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Evaluation of Deep Water Trap Nets as Commercial Gear in Pool 4A (Lake Pepin), Mississippi River

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ABSTRACT

Three deep water trap nets were fished in Lake Pepin during the winters of 1975 and 1976. The nets accounted for 12,405 pounds of commercial fish for 1975 and 3,508 pounds in 1976. Freshwater drum dominated the commercial catch during both years. Fishing the trap nets was not a profitable operation. During 1975, the best year, \$1,107.57 was made from the sale of commercial fish. This barely covered operating costs. The length of time between lifts and crowding of fish in the net had no effect on mortality during either year. Sport fish accounted for a significant portion of the total catch although mortality was low and limited primarily to white bass and black crappie. Gilling rate was 0.35 fish per net day in 1975 and 0.47 in 1976. Fat and moisture content analysis of drum samples showed that Lake Pepin drum contained significantly lower levels of fat and significantly higher percent of moisture than did the Pool 8 drum.

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INTRODUCTION

Pool 4A of the Mississippi River is a lake, 21 miles long and 25,000 acres, formed by the delta of the Chippewa River (Skrypek, 1965). Prior to 1975, a 1.0 to 2.5 million pound annual commercial fishery included 55,000 to 300,000 pounds of freshwater drum valued at \$4,000 to \$21,000 (Nord, 1967; Fernholz and Crawley, 1975). In 1975, the interstate sale of carp from Lake Pepin was prevented by the Food and Drug Administration (FDA) because these fish contained polychlorinated biphenyls (PCB) levels exceeding the FDA tolerance level of 5 ppm (Kleinert, 1976). As a result, commercial fishing in Lake Pepin has decreased sharply.

Deep water trap nets, an effective gear for taking a variety of fish in lake environments, were fished in Pool 4A in the early 1900's. They were, however, discontinued due to complaints of sport fish losses. Under current regulations, seines are the only effective commercial gear for taking drum, with 2 to 12 pounds per acre harvested annually. Commercial fishermen expressed an interest in fishing the deep water trap nets during the winter months. Once the nets are set under the ice, less manpower is required to lift them than to conduct traditional seine hauls.

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In general, drum taken from the Mississippi River above Trempealeau, including Lake Pepin, possess firmer flesh than drum below Trempealeau. This phenomenon of firm flesh or "hard meat" is important to commercial fishermen because drum classified as having "hard meat" bring a lower market price than drum with "soft meat". This difference in flesh is thought to be related to fat content.

Consequently, the objectives of this study were to determine: (1) if deep water trap nets would be an effective addition to commercial fishing in Pool 4A (Lake Pepin) for harvesting freshwater drum, (2) their compatibility with other uses of the area, particularly sport fishing, and (3) the factors determining "hard" and "soft" meat in freshwater drum.

METHODS

Net construction and fishing were completed by a commercial operator under contract with the Wisconsin Department of Natural Resources. Department personnel closely monitored catches and recorded data. Fishing was conducted during the winters of 1974-75 and 1975-76. The three nets were set under the ice and off shallow bars leading into water 30 to 38 feet deep (Figure 1). The length of set was varied to determine the time period required for efficient commercial operation and the influence of set duration on mortality. Nets of different mesh sizes (3½- and 5-inch, stretch) were fished to determine how catch efficiency and gilling problems were influenced by mesh size.

During the winter of 1975-76, one of the 15-foot deep leads was replaced with one 25 feet deep. This was done to prevent the movement of fish over the lead. The length of the lead remained at 350 feet. The components and dimensions of a trap net are illustrated in Figure 2. Interviews and visual observations were conducted on the lake to determine if trap net fishing is compatible with other winter activities. These activities included gill net fishing, sport fishing, and snowmobiling. Samples of the drum catch from Lake Pepin and downstream areas (Pool 8) were analyzed for fat content, moisture content, and growth rate to determine if measurable differences exist between the "hard meat" and "soft meat" fish.

RESULTS AND DISCUSSION

Fishing Effort

The first season of deep water trap netting in Lake Pepin was initiated on December 23, 1974, and terminated on March 31, 1975. Two nets were fished for approximately 3 months and one net for 2 months, or a total of 246 net days. The nets were lifted 36 times at approximately 1 week intervals. Netting operations in 1976 were initiated on December 23, 1975, and terminated on February 24, 1976. All nets were fished approximately 2 months or 179 net days. The nets were lifted 25 times at weekly intervals.

Commercial Catch

Although the trap net capacity is estimated at 12,000 pounds, the daily catch per net only ranged from 5 to 623 pounds of saleable fish for each year. Total catch for both winters was 12,405 pounds for 1975 and 3,508 pounds for 1976 (Table 1). This was much lower than expected by the commercial operator. During 1975, drum accounted for 82.9 percent of the commercial catch. Saleable channel catfish followed with 8.5 percent. Drum also led the catch in 1976 with 30.6 percent. Buffalo and catfish followed closely with 29.4 and 26.1 percent respectively.

The commercial catch of 12,405 pounds for 1975 was 3.5 times higher than the 3,508 pounds harvested in 1976. However, the fishing effort was 67 net days greater in 1975 than in 1976. In addition, an unusually large catch of drum was taken during the first 3 lifts of January, 1975 (Table 1). The average catch of drum during that period was 231 pounds per net day. The average catch for the remaining winter dropped to 11 pounds of drum per net day. Six pounds of drum were harvested per net day during 1976. The reason for the higher drum catch during December 30, 1974, through January 15, 1975, was not determined.

As mentioned previously, 3½-inch mesh and 5-inch mesh trap nets were used to determine how catch efficiency and gilling problems were influenced by mesh size. However, due to the methods by which the nets were fished, it was not possible to determine if the catch efficiency for commercial fish varied between the 3½-inch and 5-inch mesh nets. The 3 nets were set at different locations in Lake Pepin (Figure 1). Natural variations in the numbers and species of commercial fish caught between net locations would occur. These natural variations prevented the determination of catch efficiencies for the two mesh sizes.

The length of time between lifts varied from 2 to 10 days in 1975 and from 2 to 9 days in 1976. No significant mortalities were observed for either sport or commercial fish due to the length of set. Mortality due to crowding was not a problem during either year. The capacity of each trap net is 12,000 pounds of fish. The maximum daily catch per net of commercial fish was only 623 pounds, taken on January 2, 1975.

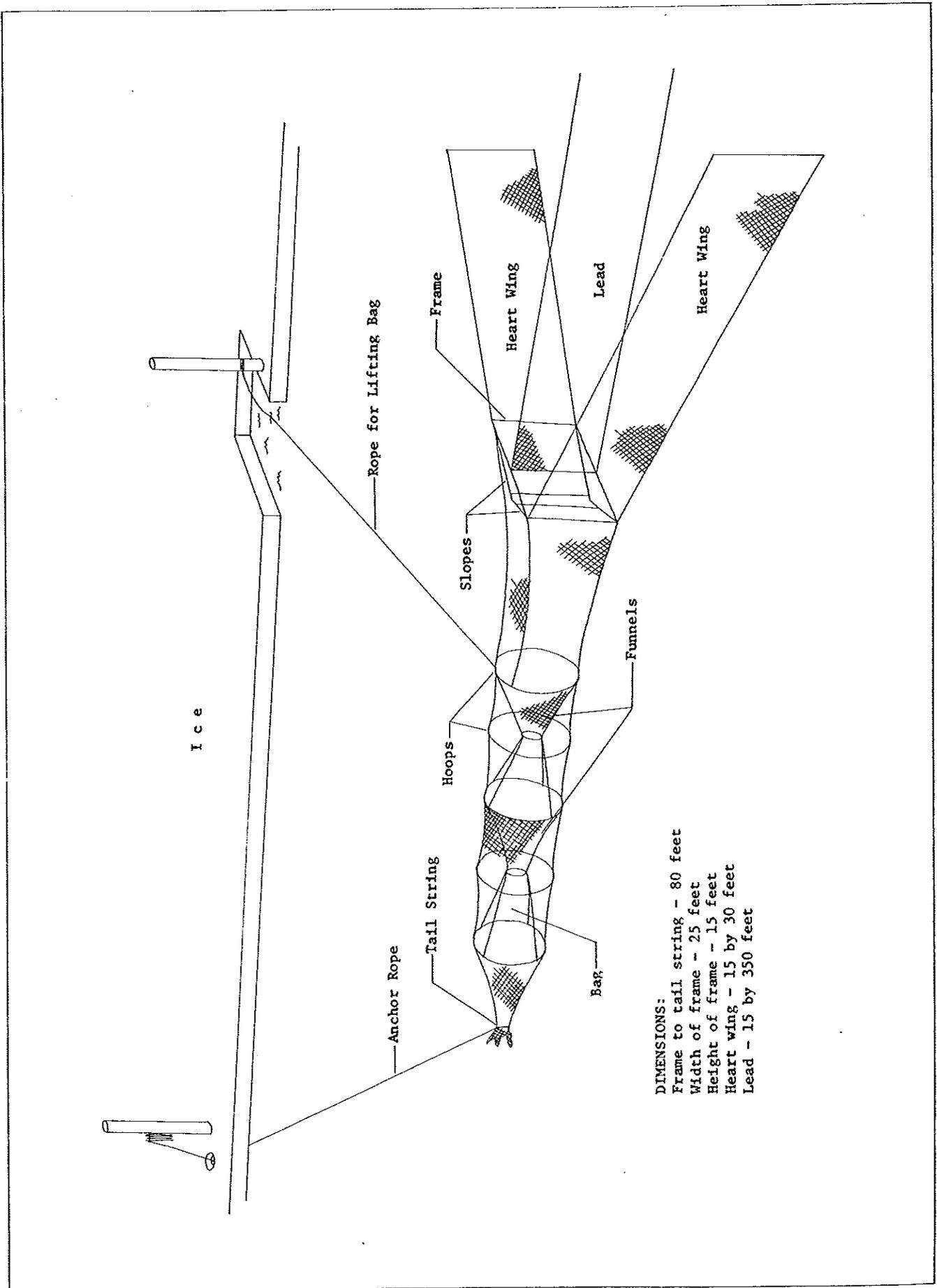


Figure 1. Diagram of a deep water trap net.

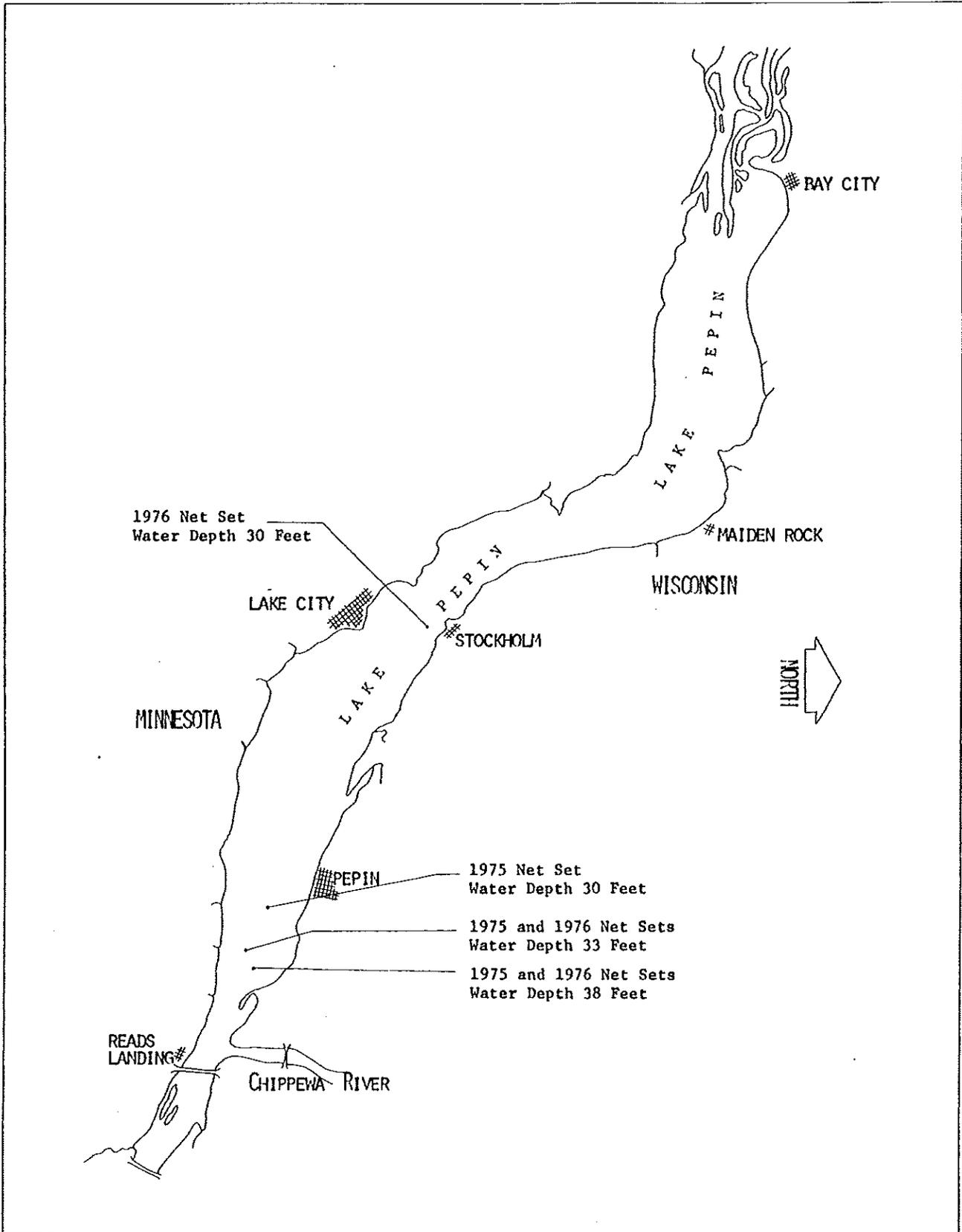


Figure 2. Locations and water depths of the 1975-76 deep water trap net sets.

Economic Value

In addition to dominating the commercial catch during 1975, drum also contributed the greatest economic returns. Of the \$1,107.57 made by the sale of the 1975 commercial catch (Table 1), 55.7 percent resulted from the drum catch. Catfish contributed 33.3 percent of the cash value. Drum again outnumbered other commercial species harvested during 1976. However, catfish contributed the greatest cash value (Table 1). Of the \$704.87 received from the sale of fish, 51.9 percent came from the sale of catfish and 34.0 percent from buffalo. Drum contributed only 10.7 percent. The difference in cash values contributed by catfish, buffalo, and drum is due to the value per pound. The market value of catfish and buffalo ranged from \$.35 to \$.40 per pound and \$.08 to \$.25 per pound respectively during the 2 years. The value of drum ranged from \$.06 to \$.07 per pound (Table 1).

Table 1. Pounds and value of commercial fish taken in deep water trap nets, Lake Pepin, 1975-1976.

Date	Species Captured										Total
	Medium Carp	Jumbo Buffalo	No. 1 Buffalo	Medium Buffalo	Catfish	Drum	Sucker	Carp-Sucker	Mooneye	Redhorse	
<u>1975</u>											
12/26	3	-	17	-	1	352	29	-	5	6	413
12/30	-	50	11	-	3	362	22	-	18	-	466
1/2	-	63	4	5	9	3,640	15	-	1	-	3,737
1/7	-	-	23	-	40	2,900	38	-	11	16	3,028
1/15	-	48	11	5	27	1,300	15	-	18	4	1,428
1/21	-	33	7	-	58	383	14	-	11	5	511
1/30	-	15	43	-	60	110	-	-	30	2	260
2/3	-	6	-	-	39	63	6	-	7	-	121
2/10	-	-	31	-	114	81	14	3	-	21	264
2/18	-	12	13	-	50	56	-	-	-	27	158
2/27	-	13	13	-	39	80	-	-	-	13	158
3/3	-	-	4	2	120	93	-	-	-	-	219
3/13	-	-	6	-	149	135	-	-	6	3	299
3/18	-	-	12	2	122	134	16	-	7	4	297
3/26	-	-	3	2	36	213	-	-	13	8	275
3/28	-	28	3	-	44	235	-	-	-	-	310
3/31	-	-	33	-	142	147	19	-	-	120	461
Total Pounds	3	268	234	16	1,053	10,284	188	3	127	229	12,405
Value per Pound	.06	.20	.18	.08	.35	.06	.03	.03	.06	.05	
Total Value	0.18	53.60	42.12	1.28	368.55	617.04	5.64	0.09	7.62	11.45	1,107.57
<u>1976</u>											
12/30	18	66	88	-	12	136	5	-	-	9	334
1/6	47	100	183	4	36	175	79	8	-	45	677
1/13	32	91	121	8	58	92	52	7	-	16	477
1/19	-	8	23	-	22	75	6	-	-	4	138
1/28	-	53	23	-	115	95	-	-	-	-	286
2/3	-	10	42	-	97	47	25	-	-	10	231
2/10	-	15	27	4	123	72	19	-	-	-	260
2/17	5	-	36	10	158	140	19	-	-	-	368
2/24	2	24	35	15	150	137	62	-	-	-	425
2/26	-	27	10	10	143	105	17	-	-	-	312
Total Pounds	104	394	588	51	914	1,074	284	15	-	84	3,508
Value per Pound	.06	.25	.23	.12	.40	.07	.04	.05	-	.07	
Total Value	6.24	98.5	135.24	6.12	365.60	75.18	11.36	.75	-	5.88	704.87

Fishing the trap nets during the 2 winters was not a profitable operation. An investment of \$4,160 was required to purchase materials to build 4 nets. Labor costs for constructing the nets was approximately \$1,000. Another \$1,000 per year was needed for operating costs, such as transporting, setting, and running the nets. Therefore, the returns from the first season of trap net fishing did little more than cover operating costs (Table 1).

Sport Fish Catch and Mortality

A total of 2,855 noncommercial or sport fish were captured during the first season and 2,223 during the final year (Table 2). In 1975, noncommercial channel catfish (those under 20 inches in length) made up 55.6 percent of the sport fish catch. The catch dropped to 33.0 percent in 1976. White bass contributed 30.0 percent to the catch in 1975, but dropped to 10.6 percent in 1976. A reverse trend was noted for black crappies and walleyes. The catch of black crappies increased from 8.2 percent in 1975 to 30.7 percent in 1976. The walleye catch increased from 4.9 percent in 1975 to 22.9 percent in 1976. Reasons for fluctuations in catch per species for the two years were not determined. Differences in net locations between the two years may be a major factor.

Table 2. Number of noncommercial fish caught and killed in pots of deep water trap nets, 1975-76.

Fish Species	1975		1976	
	Caught	Killed	Caught	Killed
Channel Catfish	1,587*	0	734*	0
Walleye	140	0	510	1
Sauger	26	0	29	0
Northern Pike	6	0	26	0
White Bass	857	159+	231	11+
Black Crappie	234	9+	682	35+
White Crappie	2	0	8	0
Yellow Bullhead	1	0	0	0
Yellow Perch	1	0	0	0
Rock Sturgeon	1	0	0	0
Shovelnose Sturgeon	0	0	1	0
Paddlefish	0	0	1	0
Smallmouth Bass	0	0	1	0
Total	2,855	168	2,223	47

*Channel catfish under 20 inches are considered sport fish.

+Mortality due to extended air bladders.

During field operations, the sport fish catch was recorded in numbers of fish caught, while the commercial fish catch was recorded in pounds sold. To calculate the percentage of sport fish in the total catch, the sport fish catch was converted to pounds (Table 5). The average weights used in the calculations were taken from sport fish captured and weighed from Pool 4 (Fleener, 1975). In 1975, 3,434.13 pounds of sport fish were captured in the trap nets, including 95.77 pounds of fish gilled in the mesh. Sport fish contributed 21.7 percent of the total catch, by weight. During 1976, the total weight of sport fish captured, including 141.07 pounds of gilled fish, decreased to 2,754.39 pounds. However, the percent of sport fish, by weight, making up the total catch rose to 43.9 percent. This percentage increase was due to the low 1976 commercial catch (3,508 pounds). In 1975, 12,405 pounds of commercial fish were captured.

Mortality sustained by sport fish caught in the pools was limited primarily to white bass and black crappies (Table 2). These species died from extended air bladders, a condition resulting from pressure changes as the fish were raised from 30 feet of water. The mortality for 1975 was 168 fish. This included 159 white bass and 9 black crappies. The following year 47 fish died, including 11 white bass, 35 black crappies, and 1 walleye. The mortality of white bass was reduced significantly in 1976 by releasing the fish immediately from the net, rather than holding them for length determination.

Total gilling of noncommercial fish in the leads, hearts, and slopes of trap nets for both years was nearly identical, 86 in 1975 and 85 in 1976 (Tables 3 and 4). However, based on net days, gilling was higher during 1976. During 1975, 0.35 fish per net day were gilled as compared with 0.47 fish per net day for 1976. White bass and sauger were most frequently gilled in 1975 (Table 3). Northern

pike and sauger were gilled most often in 1976 (Table 4). Forty-six percent of the gilled fish in 1975 were either dead or visibly injured. In 1976, gilling mortality increased to 61 percent. This increase was due to the greater mortality of gilled northern pike and sauger, a total of 71 percent.

The gilling potential of 3½-inch mesh and 5-inch mesh nets for sport fish varied among species. The data given in Table 6 reflect the number of fish gilled per net day for each mesh size during 1975 and 1976. The data for the two 5-inch mesh nets were averaged and compared with the data from the 3½-inch mesh net. For walleye, sauger, northern pike, and channel catfish, gilling during both years was greater for the 5-inch mesh (average value). However, during the two years, more black crappies were gilled per net day by the 3½-inch mesh. The gilling of white bass could not be correlated directly to mesh size. In 1975, gilling was greater in the 3½-inch mesh net. In 1976, gilling was greater in the 5-inch mesh nets.

It is evident from the gilling data that both mesh sizes, 3½- and 5-inch, will gill sport fish. However, the data also suggest that the larger sport fish or game fish are more susceptible to gilling by the 5-inch mesh trap nets, while greater numbers of panfish are likely to be gilled in 3½-inch mesh nets. Selecting the proper mesh size for trap nets when setting in areas suspected to be inhabited by either game fish or panfish could reduce the numbers of sport fish killed or injured by gilling.

The number of fish gilled in the 25-foot deep lead did not differ greatly from that gilled in the 15-foot lead. Most fish, particularly sauger, were gilled along the lead line.

Compatibility of Use

No conflicts were observed between the use of trap nets and gill nets. Some commercial fishermen set gill nets perpendicular to the shallow ends of the trap net leads to take advantage of fish movement along the lead into shallow water. This was done frequently when trap nets were fished in the early 1900's.

In 1976, a trap net was set close to shore, southwest of Stockholm, Wisconsin. This is a successful seining area for drum during early spring and should have yielded sizeable catches of drum with the trap net. However, this area also receives heavy snowmobile traffic. Mr. Hogue, the commercial operator, suggested that drum were avoiding the area due to the disturbance from snowmobiles. The large holes required to lift and remove trap nets are a potential danger to snowmobilers.

Very little sport fishing occurs through the ice on the Wisconsin side of Lake Pepin, consequently no conflicts between trap net use and sport fishing were evident. A problem could occur if trap nets were used on the Minnesota side of Lake Pepin. Sport fishing is popular in the Lake City area.

Hard and Soft Meat Analysis

Whole fish samples of drum were sent to the Nevin Laboratory for moisture content and total glyceride or fat content analysis. The fat content of drum from Lake Pepin was 3.6 percent (Table 7). In Pool 8, the fat content was 11.5 percent or 3.2 times greater than in the Lake Pepin sample. This difference was determined to be significantly different by the t test at the .99 probability level (Steel and Torrie, 1960).

An opposite relationship is observed when comparing the moisture content data (Table 5). The Lake Pepin fish contained more moisture, 76.0 percent, than did the Pool 8 drum, 67.6 percent. Again, this difference was significant as determined by the t test at the .99 probability level.

Scales were taken from drum caught during February and March of the 1976 trap netting season. Scale impressions were made on cellulose acetate slides. The annuli were read on an Eberbach scale projector. Scales from drum captured in Pool 8 were taken, pressed and read by Kerry J. Brimmer, a student at the University of Wisconsin-La Crosse. Those scales were collected during June, July, and August 1975. Comparing the average length of drum for corresponding year classes from Lake Pepin and Pool 8 was not possible. This was due to the different times that scales were collected, February and March for Lake Pepin drum, and June, July, and August for Pool 8 drum. This problem was eliminated by using a nomograph to back-calculate the length for each year of growth (Carlander and Smith, 1944). To determine the starting point of the nomograph, the relationship of total length to scale length was fitted to a linear regression (Calhoun, 1966). The effect of "Rosa Lee's phenomenon" was minimized by back-calculating the total length only for the last annulus formed on each scale. "Rosa Lee's phenomenon" is a smaller calculated size for fish of younger year classes, when back calculating scales of older fish, than the true average length at the age in question (Ricker, 1975).

Table 8 presents the average calculated length of drum for age groups I through IV for both Lake Pepin and Pool 8. Older drum were taken but the number of fish collected was not sufficient to represent drum populations from the two locations. For the 4 age groups, Lake Pepin drum were smaller in length per age group than those from Pool 8. However, this difference was significant only for the first 2 age groups. Significance was determined by the t test at the .99 probability level.

One of the objectives of this study was to investigate factors causing "hard meat" in Lake Pepin drum. These factors were fat content, moisture content and growth rate. All the factors showed significant differences between the drum populations of Lake Pepin and Pool 8. However, it could not be determined just how these factors were related to the "hard meat" phenomenon. In fact, the study does suggest that "hard meat" is itself a factor resulting from an unidentified cause, such as food organisms specific to Lake Pepin. The "hard meat" factor receives greater attention because of its economic significance.

Hopefully, future studies oriented towards the feeding habits of Lake Pepin drum will determine the specific causes of "hard meat".

Table 3. Sport fish gilled in the leads, hearts, and slopes of deep water trap nets, 1975. Length of set was 96 net days for net #1, 88 net days for net #2, and 62 net days for net #3.

Species	Net #1 (5-inch mesh)			Net #2 (5-inch mesh)			Net #3 (3½-inch mesh)			Total (all nets)		
	Good Condition	Injured	Dead	Good Condition	Injured	Dead	Good Condition	Injured	Dead	Good Condition	Injured	Dead
Walleye	1	0	3	0	0	1	0	0	0	1	0	4
Sauger	12	2	5	0	0	1	0	1	3	12	3	9
Northern Pike	1	0	5	0	0	2	0	0	0	1	0	7
White Bass	3	0	2	0	0	7	11	1	3	14	1	12
Black Crappie	4	0	2	2	0	2	7	0	1	13	0	5
Channel Catfish	0	0	1	1	0	1	0	0	0	1	0	2
Yellow Perch	0	0	0	0	0	0	0	0	1	0	0	1
Total (all species)	21	2	18	3	0	14	18	2	8	42	4	40

Table 4. Sport fish gilled in the leads, hearts, and slopes of deep water trap nets, 1976. Length of set was 65 net days for net #1, 61 net days for net #2, and 53 net days for net #3.

Species	Net #1 (5-inch mesh)			Net #2 (3½-inch mesh)			Net #3 (5-inch mesh)			Total (all nets)		
	Good Condition	Injured	Dead	Good Condition	Injured	Dead	Good Condition	Injured	Dead	Good Condition	Injured	Dead
Walleye	1	0	0	1	0	0	3	0	3	5	0	3
Sauger	6	0	9	0	0	5	4	0	3	10	0	17
Northern Pike	1	0	5	0	0	1	5	0	17	6	0	23
White Bass	1	0	2	0	0	1	3	0	1	4	0	4
Black Crappie	1	0	0	0	0	4	1	0	1	2	0	5
Channel Catfish	3	0	0	2	0	0	1	0	0	6	0	0
Total (all species)	13	0	16	3	0	11	17	0	25	33	0	52

Table 5. Pounds of sport fish caught and gilled in trap nets during 1975 and 1976. Numbers in parenthesis indicate number of fish actually weighed.

Species	Number of fish caught	Number of fish gilled	Average weight of fish (lbs.)*	Estimated Pounds of fish caught	Estimated Pounds of fish gilled
<u>1975</u>					
Walleye	140	5	1.59 (36)	222.60	7.95
Sauger	26	24	0.85 (139)	22.10	20.40
Northern Pike	6	8	2.93 (7)	17.58	23.44
White Bass	1,016	27	0.97 (104)	985.52	26.19
Black Crappie	245	18	0.79 (16)	193.55	14.22
White Crappie	2	0	0.79 (16)	1.58	0
Yellow Perch	1	0	0.35 (Estimated)	0.35	0
Channel Catfish	1,587	3	1.19 (18)	1,888.53	3.57
Yellow Bullhead	1	0	0.50 (Estimated)	0.50	0
Rock Sturgeon	1	0	6.00 (Estimated)	6.00	0
Total				3,338.31	95.77
<u>1976</u>					
Walleye	511	8	1.59 (36)	812.49	12.72
Sauger	29	27	0.85 (139)	24.65	22.95
Northern Pike	26	29	2.93 (7)	76.18	84.97
White Bass	242	8	0.97 (104)	234.74	7.76
Black Crappie	725	7	0.79 (16)	572.75	5.53
White Crappie	8	0	0.79 (16)	6.32	0
Channel Catfish	734	6	1.19 (18)	873.46	7.14
Shovelnose Sturgeon	1	0	2.50 (Estimated)	2.50	0
Paddlefish	1	0	9.50 (Estimated)	9.50	0
Smallmouth Bass	1	0	0.73 (3)	0.73	0
Total				2,613.32	141.07

*Average weight of sport fish in Pool 4 of the Mississippi River in 1972-1973. Pool 4 extends from about 5 miles above Red Wing, Minnesota, downstream to Alma, Wisconsin. Lake Pepin is included in Pool 4 (Fleener, 1975).

Table 6. Number of sport fish gilled per net day in the 3½- and the two 5-inch mesh trap nets during 1975 and 1976.

Species	5-inch mesh net	5-inch mesh net	Average for 5-inch mesh net	3½-inch mesh net
<u>1975</u>				
Walleye	.042	.011	.027	0
Sauger	.198	.011	.109	.065
Northern Pike	.062	.023	.043	0
White Bass	.052	.080	.065	.242
Black Crappie	.062	.045	.054	.129
Channel Catfish	.010	.023	.016	0
Yellow Perch	0	0	0	.016
<u>1976</u>				
Walleye	.015	.113	.059	.016
Sauger	.231	.132	.186	.082
Northern Pike	.092	.415	.237	.016
White Bass	.046	.075	.059	.016
Black Crappie	.015	.038	.025	.066
Channel Catfish	.046	.019	.034	.033

Table 7. Comparison of total length, wet weight, percent fat and percent moisture of drum from Lake Pepin and Pool 8.*

Lake Pepin				Pool 8			
Size (inches)	Wet Weight (pounds)	Percent Fat	Percent Moisture	Size (inches)	Wet Weight (pounds)	Percent Fat	Percent Moisture
19.0	3.4	1.1	76.6	33.0	14.2	17.2	61.8
17.0	2.5	4.0	76.8	25.5	9.5	14.3	65.4
17.0	2.7	3.6	75.8	22.0	6.5	16.9	63.5
16.0	2.2	4.9	74.8	20.0	3.5	1.7	76.0
15.0	1.8	8.0	70.1	19.8	3.4	8.8	70.0
14.5	1.1	5.6	74.1	17.0	2.9	13.3	65.6
13.5	1.3	1.8	77.1	16.2	1.9	10.6	67.9
12.5	0.8	1.3	78.0	13.3	1.2	13.4	67.4
11.0	0.6	2.2	79.9	13.0	1.1	6.9	71.1
10.0	0.6	4.0	76.5				
7.7	0.2	3.6	75.9				
Average values:							
13.9	1.6	3.6	76.0	20.0	4.9	11.5	67.6

*Moisture and fat content analysis by Paul E. Degurse, Supervisor of Technical Investigations at the Nevin Laboratory, Wisconsin Department of Natural Resources.

Table 8. The calculated average length of freshwater drum per age group for fish caught from Lake Pepin and Pool 8.

Location	Age Group			
	I	II	III	IV
Lake Pepin				
Calculated Avg. Length (inches)	4.2	6.9	9.6	11.4
Number of fish	10	20	9	14
Pool 8				
Calculated Avg. Length (inches)	5.2	8.2	10.5	12.1
Number of fish	8	39	16	36

SUMMARY

Three deep water trap nets were fished in Lake Pepin during the winters of 1975 and 1976. The nets accounted for 12,405 pounds of commercial fish for 1975 and 3,508 pounds for 1976. Freshwater drum dominated the commercial catch during both years. Fishing the trap nets was not a profitable operation. During 1975, the best year, \$1,107.57 was made from the sale of commercial fish. This barely covered operating costs.

The length of time between lifts and crowding of fish in the net had no effect on mortality during either year. During 1975, the sport fish caught contributed 21.7 percent of the total catch, by weight. In 1976, the percent of sport fish, by weight, making up the total catch rose to 43.9 percent. In 1975, noncommercial channel catfish (under 20 inches in length) made up 55.6 percent of the sport fish catch. White bass contributed 30.0 percent. Walleyes dominated the 1976 sport fish catch with 55.6 percent. Black crappies followed with 30.7 percent.

Sport fish mortality was limited primarily to white bass and black crappies. The mortality was caused from extended air bladders due to raising the fish from 30 feet of water. Gilling of sport fish in the leads, hearts, and slopes of trap nets was low, 0.35 fish per net day and 0.47 fish per net day for 1975 and 1976 respectively. White bass, sauger, and northern pike were the species most frequently gilled. Game fish are more susceptible to gilling by the 5-inch mesh trap nets. Greater numbers of panfish are likely to be gilled in 3½-inch mesh nets.

No conflicts were observed with the use of trap nets for either winter. The large holes required to operate trap nets are a potential danger to snowmobilers.

Fat and moisture content analysis of drum samples showed that Lake Pepin drum contained significantly lower levels of fat and significantly higher percent of moisture than did the Pool 8 drum. Lake Pepin drum showed significantly slower growth rate for the first 2 age groups than did Pool 8 drum. The actual cause of "hard meat" in Lake Pepin drum was not determined.

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