should be able to locate your UTM Zone on your GPS unit. In the Mississippi River Basin, the zone will be a whole number between 13 and 17. For example, most of MN, IA, MO, AR, and LA fall within Zone 15 (Figure A1).
3. Structure	
Predominant Substrate	Circle the one value that best describes the predominant substrate based on a qualitative visual and tactile observation of the sediments: 1 = Silt (very fine and very soft sediments that may contain highly hydrated, very soft clay; sand lacking) 2 = Silt/Clay/Little Sand (fine and soft sediments dominated by silt but usually containing little fine sand, with perhaps dehydrated (firm) clay pellets or moderately hydrated clay with little fine sand) 3 = Sand/Some Gravel (firm to very firm, fine to coarse sediments with sand dominant, or entirely sand) 4 = Gravel/Rock (hard substrate consisting of gravel, rock, bedrock, or concrete) 5 = unknown substrate
Other Structure	Record presence of other habitat structures within a 100-m radius. Circle all that apply: wind dam/dyke low-head dam/closing structure/weir revetment woody debris/snags flooded terrestrial inlet/outlet channel other (specify) Note: Describe important features that aren't listed on the data sheet in the "comments" field.
4. Water Data	

Gaging Station	Station where water elevation data is acquired. Indicate either gage name (e.g. USGS gage @ Boonville, MO) or location, (e.g. face of Lock & Dam #24).
Water Elevation (m)	Record water level or elevation to the nearest 0.1 meters at the time of sample. Please indicate if elevation is in feet.
Secchi (cm)	Record water transparency to the nearest centimeter using a Secchi disk. Please indicate if reading is in inches.
Temp	Record surface water temperature measurement to the nearest 0.1 C. Please indicate if temperature is in degrees Fahrenheit.
Conductivity (µS/cm)	Four digit numeric field to record conductivity to the nearest 1 µS/cm.

MICRA *PADDLEFISH RESEARCH* STATE MO PROJECT NUMBER 1253

COLLECTION SHEET - EXAMPLE

SITE NAME Hermann

BASIN: Mississippi R. (Missouri R.) Ohio R. Gulf

1. HEADER

River	Impoundment/ Pool/Reservoir	River Mile	Stratum[1]	Start Date mm/dd/yy	Finish Date mm/dd/yy	Start Time _ _ : _ _	Finish Time _ _ : _ _
Missouri		97.9	MCB	07/14/98	07/14/98	09:30	16:00

[1]Stratum Codes: MC = main channel; MB = main channel border; SC = side channel; TZ = tailwater zone; TM = tributary mouth/confluence; BI = backwater, isolated; BC = backwater, contiguous; NL = natural lake

2. LOCATION / MAP COORDINATES

N/S Coordinates	E/W Coordinates	Method[2]	Map Datum[3] (GPS)	UTM Zone
4310300n	0510922e	2	1	15

[2] 1 = UTM (map) 2 = UTM (GPS) 3 = L/L (GPS) 4 = L/L (map)

[3] 1 = NAD 83 or GRS 80 2 = NAD 27 or CLARK 1866

3. STRUCTURE

Predominant Substrate (circle one number) (1)- silt 2 - silt/clay/little sand 3 - sand/some gravel 4 - gravel/rock 5 - unknown

Other Structure (circle all that apply) (wing dam/dyke) low-head dam/closing structure/weir revetment woody debris/snags flooded terrestrial inlet/outlet channel other_____

4. WATER DATA

Gaging Station	Water Elevation (m)	Secchi (cm)	Temperature (_ _._ C)	Conductivity (µS/cm)
USGS-Boonville, MO	18.5 ft	10	30.6	356.0

COMMENTS:_____

MICRA *PADDLEFISH RESEARCH* STATE _____ PROJECT NUMBER _____

SAMPLING EFFORT DATA PAGE ___ OF ___

Effort Number	Effort Code* _ _ _	Mesh Size (bar) _ _ . _ in	Panel Length _ _. _ ft	Panel Height _ _ . _ ft	Set Time _ _ : _ _	Pull Time _ _ : _ _	Soak Time (minutes)	Min. Water Depth _ _ . _ m	Max. Water Depth _ _ . _ m	Velocity m/sec _ _ . _

*EFFORT CODE (X Y Z)		
Effort Type: X G-gillnet H-hobbled gillnet T-trammel net P-dipnet N-seine S-snagging (SOO) E-electrofishing (EOO) O-brood stock release (OOO) U-unknown	Mesh Type: Y M - monofilament I - multifilament O - not applicable U - unknown	Set Type: Z D - drift F - floating (surface) S - sinking (bottom) B - both (surface to bottom) M - mid-depth only O - not applicable U - unknown

Sampling Effort Data sheet

Field Name	Description and Instructions
State	Two letter postal state abbreviation
Project Number	Record the assigned project number from the corresponding *Paddlefish Collection Sheet*. The project number is the only way to relate the habitat and sampling effort data with the individual fish.
Page_ of _	Page number of total number of sampling effort data sheets.
Effort Number	Pertains to the nets/gears as they are set and checked in order. All sampling gears in a given project should be sequentially numbered. For example, a crew which fished 3 gillnets and ran 3 electrofishing runs had effort numbers 1 through 6.
Effort Code	Three-letter code (XYZ) that describes gear type, mesh type (if applicable), and set type. Effort type (X) G = gillnet H = hobbled gillnet T = trammel net P = dipnet N = seine S = snagging E = electrofishing O = brood stock release U = unknown Mesh Type (Y) M = monofilament I = multifilament O = not applicable U = unknown Set Type (Z) D-drift F = floating (surface) S = sinking (bottom) B = both (surface to bottom) M = mid-depth only O = not applicable U = unknown For example, snagging would be coded as SOO and electrofishing would be coded as EOO.
Mesh Size (bar)	Record the bar mesh size of all nets used for each project number. Nets with multiple mesh sizes should have an entry for each mesh size. For trammel nets give the size of the large mesh (the mesh the fish pass through).
Panel Length	Record the total length (ft.) of each mesh size whether the length is for individual panels (experimental nets) or the entire net.

Panel Height	Record exact height (ft.)of each panel or net used in feet. For hobble nets please give the height of the hobble. As a general rule we are looking for the shortest verticle distance between the bottom and top of the net while its fishing.
Set Time	Record 2400-h (military) Central Standard Time at which a net is set to the nearest minute. Examples: 1:45 pm is recorded as 13:45 and midnight is 00:00 of the new day.
Pull Time	Record 2400-h (military) Central Standard Time at which a net is pulled to the nearest minute. Examples: 1:45 pm is recorded as 13:45 and midnight is 00:00 of the new day.
Soak time (minutes)	Record the exact time in minutes that each gear was fished.
Minimum Water Depth	Record minimum water depth of the gear sampled to the nearest 0.1 m. Please indicate if measurement is in feet.
Maximum Water Depth	Record maximum water depth of the gear sampled to the nearest 0.1 m. Please indicate if measurement is in feet.
Velocity (m/sec)	Record water velocity to the nearest 0.1 m/s. Velocity should be measured at the mid-depth of the sampling gear and the corresponding water depth (m) should be indicated in the margin.
Comments:	Insert any additional comments regarding collection efforts.

MICRA *PADDLEFISH RESEARCH* STATE MO PROJECT NUMBER 1253

SAMPLING EFFORT DATA - EXAMPLE

Effort Number	Effort Code* _ _ _	Mesh Size (bar) _ _ . _ in	Panel Length _ _. _ ft	Panel Height _ _ . _ ft	Set Time _ _ : _ _	Pull Time _ _ : _ _	Soak Time (minutes)	Min. Water Depth _ _ . _ m	Max. Water Depth _ _ . _ m	Velocity m/sec _ _ . _
1	GMF	3.0	50.0	10.0	09:30	12:00	150	4.8	9.4	0.30
		4.0	50.0	10.0	09:30	12:00	150	4.8	9.4	0.30
2	GMF	4.0	100.0	10.0	09:40	12:35	175	3.0	6.2	0.21
3	EOO	(707 V, 6.5 amps, 4 millisecond pulse, 60					10.0	0.1	1.8	0.15
4	EOO						15.0	0.1	1.9	0.12
5	EOO						10.0	0.1	2.2	0.10
6	SOO	(used 8/0			13:34	15:50	136	0.0	9.4	
7	SOO				13:32	15:51	135	0.0	9.4	
8	SOO				13:48	15:50	122	0.0	9.4	
	*optional information which some states provide, not required for current									

*EFFORT CODE (X Y Z)

Effort Type: X	Mesh Type: Y	Set Type: Z
G-gillnet H-hobbled gillnet T-trammel net P-dipnet N-seine S-snagging (SOO) E-electrofishing (EOO) O-brood stock release (OOO) U-unknown	M - monofilament I - multifilament O - not applicable U - unknown	D - drift F - floating (surface) S - sinking (bottom) B - both (surface to bottom) M - mid-depth only O - not applicable U - unknown

MICRA *PADDLEFISH RESEARCH* STATE_____ PROJECT NUMBER_____

PADDLEFISH MEASUREMENT/TAGGING SHEET PAGE ___ OF ___

Sequential Tag Data: Agency Code_____ Data-1 Code_____ Data-2 Code_____

Fish Number	Effort Number	Bar Mesh (in)	Eye-Fork Length (mm)*	Weight (kg)	Sex M/F	P/C Codes **	Lamprey Attack Scars (#)	Lamprey Attack Wounds (#)	T A G		T A G	CWT Recapture Y/N	CWT Marked Y/N	Jawtag Recapture (tag #)	Jawtag Marked (tag #)	Released Y/N

* Body length is measured in mm from the beginning of the eye to the fork of the tail.

**P/C CODES: (enter all that apply)

no visible abnormalities	=0	injury	=3	other _____ =6
skeletal abnormality	=1	rostrum damaged/missing	=4	
tumors	=2	sampling gear injury	=5	

Paddlefish Measurement/Tagging Sheet

Field Name	Description and Instructions
State	Two letter postal state abbreviation
Project Number	Record the assigned project number from the corresponding *Paddlefish Collection Sheet*. The project number is the only way to relate the habitat and sampling effort data with the individual fish.
Page_of_	Page number of total number of paddlefish measurement/tagging data sheets.
Sequential Tag Data:	
Agency Code	Check CWT spool for Agency code. This is located on the spool label after the A. The Agency code will always be 25 for MICRA paddlefish.
Data-1 Code	Check CWT spool for the Data 1 code. This is located on the spool label after the D and before the /. The Data 1 codes for cooperating states are as follows: Iowa 1 — Minnesota 34 Indiana 4 — Nebraska 37 Louisiana 7 — South Dakota 40 Kentucky 10 — West Virginia 43 Missouri 13 — Wisconsin 46 Ohio 16 — Pennsylvania 49 Mississippi 19 — Alabama 52 Tennessee 22 — Montana 54 Arkansas 25 — Oklahoma 56 Illinois 28 — North Dakota 60 Kansas 31 — Texas 62
Data-2 Code	Check CWT spool for the Data 2 code. This is located on the spool label after the D(data 1 code)/.
Fish Number	All fish within a given project are sequentially numbered starting with #1.

Effort Number	Effort number in which paddlefish was collected. Effort number should relate to sampling effort data sheet. If paddlefish were not collected in a specific sampling effort, please record the effort number followed by “no fish”. All effort numbers from sampling effort Data sheet should be accounted for on paddlefish measurement/tagging Data sheet.
Bar Mesh (in)	Record the bar mesh size the paddlefish was collected in (e.g. 5.0" bar mesh). For trammel nets give the size of the large mesh (the mesh the fish pass through). All panels recorded on sampling effort data sheet should be accounted for on this sheet. If no paddlefish were collected in a specific mesh, please record the mesh followed by “no fish”.
Eye-Fork Length	Body length is measured from the beginning of the eye to the fork in the tail. Record length to the nearest millimeter. All paddlefish should be measured with a measuring tape.
Weight	Weight is measured to the nearest 0.1 kilograms. Please indicated if weight is in pounds/ounces.
Sex	If fish sex is known, use M (male) or F (female) to designate sex. If unknown leave field blank.
P/C Codes	Enter all that apply: 0 = no visible abnormalities 1 = skeletal abnormalities 2 = tumors 3 = injury 4 = rostrum damaged/missing 5 = sampling gear injury 6 = other - please note what other is. Note: fish that are collected by snagging and bear snagging wounds would be classified as #5 if the fish was uninjured prior to sampling. A fish with a PC code of 0 should have no other PC codes listed.
Lamprey Attack Scar	Carefully check each paddlefish for the presence of lamprey attack scars (abrasion scars and healed wounds). Record the number of individual scars caused by lamprey attacks.
Lamprey Attack Wound	Carefully check each paddlefish for the presence of lamprey attack wounds (not completely healed). Record the number of individual wounds caused by lamprey attacks.

TAG	Field should be covered with strip of silicone. Sample tag should be inserted in silicone prior to tagging individual fish.
TAG	Field should be covered with strip of silicone. Sample tag should be inserted in silicone after tagging individual fish.
CWT Recapture	Answer is Y(yes) or N(no). Carefully check each paddlefish for presence of a coded wire tag. Tissue containing tag should be removed and carefully place in small tag envelope. Do not try to remove the tag from the flesh. It is very important that the tag envelope is filled out completely.
CWT Marked	Answer is Y(yes) or N(no). If the fish is not tagged you must mark the fish prior to release. If the fish is a recapture you must mark the fish with an individually coded sequential tag prior to release.
Jawtag Recapture	Carefully check each paddlefish for presence of a jawtag. If fish is carrying a jawtag put 2-letter state agency code followed by the tag number in this box. (Use FW for agency code if tag is a Fish & Wildlife Service tag). If fish is not jawtagged leave this cell blank.
Jawtag Marked	If fish is marked with a jawtag put 2-letter state agency code followed by the tag number in this box. (Use FW for agency code if tag is a Fish & Wildlife Service tag). If fish is not jawtagged leave this cell blank.
Released	Answer is Y(yes) or N(no). Marked fish should be released with individually coded sequential tag.

MICRA *PADDLEFISH RESEARCH* STATE MO PROJECT NUMBER 1253

PADDLEFISH MEASUREMENT/TAGGING SHEET

Sequential Tag Data: Agency Code 25 Data-1 Code 13 Data-2 Code

Fish Number	Effort Number	Bar Mesh (in)	Eye-Fork Length (mm)*	Weight (kg)	Sex M/F	P/C Codes **	Lamprey Abrasion Scars (#)	Lamprey Puncture Scars (#)	T A G		T A G	CWT Recapture Y/N	CWT Marked Y/N	Jawtag Recapture (tag #)	Jawtag Marked (tag #)	Released Y/N
1	1	3.0	871	7.7	F	0						Y	Y	N	N	Y
2	1	4.0	685	5.4	F	0						N	Y	N	N	Y
no fish	2	4.0														
3	3		718	5.9	M	1						N	Y	FW 1234	N	Y
4	4		736	6.3	M	0						N	Y	N	N	Y
5	4		718	5.2	M	0						N	Y	N	N	Y
no fish	5															
no fish	6															
6	7		682	4.6		5, 3						N	Y	N	N	Y
7	7		770	6.7	F	5						N	Y	N	N	Y

* Body length is measured in mm from the beginning of the eye to the fork of the tail.

**P/C CODES: (enter all that apply)
no visible abnormalities =0
skeletal abnormality =1
tumors =2
injury =3
rostrum damaged/missing =4
sampling gear injury =5
other _____ =6

MICRA *PADDLEFISH RESEARCH* STATE____

PADDLEFISH STOCK IDENTIFICATION FORM

TAGGING DATA Tagging Date: _____

Hatchery: Name _____ Location _____

Brood Source: River _____ Pool/Reservoir _____ River mile _____

Site Name _____

Tagging Crew: _____ Supervisor: _____

Size (mm) at Tagging: mean _____ range _____-_____ Fish Age: _____ months / weeks

Coded Wire Tag Data: Agency_____ Data 1 _____ Data 2 _____

Attach reference tag here immediately before and after tagging batch: Start____ End____
(IMPORTANT: USE A NEW SHEET WITH EACH BATCH OF PADDLEFISH TAGGED)

	Tagging Machines	Hand-held Taggers	Total
Number in Operation			----------
Number of Fish Tagged			
Processing Time (hrs:min)			
Percent of Fish Missing Rostrums			
Mortality (at completion of tagging)			

RELEASE DATA Release Date: _____

Number of Fish Released: _____ Size (mm) at Release: mean _____ range _____-_____

Release Site: River _____ Pool/Reservoir _____ River mile _____

Site Name _____

Release Coordinates: N/S Coordinates _____ E/W Coordinates _____ UTM Zone _____
Method (circle one) 1=UTM (map) 2=UTM (GPS) 3=L/L (GPS) 4=L/L (map)
Map Datum (circle one) 1=NAD 83 or GRS 80 2=NAD 27 or CLARK 1866

FINAL RETENTION SAMPLING

Date: mm dd yy	Retention Time (days)	Number of Fish	Number with Tags	Retention %	Mortality %
initial: ___ ___ ___			----------	----------	----------
intermediate: ___ ___ ___					
final: ___ ___ ___					

Comments:

Paddlefish Stock ID Form

Field Name	Description and Instructions
State	Two letter postal state abbreviation
Tagging Date	Date hatchery paddlefish were stocked. Record in mmddyy format (e.g. July 10, 1998 is recorded as 071098).
Tagging Data	
Hatchery:	
Name	Name of hatchery stocking the paddlefish.
Location	Location of hatchery stocking the paddlefish.
Brood Source:	
River	Name of river from which paddlefish broodstock were removed.
Pool/Reservoir	Name of impoundment/pool/reservoir from which paddlefish broodstock were removed. i.e. Lewis & Clark Lake or Pool 24.
River mile	Record river mile of broodstock collection location to nearest tenth, i.e. 102.3. If you use river kilometer please indicate by crossing out mile and writing in kilometer.
Site Name	Name of site where paddlefish broodstock were acquired. Name should be one commonly used by biologists/COE/river maps/etc.
Tagging Crew	Names of tagging crew.
Supervisor	Name of tagging supervisor.
Size at Tagging	Measure a subsample of fish tagged in millimeters. Provide the range of fish lengths and the mean length.
Fish Age	Enter the age of the fish at time of tagging. Please indicate whether the time increment is in months or weeks.
Coded Wire Tag Data:	
Agency	Check CWT spool for Agency code. This is located on the spool label after the A. The Agency code will always be 25 for MICRA paddlefish.

Data 1	Check CWT spool for the Data 1 code. This is located on the spool label after the D and before the /. The Data 1 codes for cooperating states are as follows: Iowa 1 Minnesota 34 Indiana 4 Nebraska 37 Louisiana 7 South Dakota 40 Kentucky 10 West Virginia 43 Missouri 13 Wisconsin 46 Ohio 16 Pennsylvania 49 Mississippi 19 Alabama 52 Tennessee 22 Montana 54 Arkansas 25 Oklahoma 56 Illinois 28 North Dakota 60 Kansas 31 Texas 62
Data 2	Check Coded Wire Tag spool for the Data 2 code. This is located on the spool label after the D(data 1 code)/.
Start	Attach 1 inch piece of Coded Wire Tag prior to tagging fish. This will provide the beginning number for the range of codes used in the hatchery fish.
End	Attach 1 inch piece of Coded Wire Tag after tagging fish. This will provide the end number for the range of codes used in the hatchery fish.
Number in Operation	Enter the number of tagging machines and hand-held taggers used to tag the batch of fish.
Number of Fish Tagged	Enter the number of fish tagged by tagging machines and hand-held taggers. Enter the total fish tagged in the last column.
Processing Time	Enter the time it took to tag the batch of fish in hours and minutes for both tagging machines and hand-held taggers. Enter the total processing time in the last column.
Percent of Fish Missing Rostrums	Enter the percentage of fish missing rostrums encountered by both tagging machines and hand-held taggers. Enter the total percentage of fish missing rostrums in the last column.
Mortality (at completion of tagging)	Enter the number of fish which died during tagging with both tagging machines and hand-held taggers. Enter the total number of dead fish in the last column.
RELEASE DATA	

Release Date	Date coded-wire tagged hatchery paddlefish were released. Record in mmddyy format (e.g. July 10, 1998 is recorded as 071098).
Number of Fish Released	Enter number of fish released. All fish released should be marked with coded wire tags.
Size at Release	Measure a subsample of fish released in millimeters. Provide the range of fish lengths and the mean length.
Release Site:	
River	Name of river in which paddlefish were stocked.
Pool/Reservoir	Name of impoundment/pool/reservoir in which paddlefish were stocked. i.e. Lewis & Clark Lake or Pool 24.
River mile	Record river mile of stocking location to nearest tenth, i.e. 102.3. If you use river kilometer please indicate by crossing out mile and writing in kilometer.
Site Name	Name of site where young paddlefish were stocked. Name should be one commonly used by biologists/COE/river maps/etc.
2. Location/Map Coordinates - Release Location	
N/S Coordinates	Record latitudinal (north/south) coordinates of the release location. Units are specific to the location method; UTM Northing or degrees-minutes-seconds north latitude. For fixed release sites, this value should be measured using a GPS unit at least once when each site is marked and recorded.
E/W Coordinates	Record longitudinal (east/west) coordinates of the release location. Units are specific to the location method; UTM Easting or degrees-minutes-seconds west longitude. For fixed release sites, this value should be measured using a GPS unit at least once when each site is marked and recorded.
Method	Specify the method used to acquire location data. Please circle one: 1 = UTMs reached from cross-reference between base map and site features. 2 = UTMs recorded from GPS device 3 = Latitude and longitude recorded from GPS 4 = Latitude and longitude recorded from cross-reference between base map and site features. Option #2 is the preferred method. Please program your GPS unit to record in UTMs if possible.

Map Datum	The map datum is the cartographic approximation of the spherocity of the globe. You should be able to locate the map datum your GPS unit is using in its setup menu. Enter one of the map datum options provided: 1 = NAD 83 or GRS 80 2 = NAD 27 or CLARK 1866 Option #1 is the preferred map datum. Please program your GPS unit to use this map datum if possible.
UTM Zone	Record the two-digit Global Positioning System (GPS) zone of the coordinate location. You should be able to locate your UTM Zone on your GPS unit. In the Mississippi River Basin, the zone will be a whole number between 13 and 17. For example, most of MN, IA, MO, AR, and LA fall within Zone 15 (Figure A1).
Final Retention Sampling	
Date:	Enter the date in six-digit month-date-year (mm dd yy) format for the initial date, intermediate retention test date, and final retention test date.
Retention Time (days)	Indicate the number of days fish have retained tags between the tagging date and the initial, intermediate, and final retention test dates.
Number of Fish	Indicate the number of fish in the retention subsample at the initial, intermediate, and final retention test dates.
Number with Tags	Indicate the number of fish in the retention subsample which have tags at the intermediate and final retention test dates.

Retention %	Indicate the percentage of fish in the retention subsample which have retained their coded wire tags at the intermediate retention test date and the final retention test date.
Mortality %	Indicate the percentage of fish in the retention subsample which have died at the intermediate retention test date and the final retention test date.
Comments:	Insert any additional comments regarding hatchery tagging.

MICRA *PADDLEFISH RESEARCH* STATE MO

PADDLEFISH STOCK IDENTIFICATION FORM - EXAMPLE

TAGGING DATA Tagging Date: 08/15/98

Hatchery: Name Blind Pony Location Sweet Springs, MO

Brood Source: River Mississippi River Pool/Reservoir _____ River mile 145.5

Site Name Chester

Tagging Crew: DeiSanti, Milligan, Finley Supervisor: Kim Graham

Size (mm) at Tagging: mean 177.8 range 163.0 - 190.3 Fish Age: 4.5 (months)/ weeks

Coded Wire Tag Data: Agency 25 Data 1 13 Data 2 _____

Attach reference tag here immediately before and after tagging batch: Start____ End____
(IMPORTANT: USE A NEW SHEET WITH EACH BATCH OF PADDLEFISH TAGGED)

	Tagging Machines	Hand-held Taggers	Total
Number in Operation	1	1	----------
Number of Fish Tagged	3510	3490	7000
Processing Time (hrs:min)	2:56	3:00	5:56
Percent of Fish Missing Rostrums	0	0	0
Mortality (at completion of tagging)	2	3	5

RELEASE DATA Release Date: 08/25/98

Number of Fish Released: 6987 Size (mm) at Release: mean 180.2 range 167.0 - 198.2

Release Site: River Missouri River Pool/Reservoir _____ River mile 97.9

Site Name Hermann, MO

Release Coordinates: N/S Coordinates 4310300N E/W Coordinates 0510922E UTM Zone 15

Method (circle one) 1=UTM (map) [2=UTM (GPS)] 3=L/L (GPS) 4=L/L (map)

Map Datum (circle one) [1=NAD 83 or GRS 80] 2=NAD 27 or CLARK 1866

FINAL RETENTION SAMPLING

Date: mm dd yy	Retention Time (days)	Number of Fish	Number with Tags	Retention %	Mortality %
initial: 08 15 98	0	6995	----------	----------	----------
intermediate: 08 20 98	5	600	600	100%	0%
final: 08 25 98	10	599	598	99%	0.1%

Comments:

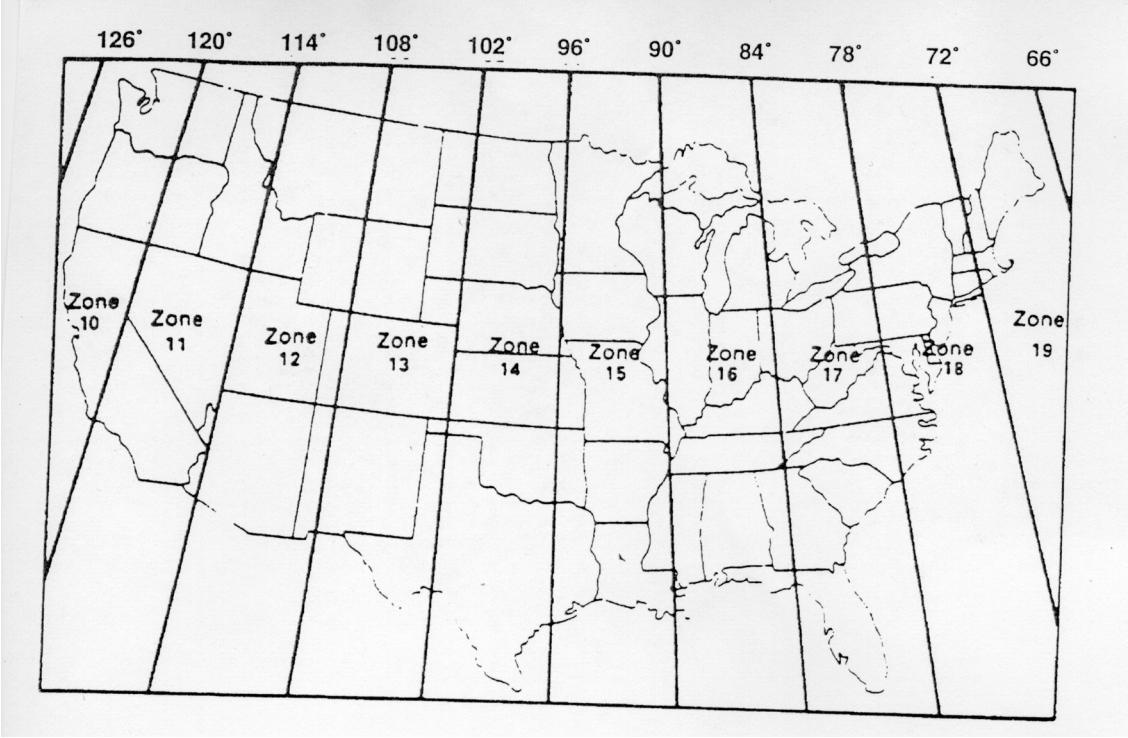

Figure B1. UTM Zones of the United States.

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