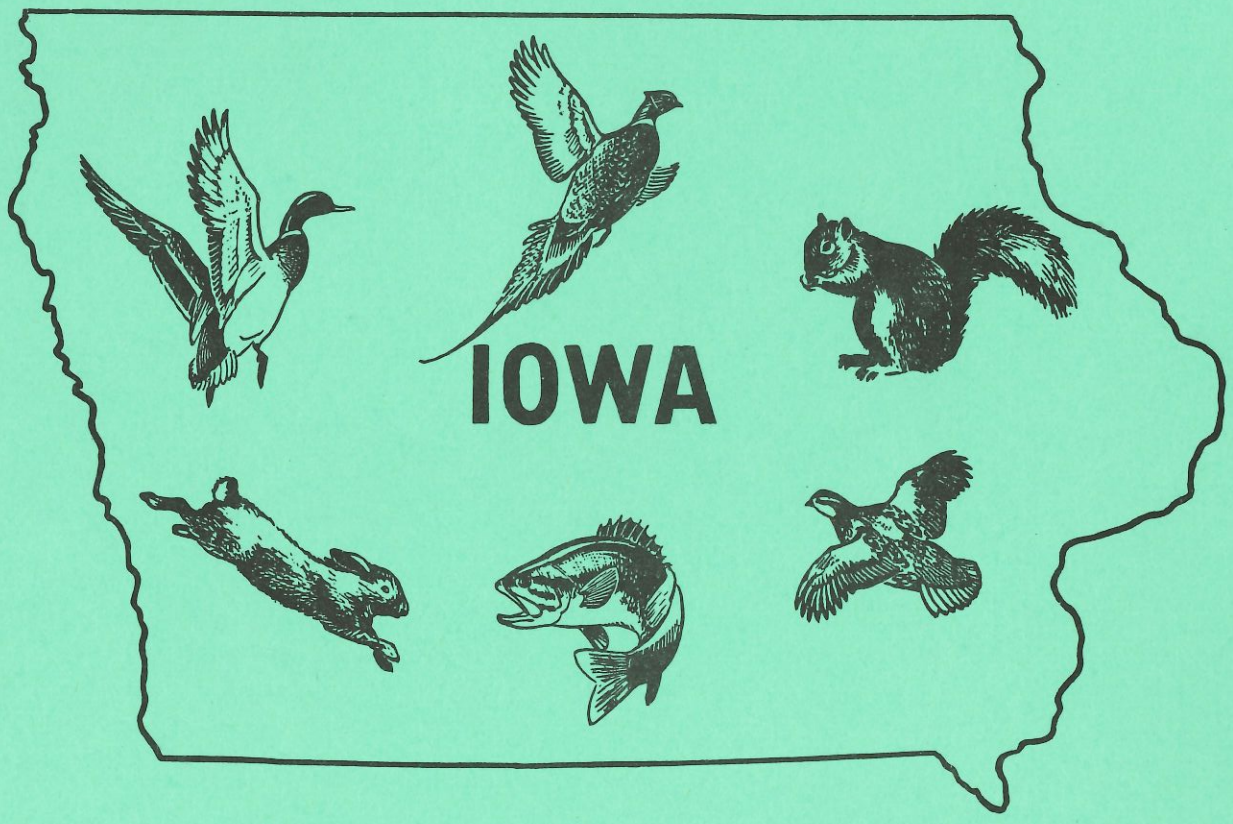
1968

QUARTERLY BIOLOGY REPORTS



FISH AND GAME DIVISION — BIOLOGY SECTION

STATE CONSERVATION COMMISSION

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ABSTRACTS OF PAPERS

FISHERIES

Creel Census Results from Three Iowa Lakes - 1967-68

Terry Jennings
Fisheries Biologist

Data are presented on the results of a comprehensive creel census made on Spirit Lake, East Okoboji and West Okoboji. A combined total of 163,194 fishing trips lasting 476,050 hours were made to these lakes during 1967. During these trips 804,632 fish weighing 451,283 pounds were caught. Each fishing trip lasted 2.9 hours and yielded about 5 fish. These fish were caught at an average rate of 1.7 fish-per-hour. Bullhead and yellow perch dominated the catch comprising 52% and 31% respectively.

Population Dynamics of Channel Catfish in Coralville Reservoir

Larry R. Mitzner
Fisheries Biologist

Measurements of condition, growth rate, mortality rate and catch success were monitored prior to and during the removal of channel catfish and rough fish species. The objective was to measure the effect of this increased harvest upon the catfish population. This population reduction consisted of 1.13 pounds per care or 14.2% of the catfish population and 6.09 pounds per acre of rough fish species. There were no detrimental effects in growth rate, catch success or mortality rate, but channel catfish body conditions increase slightly.

Backbone Lake Renovation Project

Robert Schacht
Fisheries Biologist

Backbone Lake, located in Backbone State Park, near Strawberry Point has had a declining quality in the sport fisheryfor the last decade. Rough-fish populations have increased during the same period. The lake was drained as a management in November of 1967 followed by chemical renovation of the lake and watershed in the spring of 1968. The resulting fish kill was estimated to be 90 per cent complete with vast reduction of all fish species in the lake. A brief history of survey datum is presented up to the time of renovation. Preliminary evaluation of post-treatment surveys is also presented.

Aquatic Habitat of Mississippi River Navigation Pools 11 and 18

Don R. Helms
Fisheries Biologist

The different aquatic habitats of Mississippi River navigation pools 11 and 18 were mapped according to classification proposed by the U. M. R. C. C. Pool 11 was found to consist of 0.3% tail waters, 11.9% main channel, 8.9% main channel border, 7.7% side channel, 60.7% lake, 0.6% pond and 10.0% slough. Pool 18 consisted of 0.7, 22.1, 20.4, 14.8, 31.6, 1.5 and 9.0% of each habitat respectively. Maps were reproduced on legal size paper for field use.

Age and Growth of Carpsucker in the Des Moines River

Donald Kline
Fisheries Biologist

Carpsuckers were removed from the study area to determine the effect of exploitation on the remaining populations. A total of 1,051 carpsuckers were removed in a 20-week period. Scale samples were collected from 337 carpsuckers-for age and growth studies. Carpsuckers in this sample were 12 inches long and weighed 10 pound in the fifth year of life. The length-weight relationship for the 1967 sample was log $W = 1.7170 + 2.4739 \log L$.

GAME

1968 Officers' Deer Estimates

Paul Kline
Game Biologist

Estimates by Conservation Officers indicate 22,870 deer were present in Iowa early in 1968. This is a decline of 10.1 percent from 1967 estimates. Since 1963, populations have increased in southern and western portions of Iowa, and declined elsewhere. However, these population booms seem to have run their course. It is believed hunting is the one major population depressant and that more restrictive controls may need to be applied in the future.

Fox Movement Studies in Iowa

Ron Andrews
Game Biologist

To provide information needed to properly manage the red fox as a game animal and predator in Iowa, a fox tagging project was inititated in 1966 to determine dispersal, population status and mortality of this species. Hunting, trapping and road kill are the major factors of mortality. A total of 85 foxes was tagged in 1966 with a 45 per cent return; 249 foxes were tagged in 1967 with nearly a 20 per cent return; and in 1968, 388 foxes were tagged. An initial analysis of the data indicates that foxes disperse an average of 20 to 35 miles randomly in all directions prior to and during their breeding season. Fox hunting provides considerable recreation for sportsmen in Iowa, and we hope that this study will initiate a hunting season for the Iowa foxes.

Results from Lead Poisoning Studies at Forney's Lake

Richard Bishop
Game Biologist

Forney's Lake in Fremont County is a popular waterfowl concentration area along the Missouri River. This area has had a history of lead poisoning of mallards. The lake has been shot over for years and a large amount of lead deposited. When weather conditions are such that the lake remains open in December and January, high losses occur. Mallard losses of about 1800 occurred in the winter of 1965 and 1966. About 1500 died from lead poisoning in 1960 at Forney's Lake. Data were desired to document waterfowl losses and amount of lead available. A total of 143 bottom samples were taken in 1966 and 1967. Results show an average of 1.6 pellets per square foot were available to waterfowl. The samples were one foot square and two inches or four inches deep. Lead poisoning losses on this area can be minimized by regulating water levels after the hunting season to move the bird elsewhere.

Iowa's Spring Pheasant Population - 1968

Richard C. Nomsen
Game Biologist

Iowa's 1968 statewide spring pheasant population was slightly higher than in 1967. The population appeared to be the same or higher in the Southeast half of Iowa - and lower in the Northwest half of the pheasant range. The 1968 spring hen index increased 18 per cent and observers reported 7 per cent more hens sighted on the roadside survey. Pheasant experienced a mild winter and a warm early spring prompted early nesting activity.

Woodcock Singing-Ground Survey, 1968

Gene Hlavka
Game Biologist

The Iowa woodcock singing-ground survey has been conducted each spring since 1961. This work is done in cooperation with the U. S. Fish and Wildlife Service to obtain on index to the size of the breeding population. The number of different males heard "peenting" on the ground forms the basis for the evening roadside counts. The 1968 index of 0.22 woodcock heard per stop equals the 8-year average. In 1968 one brood was reported on the Wilson Island Game Area in Western Iowa. Wide woodcock distribution over the state is indicated by this survey.

Postal Card Surveys of Iowa Quail Hunters for the 1967-68 Season

M. E. Stempel and Gene Hlavka
Game Biologists

During the 100 day1967-68 quail season all of the state was open for hunting. Of all licensed hunters 20 per cent, or 62,484 hunters, took 736,519 quail at a rate of 1.9 hours per quail. Of that number of hunters 3,584 were non-residents who took 112,179 quail at a rate of 1.0 hour per quail. The most of the quail and the best of the shooting are in southern Iowa.

Postal Card Surveys of Cottontail, Jackrabbit and Crow Hunters for The 1967-68 Season

M. E. Stempel
Game Biologist

Gene Hlavka
Game Biologist

The 1967-68 Iowa cottontail and jackrabbit season was open statewide. The bag was 1,548,035 cottontails, with 49 per cent of the 294,500 licensed resident hunters reporting they hunted for rabbits. Seven per cent of the hunters sought jackrabbits, of which 55,661 were taken. Crows were shot by 9 per cent of licensed hunters, who bagges 230,594 birds. Best cottontail shooting is in southern Iowa, while jackrabbits are found in the north and west portions of the state.

Ruffed Grouse 1968 Spring Drumming Survey

Eugene D. Klonglan
Asst. Supt. of Biology

Spring roadside drumming surveys of the ruffed grouse population in northeastern Iowa have been conducted on a systematic basis since 1961. The 1968 mean of 1.46 drums heard per stop on nine routes compares closely with means from previous years. The 8 - year average is 1.59 drums per stop. As measured by this survey technique, there has been no appreciable change in the grouse population in northeastern Iowa over this period, with no significant evidence of cycling.

Creel Census Results from Three Iowa Lakes - 1967-68

Terry Jennings
Fisheries Biologist

INTRODUCTION

During the 1967-68 fishing season a comprehensive creel census was made on Spirit Lake, East Okoboji, and West Okoboji. A previous paper thoroughly explained the methods used for collection and expansion of creel data. These investigations were made primarily to assess fish harvest, harvest rates, and angler use.

May through February were censused on Spirit Lake and West Okoboji, These data were separated into open water fishing (May through November) and winter fishing (December through February). East Okoboji was censused from May through September.

SPIRIT LAKE

Open Water Fishing. An estimated 230,618 fish were caught during this period (Table 1). Eighty per cent of the catch were bullheads, 9% were walleye and 5% were yellow perch. Listed in order of abundance, crappie, bluegill, northern pike, sheepshead, white bass, smallmouth bass, and largemouth bass made up the remainder of the fish harvest.

During this period 54,353 fishing trips were made to the lake. Nearly 48% of these trips occured during June and July. An average trip lasted 2 hours and 40 minutes and yielded 4.2 fish.

The computed harvest rate of 1.59 fish-per-hour indicated good fishing. Fish were caught most rapidly in August, with a catch rate of 1.97 fish-per-hour. November had the poorest catch rate with 0.60 fish-per-hour.

Winter Fishing. Yellow perch and walleye comprises 94% and 5% of the total estimated harvest (Table 2). Crappie, northern pike, and white bass were also caught.

An estimated 8,782 fishing trips were made to Spirit Lake during this period. The average trip yielded 4.5 fish. These fish were caught at an average rate of 1.27 fish-per-hour.

For the entire census period, 28 pounds of fish-per-acre were harvested from Spirit Lake. Eleven fishing trips and 31 hours per acre were necessary to produce this fishery.

Table 1. Total estimated harvest of fish from Spirit Lake, May through November, 1967

Species	May	June	July	August	Sept.	Oct.	Nov.	Total	% of Total	Ave. Wt. per fish(lbs.)
Bluegill	---	604	703	235	199	---	---	1,741	1	0.45
Crappie	1,105	731	91	2,335	650	20	---	4,932	2	0.47
Walleye	5,674	10,385	2,312	1,631	1,759	214	28	22,013	9	1.13
White Bass	---	188	---	36	---	23	7	254	<1	2.23
N. Pike	462	384	60	38	128	17	---	1,089	1	2.12
Bullhead	26,190	64,022	27,932	21,196	26,083	377	18	186,478	80	0.50
L. M. Bass	---	---	39	---	---	---	---	39	<1	1.15
S. M. Bass	31	51	5	---	40	---	---	127	<1	2.24
Sheepshead	22	340	247	348	87	---	---	1,044	1	1.48
Perch	19	945	3,044	2,734	2,122	3,446	591	12,901	5	0.63
TOTALS	33,503	77,660	34,433	49,213	31,068	4,097	644	230,618	99	0.58
Total Angler Trips	8,754	16,282	10,000	9,613	7,138	2,097	469	54,353		
Total Hours	24,974	45,944	25,159	24,820	18,157	5,322	1,067	145,443		
Fish-per-trip	3.83	4.77	3.44	5.12	4.35	1.95	1.37	4.24		
Fish-per-hour	1.34	1.69	1.34	1.98	1.71	0.77	0.60	1.59		

Table 2. Total estimated harvest of fish from Spirit Lake, December through February, 1967-68

Species	December	January	February	Total	% of Total	Ave. Wt. per fish (lbs.)
Crappie	13	54	23	90	<1	0.62
Walleye	1,001	968	253	2,222	5	1.72
White Bass	7	---	---	7	<1	2.14
N. Pike	35	9	36	80	<1	3.23
Perch	6,458	10,636	19,718	36,812	94	0.60
TOTALS	7,514	11,667	20,030	39,211	99	0.67
Total Angler Trips	1,930	2,158	4,694	8,782		
Total Hours	6,150	8,962	15,746	30,858		
Fish-per-Trip	3.89	5.41	4.28	4.47		
Fish-per-Hour	1.22	1.30	1.27	1.27		

WEST OKOBOJI

Open Water Fishing. During this period an estimated 232,402 fish were caught (Table 3). Yellow perch, bullhead, and bluegill made up 47%, 28%, and 18% of these fish respectively. Crappie, walleye, largemouth bass, smallmouth bass, white bass, catfish, and northern pike were also caught.

An estimated 38,524 fishing trips were made to West Okoboji. The trips lasted about 2 hours and 40 minutes each. Each trip yielded an average of about 6 fish.

Fish were caught at an average rate of 2.20 fish-per-hour. The best harvest rate occurred in October when 3.83 fish-per-hour were taken. August was the poorest fishing month with a harvest rate of 0.76 fish-per-hours.

Winter Fishing. Table 4 shows yellow perch was the dominant species creeled comprising 81% of the fish harvested. Bluegill composed 16% of the catch. Northern pike, walleye, crappie, and largemouth bass, were also caught.

During this period, an estimated 23,029 fishing trips were made to West Okoboji. Nearly 60% of these trips were made in January. An average of 3.5 fish were caught during each trip. Approximately 1.23 fish were caught per hour.

Fourteen angling trips totaling 45 hours of fishing were caluated for each surface acre of West Okoboji. Forty pounds of fish were caught.

EAST OKOBOJI

Bullheads dominated the catch, contributing 73% to the total estimated harvest (Table 5). Yellow perch, bluegill, and walleye made up 10%, 8%, and 6% of the catch respectively. Crappie, catfish, whitebass, smallmouth bass, northern pike, and largemouth bass were also creeled.

An estimated 38,506 fishing trips were made to East Okoboji. An average trip lasted 3 hours and 30 minutes. It yielded 5.79 fish. These fish were caught at an average rate of 1.74 fish-per-hour.

The catch of fish from East Okoboji was approximately 74 pounds of fish per acre. Approximately 21 fishing trips totaling 68 hours were made per acre.

Table 3. Total estimated harvest of fish from West Okoboji, May through November, 1967

Species	May	June	July	August	Sept.	Oct.	Nov.	Total	% of Total	Ave. Wt. Per fish (lbs.)
Bluegill	194	14,285	18,303	2,407	4,179	1,700	----	41,068	18	0.40
Crappie	5,616	1,285	1,217	286	639	12	----	9,055	4	0.48
Walleye	791	167	1,290	142	282	752	229	3,653	2	2.03
White Bass	---	-------	------	55	33	676	---	764	<1	0.50
N. Pike	---	275	94	97	182	38	17	703	<1	4.50
Bullhead	9,487	38,775	13,538	1,603	1,514	66	92	65,075	28	0.59
L. M. Bass	291	366	897	55	23	------	----	1,542	1	2.73
S. M. Bass	138	185	248	88	89	31	16	775	<1	2.44
Perch	783	596	6,579	8,112	37,677	36,130	19,184	109,061	47	0.36
Catfish	---	------	699	-----	7	----	----	706	<1	2.32
TOTALS	17,300	55,934	42,775	12,845	44,605	39,405	19,538	232,402	100	0.50
Total Angler Trip	5,066	7,600	7,669	6,618	5,492	3,924	2,155	38,524		
Total Hours	11,575	21,709	22,001	16,895	17,253	10,299	5,626	105,358		
Fish-per-Trip	3.41	7.36	5.60	1.94	8.12	10.04	9.07	6.03		
Fish-per-Hour	1.49	2.58	1.94	0.76	2.59	3.83	3.47	2.20		

Table 4. Total estimated harvest of fish from West Okoboji, December through February, 1967-68

Species	December	January	February	Total	% of Total	Ave. Wt. per fish (lbs.)
Bluegill	4,106	3,111	5,190	12,407	16	0.35
Crappie	321	87	278	686	1	0.49
Walleye	284	485	---	769	1	3.89
N. Pike	---	443	732	1,175	2	3.75
L. M. Bass	---	17	---	17	T*	3.18
Perch	20,389	34,759	9,417	64,565	81	0.34
TOTALS	25,100	38,902	15,617	79,619	101	0.43
Total Angler Trips	4,876	13,734	4,419	23,029		
Total Hours	11,584	38,704	15,770	66,958		
Fish-per-Trip	5.15	2.83	3.53	3.46		
Fish-per-Hour	2.17	1.01	0.99	1.21		

* Less than 1%

Table 5. Total estimated harvest of fish from East Okoboji, May through September, 1967

Species	May	June	July	August	Sept.	Total	% of Total	Ave. Wt. per fish (lbs.)
Bluegill	272	4,651	8,233	2,150	2,628	17,934	8	0.48
Crappie	1,135	647	582	137	86	2,587	1	0.52
Walleye	429	3,416	7,510	1,619	982	13,956	6	1.01
White Bass	---	164	460	78	25	727	<1	0.81
N. Pike	---	---	25	26	11	62	<1	3.40
Bullhead	21,981	109,739	8,758	16,206	6,913	163,597	73	0.62
L. M. Bass	---	---	---	27	---	27	<1	0.52
S. M. Bass	---	---	---	267	---	267	<1	1.35
Perch	67	4,914	8,234	8,636	3,822	22,673	10	0.41
Catfish	---	262	273	406	11	952	<1	2.91
TOTALS	23,884	120,793	34,342	29,285	14,478	222,782	98	0.62
Total Angler Trips	3,438	14,095	7,632	9,285	4,056	38,506		
Total Hours	12,498	46,005	27,539	29,006	13,285	128,333		
Fish-per-Trip	6.90	8.58	4.50	3.15	3.57	5.79		
Fish-per-Hour	1.91	2.63	1.29	1.01	1.09	1.74		

Population Dynamics of Channel Catfish in Coralville Reservoir

Larry R. Mitzner
Fisheries Biologist

Rounsefell (1953) states that parameters of a fish population such as decrease in age, increase in growth and condition and a decline in catch success can be used to detect a decline in the abundance of the available stock.

The channel catfish in Coralville Reservoir are underharvested by the angles (Mitzner 1967) and until 1967 were subjected only to limited fishing morality. The vital statistics of this population were measured in 1966 before a controlled exploitation program was initiated in 1967. It is essential to know if this removal has had any effect on the remaining population. The per cent removal was determined by a population estimate as established by Mitzner (in press). In 1967, 10,842 channel catfish and 16,192 rough fish were removed from the reservoir.

Length-weight relationship

Lengths and weights were collected from channel catfish in 1966 and 1967. From this information the mathematical expression of the length-weight relationship was determined for both years. The general formula Log W = a + b Log L was used to describe this relationship. In 1966 this equation was:

$$\log W = -3.444 + 2.932 \log L,$$

and in 1967 the relationship was:

$$\log W = -3.893 + 3.313 \log L$$

were W = weight in pounds and L = total length in inches (Figure 1).

The "b" values were tested by the Students' t-distribution for a difference in regression between years. The analysis was significant at the 5 per cent level of probability and not significant at the one per cent level. This analysis indicates better higher weight for the same length in 1967 compared with 1966 but it does not rule out other factors might also cause this chonge.

Description of growth

Mayhew and Mitzner (1967) describe the growth pattern for channel catfish in Coralville Reservoir based on data collected in 1966. The sample collected in 1967 was treated indentically with that of 1966.

Grand average calculated lengths (Table 1) are very similar to those calculated in 1966. A Student's t-test revealed the difference was not significant ($P<0.05$) except in the first year of life. The data for the two calendar years were combined by weighted means for the second through eighth year of life (Figure 2).

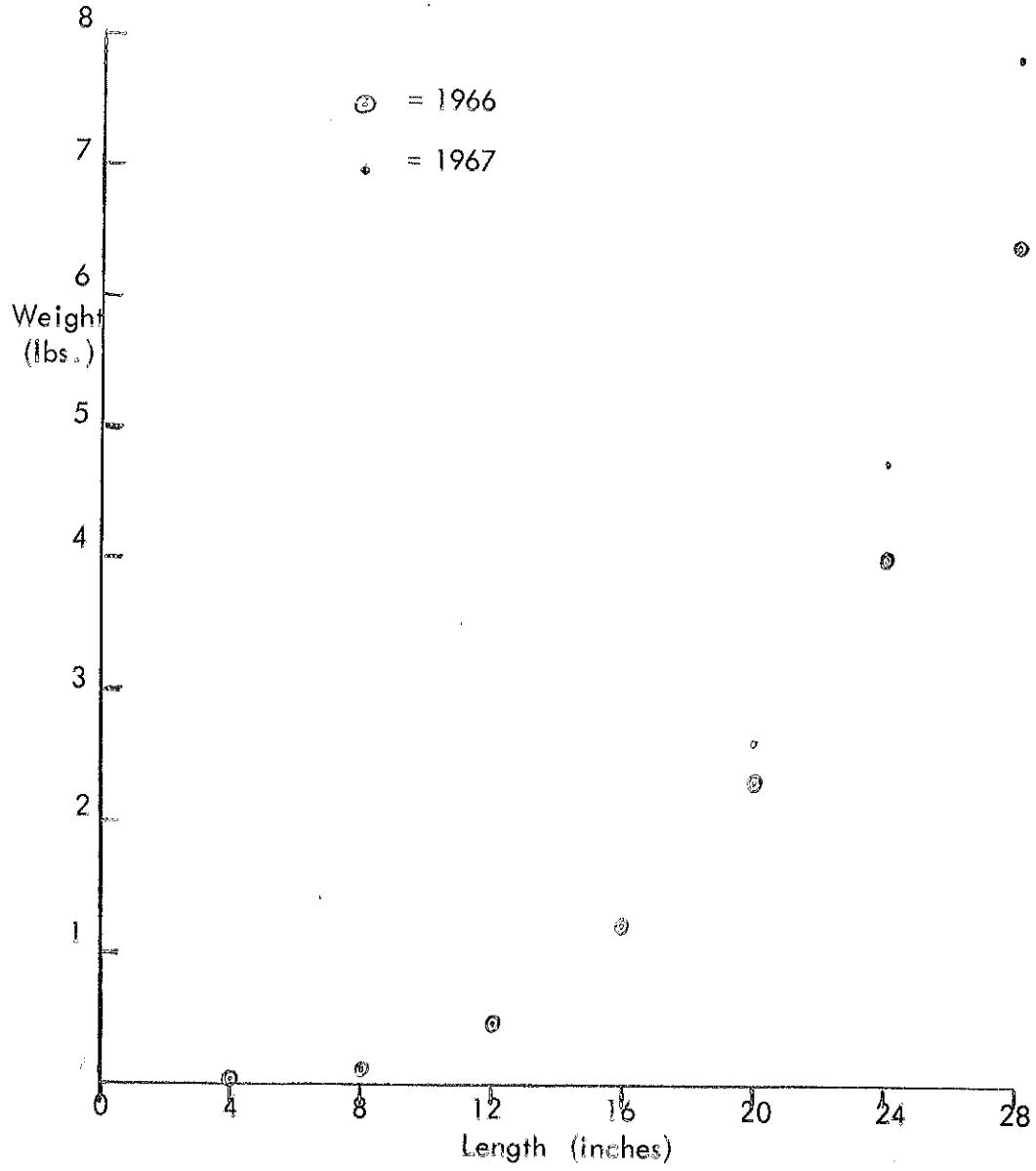

Figure 1. Length-weight relationship of channel catfish in Coralville Reservoir for 1966 and 1967.

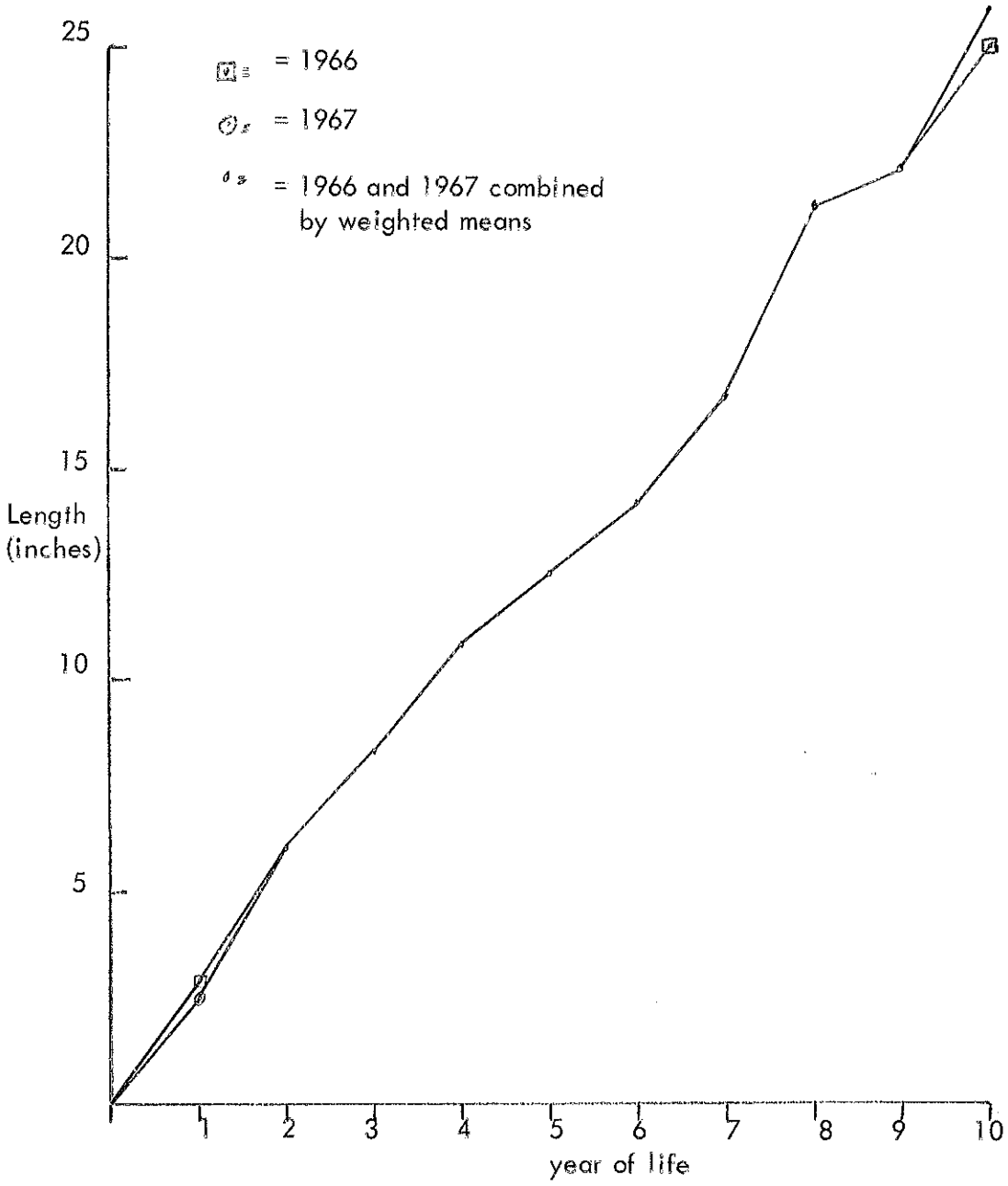

Figure 2. Grand average calculated lengths of channel catfish in Coralville Reservoir based on weighted means for 1966 and 1967.

Table 1. Grand average calculated lengths of channel catfish in Coralville Reservoir pool, based on data collected in 1967.

Year Class	Age Group	Year of Life 1	2	3	4	5	6	7	8	9	10
1966	I	2.3									
1965	II	2.3	6.3								
1964	III	2.6	6.4	10.3							
1963	IV	2.1	4.3	8.9	13.3						
1962	V	2.2	5.1	7.4	11.6	16.2					
1961	IV	2.3	4.3	6.7	9.1	12.3	16.1				
1960	VII	-	4.1	6.8	8.8	10.1	14.8	19.1			
1959	VIII	2.7	5.0	6.9	9.6	10.7	12.1	15.7	18.5		
1958	IX	2.8	5.7	8.8	10.0	12.3	13.2	14.3	17.8	20.2	
1957	X	-	4.7	7.6	10.3	11.5	13.3	14.5	15.5	18.9	21.3
Mean		2.4	4.9	7.6	9.8	11.9	14.0	15.4	16.7	19.5	21.3
Mean Incr.		2.4	2.9	2.9	2.5	2.5	2.5	2.1	1.9	1.9	1.8

The 1966 and 1967 deviations of growth from mean growth agreed and both years were combined. (Figure 3.) Growth was above normal in 1966 and 1967 and below in 1964. The fish kill in the winter of 1964-1965 had an inverse affect on the growth rate of channel catfish.

Spine samples were also collected and examined from the headwaters area. Smaller differences occurred between the headwaters and pool than the two years of growth data in the pool. The similarity in growth between the headwaters and the pool was also established by Mayhew and Mitzner (1967).

Age Distribution and Mortality

Mortality rates for channel catfish were determined from the age structure as described by Rounsefell (1953) and Ricker (1958). The age distribution for channel catfish in 1966 and 1967 indicate fish are not completely vulnerable to the fishing gear until their second year of life is completed (Figure 4.) Mortality rates were calculated for the age group III and older.

The logarithm of a particular age group was substracted from the logarithm of the next older age group and multiplied by -2.3026 to give the instantaneous rate of mortality (i) between the two age groups. These rates were averaged for all age groups and the annual mortality (a) was determined from a table of exponential functions for the equation $a = e^{-i}$.

The average annual mortality rate for 1966 was 0.45; 1967 was 0.48 (Table 2). A Student's t-distribution analysis showed no significant difference ($P<0.05$) in these years. The age structure for the two years was combined and on annual average mortality of 0.46 was obtained.

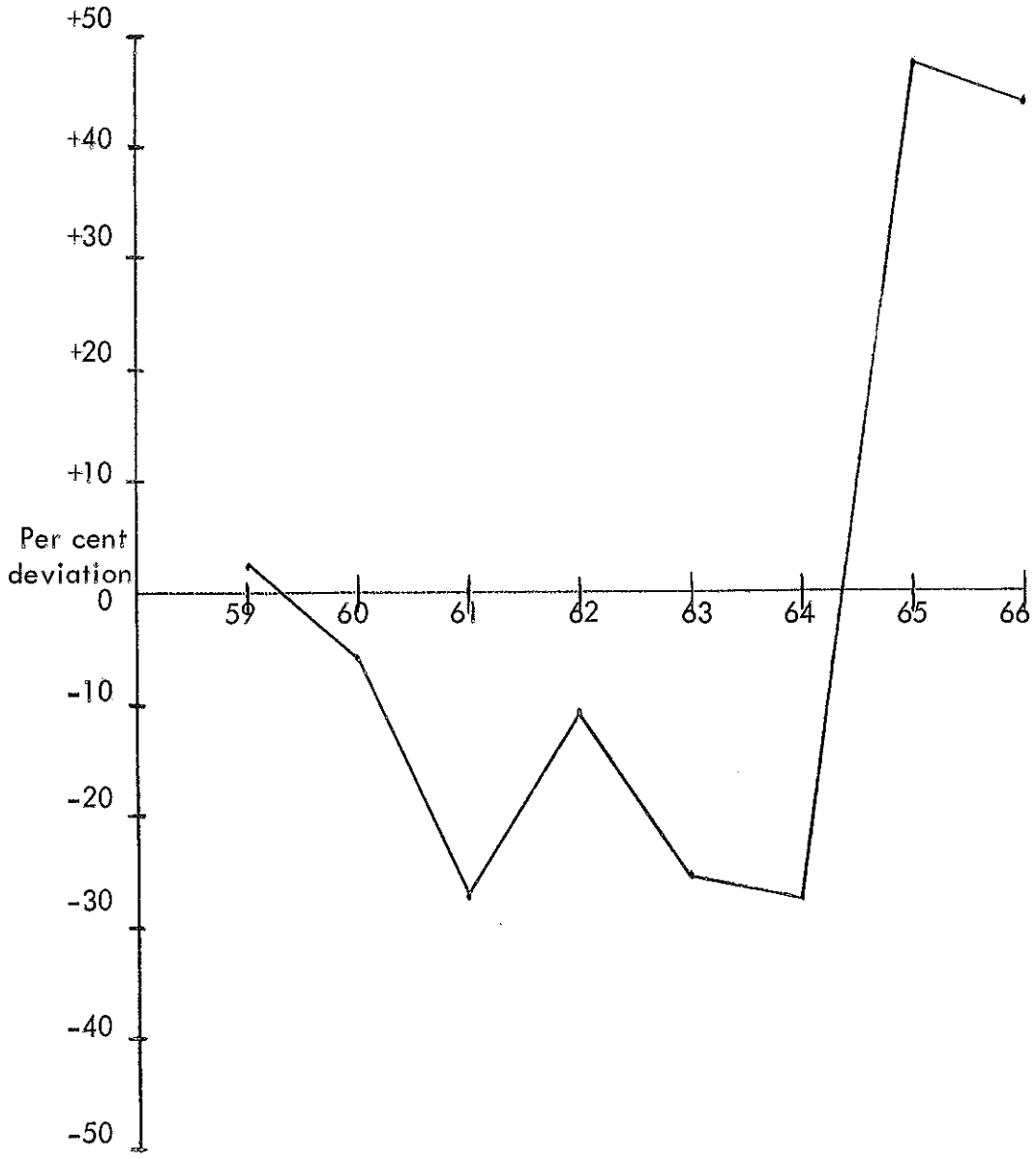

Figure 3. Per cent deviation of growth from mean annual increment of growth for channel catfish in Coralville Reservoir pool, based on weighted means for 1966 and 1967.

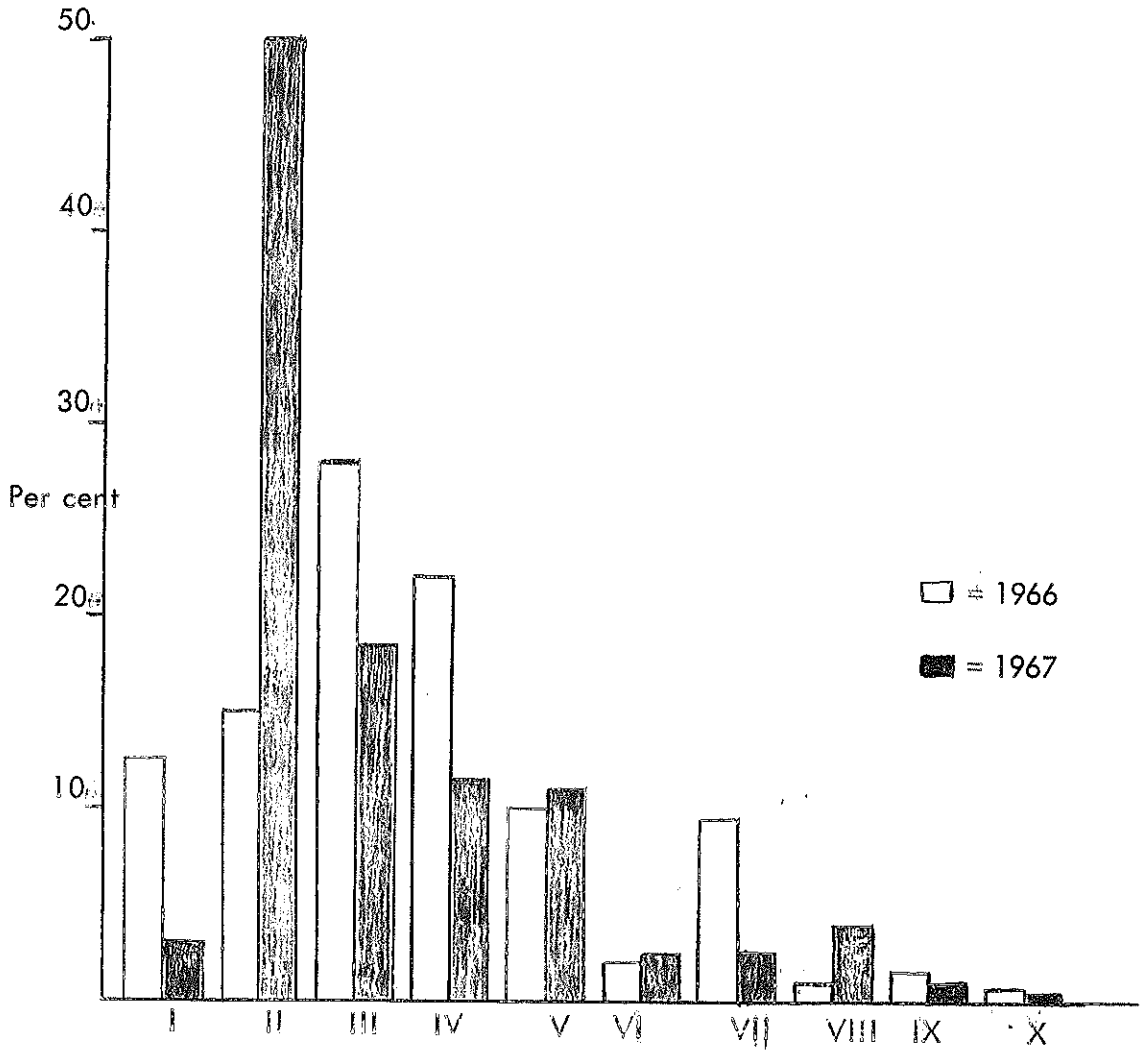

Figure 4. Age distribution of channel catfish in Coralville Reservoir for 1966 and 1967.

From creel census data in the Coralville Reservoir pool it was estimated that 400 to 500 channel catfish are taken by pole-and-line anglers annually. Approximately 1.3% of the estimated fish population is taken by this means. This creel census survey did not include trot line fishing, which would raise the yield substantially. Work is presently being conducted to determine the extent and nature of the trotline fishery.

Table 2. Mortality rates for channel catfish in Coralville Reservoir pool.

	1966		1967		Combined	
Age	Per cent composition	(i)	Per cent composition	(i)	Per Cent composition	(i)
III	25.8		18.4		20.8	
		0.168		0.470		0.329
IV	21.9		11.5		15.0	
		0.781		0.044		0.348
V	10.0		11.0		10.6	
		1.470		1.480		1.482
VI	2.3		2.5		2.4	
		-1.408		0.655		-0.535
VII	9.4		1.3		4.1	
		2.058		-1.097		0.313
VIII	1.2		3.9		3.0	
		-0.081		1.583		1.098
IX	1.3		0.8		1.0	
		1.180		1.382		1.200
X	0.4		0.2		0.3	
Mean (i)		0.598		0.658		0.605
(a)		.45		.48		.46

During the season 17.5% and 11.9% of the estimated population was removed from the pool and headwaters, respectively. At present this rate of removal has not effected total annual mortality.

Catch Success

During 1966 and 1967, 16,565 channel catfish were taken with pounds, bait, buffalo, gill and slat nets. Sixty-five% of these fish were caught in slat nets. A comparison was made of the catch per unit effort of the slat nets in 1966 and 1967 (Table 3).

The catch success for the bi-weekly periods examined averaged 0.10 in 1966 and 0.09 fish-per-net-hour in 1967. This 16.2% decline in catch per unit of effort was examined by analysis of variance to determine if the difference was statistically significant. The result was not significant at the 5 per cent level of probability. If consideration is given to the variation between the years and within the bi-weekly periods there was no difference in catch success.

Table 3. Catch per unit effort of channel catfish in Coralville Reservoir pool taken with slat nets (Units are fish-per-net-hour).

Period	1966	1967
June 4-July 17	0.17	0.17
June 18-July 1	0.08	0.11
July 2-July 15	0.03	0.06
July 16-July 29	<0.01	0.02
July 30-Aug 12	<0.01	0.03
Aug 13-Aug 26	<0.01	0.04
Aug 27-Sept 9	0.03	0.01
Sept 10-Sept 23	0.04	0.09
Sept 24-Oct 7	0.06	0.13
Oct 8-Oct 21	0.39	0.10
Oct 22-Nov 4	0.38	0.21
Average	0.10	0.09

Discussion

Removal of channel catfish in this study in 1967 was almost 14% of the population. This was a harvest of 1.13 pounds per acre at the conservation pool elevation. Concurrently, rough fish species were removed at a rate of 6.09 pounds per acres. Prior to 1967 the harvest for channel catfish was approximately 1.5 per cent, indicating a 9.5 per cent increase by numbers.

If this increase removal had any effect on the population it should have changed parameters such as growth rate, condition, total mortality rate and catch success. All measurements indicate there was no detrimental effect.

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Backbone Lake Renovation Project

Robert Schacht
Fisheries Biologist

Backbone Lake, located in northwest Delaware County, is a shallow 125 acre lake formed by a lowhead dam in the Maquoketa River. Over several decades the lake has become severly silted. The contant filling of the lake has reduced desirable habitat for game-fish species and increased habitat for rough fish. With an increase in rough fish populations the lake has suffered a declining sport fishery.

Survey work on the lake from 1956-1960 revealed large numbers of small crappies were present in the lake and it was recommend this population density should be reduced. Removal of 4,901 pounds of crappies was accomplish by netting in 1956 and 1957. Indications were the average condition and average length increased after removal until 1960 and decreased constantly thereafter (Table 1).

Table 1. Average condition and total length of Backbone Lake Crappie.

DATE OF COLLECTION	BLACK CRAPPIE		WHITE CRAPPIE	
	Length	C	Length	C
May 1956	7.4	31	7.5	31
May 1957	7.3	48	7.5	44
May 1959	8.0	52	8.4	47
May 1960	9.3	58	8.9	50
May 1961	9.1	52	9.9	48
June 1962	8.7	50	9.5	47
June 1963	8.3	52	8.8	46
June 1964	7.7	44	9.2	43
June 1966	7.3	42	8.5	41

Pound net survey since 1962 showed increasing rough fish populations. White sucker, carp, and redhorse increased from 49% by weight of all fish taken in survey nets in 1962 to 67% in 1966 (Table 2).

Table 2. Number and weight per centages of game and rough fish taken in trap net catches in Backbone Lake.

	Per Cent of Total Number				Per Cent of Total Weight			
	1962	1963	1964	1966	1962	1963	1964	1966
Rough Fish	30	26	47	34	49	60	60	67
Game Fish	70	74	53	66	51	40	40	33

In order to control expanding rough fish populations partial treatment with Antimycin A was directed at spawning carp in the spring of 1967 (Helms, 1967). Poor weather conditions caused an inadequate kill and complete chemical renovation was planned for 1968.

Results

The lake was drained in November 1967. In the first week of March, rotenone was to be applied to the lake and a portion of the watershed including Lamont Creek and the Maquoketa River. Pre-treatment planning included volume of flow measurements. These measurements were accomplished the day prior to treatment using the Embody formula described by Lagler (1956).

Flow measurements were taken near the location of sites chosen for drip barrel stations. Landowners were contacted along Lamont Creek where the chemical would be used. The treated segment of the Maquoketa River was entirely within State Park boundaries and therefore contact of land-owners was not necessary.

Two drip barrels were set up on each stream to provide a constant flow of toxicant for approximately a 6 - 8 hour period. Drip barrels were designed after those built by Price and House (1962). One barrel was set up at the upper limit on each stream with another about mid-way to the lake. On Lamont Creek, the first barrel was set up at the K. Linderwell farm 8 miles from the lake and the second at the Buchanan - Delaware County line bridge. On the Maquoketa River, the first barrel was set up just below the confluence of Richmond Spring and the second at the lower bridge in the central picnic area. Two crews of 3 men took the barrels to the predesignated locations starting shortly before 8 A.M. Each barrel was filled with a mixture of 1 part Pro-noxfish to 10 parts water and was allowed to drip at a rate of 1 - 2cc flow of toxicant per minute for each cc of stream flow. A man carrying a back-pack sprayer and another carrying additional rotenone was sent down stream to spray backwater areas and insure a complete kill in the treated sections of stream. During the stream application a boat mounted sprayer was used in the deeper river channel of the lake. As the toxicant reached the dam, stop logs were replaced. Treatment continued until all areas in the lake were covered.

Some difficulty was encountered with the drip barrels when the flow of toxicant did not remain constant. This made observations difficult since much time was spent re-calibrating the drip barrels.

Fish were easily observed floating down with the current, but in the deeper channel of the lake most fish went to the bottom making observation and pickup of dead fish impossible. Pickup of dead fish was accomplished in the stream sections. White sucker was most numerous followed by bullheads, rock bass, smallmouth bass, carp, rainbow trout, bluegill, and brown trout. It was estimated 90% of the fish in the lake and stream were destroyed.

A pound net survey in early June produced black bullhead (stocked after renovation), white sucker, redhorse, carp, white crappie, and green sunfish (Table 3).

Table 3. Population composition of Backbone Lake as shown in 192 net hours of pound netting.

Species	Number	Per Cent of Total Number	Weight	Per Cent of Total Weight
Black Bullhead	119	77.0	71.4	70.6
White Sucker	28	18.0	20.1	19.9
Redhorse	5	3.2	6.3	6.2
Carp	1	0.6	2.3	2.3
White Crappie	1	0.6	0.8	0.8
Green Sunfish	1	0.6	0.2	0.2
	155	100.0	101.1	100.0

Stocking of 250,000 walleye fry, 2,000 adult bullhead, 20,000 largemouth bass fry was accomplished by the end of June. Management of the lake for largemouth bass appears most promising with the available habitat.

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AQUATIC HABITAT OF MISSISSIPPI RIVER NAVIGATION POOLS 11 AND 18

Don R. Helms
Fisheries Biologist

INTRODUCTION

The Mississippi River is composed of an intricate network of diverse aquatic habitats ranging from back water sloughs and lakes to swift navigation channel and expansive pools above the dams. There has been much confusion in the nomenelature of these habitats, and a uniform classification and inventory of the habitat types are essential to biological studies.

The U.M.R.C.C. has proposed a classification which separates aquatic habitat into 7 different catageries. These are tail waters, main channel, main channel border, side channel, lake, pond and slough. A brief description of each follows, (Detailed description, available in the Proceedings of the Twentieth Annual Meeting of the Upper Mississippi River Conservation Committee).

Tail Waters

These waters include all areas immediately below dams which are affected by turbulence from passage of water through the gates and locks. These areas change in size according to water stage, and an arbitrary lower boundary for fishery purposes has been set at a distance of one-half mile below the dams.

Main Channel

This included only the portion of river through which large commerical craft can operate. It is defined by combinations of wing dams, river banks, islands and bouys and other markers. It has a minimum depth of 9 feet and a minimum width of 400 feet.

Main Channel Border

The zone is lowest between the 9-foot channel and main river bank, island or submerged definitions of the old main river channel. It includes all areas where wing dams occur along the main channel.

Side Channels

Included all departures from the main channel and main channel border where there is current during normal river stage.

River Lakes and Ponds

This classification along with slough replaces the old term "back waters". River lakes and ponds generally are open expanses of water without current, Several types of lakes occur along the Mississippi. These are: lakes due to fluviatile dams, lakes of mature flood plains and lakes of higher organisms. Ponds are smaller than lakes.

Sloughs

The category includes all of the remaining aquatic habitat found in the river. Sloughs often border on the lake and pond category on the one side and on the "side channel" category on the other. They are characterized by having no current at normal water stage, muck bottoms and an abundance of submerged and emergent aquatic vegetation.

Member states of U.M.R.C.C. are jointly mapping these habitats in their respective waters. Progress thus far has been directed toward pools in which the 5 years creel census is conducted in order the resulting information can be used in evaluating the census. Iowa has completed pools 11 and 18. These are the subject of the following report.

METHODS

The limits of each habitat are determined by field reconnaissance maps having a scale of 1" - 1,000 which show land outlines and navigation structures. After habitat limits are determined, each enviroment is planimetered to determine surface area. Habitats are reproduced on smaller scale maps with specific patterns and reproduced on legal size paper.

The maps are divided into segments suitable for coping on legal size paper. Pools 11 and 18 were each reproduced on 8 sheets. This particularly desirable on the pools because the census procedure specifies dividing the pools into 8 segments.

RESULTS

A summary of the results are provided in Table 1 and 2 for each segment (A through N). Tail water area are confined to the upper segment in each pool. Main channel and main channel border extend the length of the pool except in the lower reaches where the pool opens into lake habitat. Lake habitat is not wholly confined to the lower expanse of pool. In segments C and D of pool 11 and B of 18, marginal lakes exist. These lakes differ from the lower lake type because they are enclosed by slough area and differ from slough only in depth and expanse. Slough and side channel habitat end to be more prominent in the upper segments.

Surface areas obtained in the present study are 19,600 and 12,650 acres. These differ only slightly from data provided by the U. S. Army Corps of Engineers. Differences are due to the inclusion of island and land areas in the Corps' figures and changes in the river since the surveys were made.

Table 1. Acreage and percentage of habitats represented in each segment of Mississippi River navigation pool 11 (per cent of Area in parenthases).

Segment	Tail Waters	Main Channel	Main Channel Border	Side Channel	Lake	Pond	Slough	Segment Total
A	50.6 (2.5)	430.1 (21.0)	296.7 (14.5)	579.6 (28.3)		39.1 (1.9)	655.5 (32.0)	2,051.6 (10.5)
B		273.7 (29.7)	264.5 (28.7)	280.6 (30.4)			103.5 (11.2)	927.3 (4.7)
C		420.9 (34.2)	184.0 (15.0)	227.7 (18.5)	59.8 (4.9)	11.5 (0.9)	326.6 (26.5)	1,230.5 (6.3)
D		425.5 (19.6)	326.6 (15.0)	197.8 (9.1)	977.5 (44.9)		248.4 (11.4)	2,175.8 (11.1)
E		425.5 (15.9)	276.0 (10.3)	218.5 (8.2)	1,124.7 (42.0)	13.8 (0.5)	618.7 (23.1)	2,677.2 (13.7)
F		358.8 (10.6)	402.5 (11.9)		2,578.3 (76.1)	48.3 (1.4)		3,387.9 (17.3)
G					4,041.1 (100.0)			4,041.1 (100.0)
H					3,114.2 (100.0)			3,114.2 (100.0)
Pool Total	50.6 (0.3)	2,334.5 (11.9)	1,750.3 (8.9)	1,504.2 (7.7)	11,895.6 (60.7)	112.7 (0.6)	1,952.7 (10.0)	19,600.6

Table 2. Acreage and percentage of habitats represented in each segment of Mississippi River navigation pool 18 (per cent of Areas in parenthases).

Segment	Tail Waters	Main Channel	Main Channel Border	Side Channel	Lake	Pond	Slough	Segment Total
A	89.7 (10.3)	347.3 (39.9)	174.8 (20.1)	211.6 (24.3)	48.3 (5.5)			871.7 (6.9)
B		411.7 (40.2)	230.0 (22.5)	92.0 (9. 0)	289.8 (28.3)			1,023.5 (8.1)
C		450.8 (47.8)	280.6 (29.8)	177.1 (18.8)			34.5 (4.7)	943.0 (7.5)
D		402.5 (33.5)	368.0 (30.6)	289.8 (24.0)			142.6 (11.9)	1,202.9 (9.6)
E		565.8 (22.3)	604.9 (21.4)	552.0 (21.8)			874.0 (34.5)	2,596.7 (20.1)
F		547.4 (25.4)	786.6 (36.5)	547.4 (25.4)		195.5 (9.1)	78.2 (3.6)	2,155.1 (17.1)
G		64.4 (3.3)	133.4 (6.8)		1,766.4 (89.9)			1,964.2 (15.6)
H					1,895.2 (100.0)			1,895.2 (100.0)
Pool Total	89.7 (0.7)	2,789.9 (22.1)	2,578.3 (20.4)	1,869.9 (14.8)	3,999.7 (31.6)	195.5 (1.5)	1,129.3 (9.0)	12,652.3

Age and Growth of Carpsucker in the Des Moines River [1]

Donald Kline
Fisheries Biologist

Carpsuckers have a potential commercial value in the Des Moines River. They have been removed from the study area, along with channel catfish, carp and flathead catfish, during 1966 and 1967 to determine the effect of exploitation on the remaining populations. Age and growth data collected in 1967 will be used for comparison with future years. The results of the comparisons will be used to determine the effects of exploitation.

A total of 1,051 carpsuckers were captured during 1967 making them the third most important fish in the catch. Carpsuckers contributed 5% of the total fish harvest. In 1966 they comprised <1% of the catch.

The study area is located in the Des Moines River in Marion County near Knoxville, State highway 14 bridge divides the 20 mile area. Hoop nets with $1\frac{1}{2}$" bar mesh were set to specifically catch carp and carpsucker. Carpsucker were also caught in 3/4" bar mesh nets set for channel catfish. Although, 3 different species of carpsucker exist in the Des Moines River no attempt was made to separate the sample to species.

Length and weight measurements and scale samples from 337 carpsuckers were collected. Scale samples were taken from an area 3 scale rows below the insertion of the dorsal fin. Scales were age with a microprojector at a magnification of 17X. Scales from fish over 4 years old were difficult to read, because annuli were crowded. Two persons examined questionable scales and assigned the scales to an age group by agreement. Many samples had to be discarded because scales were regenerated.

LENGTH-WEIGHT RELATIONSHIP

The sample was divided into 0.5 inch size intervals and mean values plotted in Figure 1. The least squares procedure was used to compute the equation:

$$\log W = 1.7170 + 2.4739 \log L,$$

where L = total length and W = weight. Weight of carpsuckers increase significantly less than the length cubed ($t = 3.739$, $t.05 = 2.060$; 25 d.f.).

Observed and calculated wights (Table 1) do not differ significantly ($t = 0.241$. $t.05 = 2.060$; 25 d.f.).

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1. This paper is a contribution of project 4-11-R, Commercial and Industrial Food Fish Investigation; U. S. Bureau of Commercial Fisheries and Iowa State Conservation Commission cooperating.

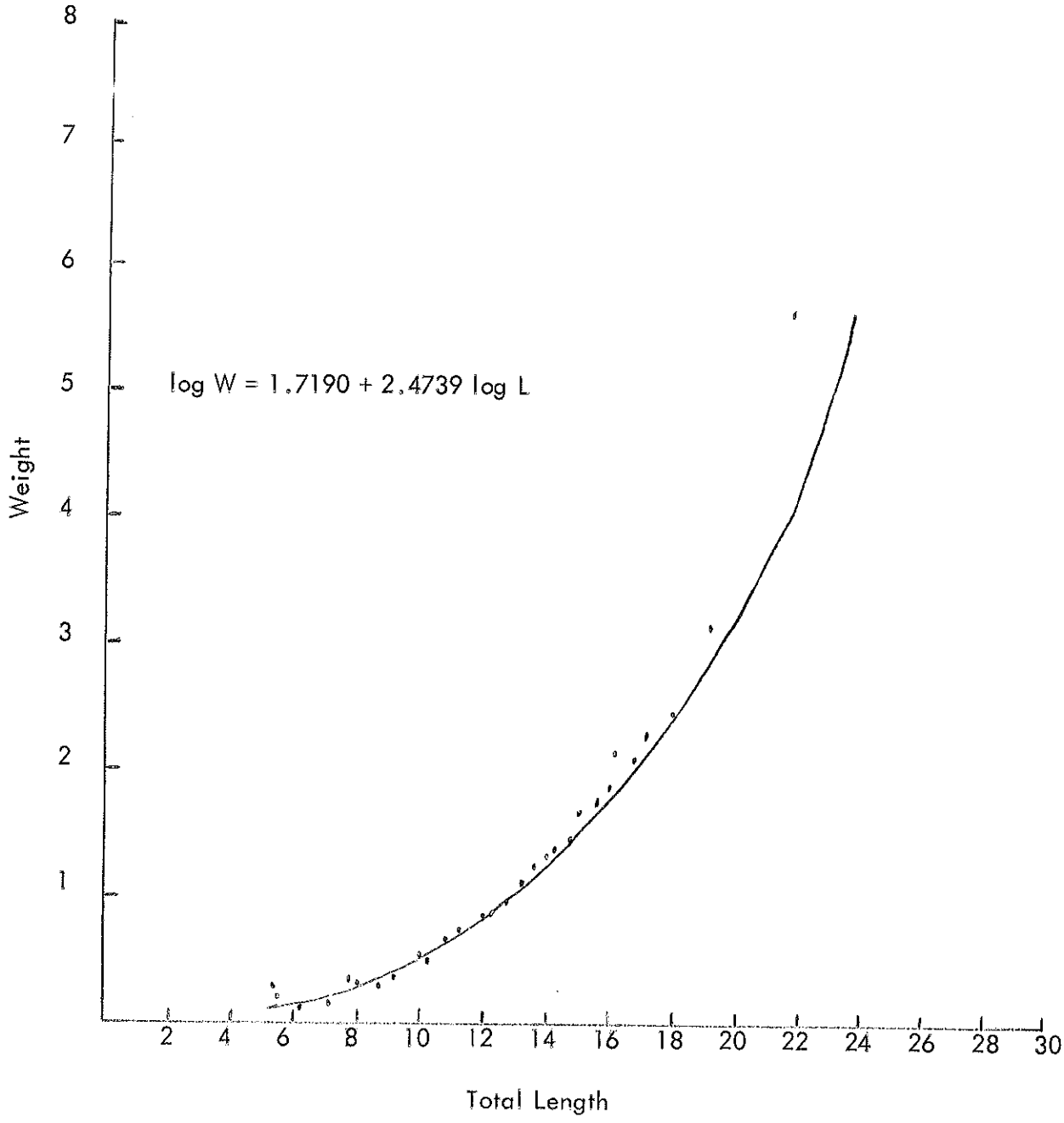

Figure 1. Length-weight relationship of carpsuckers caught in the Des Moines River, 1967.

Table 1. Observed and calculated weight of carpsucker in Des Moines River, 1967.

Size Group	Mean length	"C"	Mean Weight Observed	Mean Weight Calculated	Deviation c/o	Number in Group
5.0-5.4	5.4	19	.30	.12	-.18	1
5.5-5.9	5.6	30	.20	.14	-.06	1
6.0-6.4	6.3	52	.13	.18	.05	3
7.0-7.4	7.1	42	.15	.25	.10	1
7.5-7.9	7.8	73	.35	.31	-.04	1
8.0-8.4	8.0	58	.30	.33	.03	1
8.5-8.9	8.7	45	.30	.41	.11	3
9.0-9.4	9.2	50	.39	.47	.08	8
9.5-9.9	9.7	47	.43	.53	.10	6
10.0-10.4	10.2	47	.50	.60	.10	7
10.5-10.9	10.7	53	.65	.68	.03	11
11.0-11.4	11.2	53	.75	.76	.01	17
11.5-11.9	11.7	48	.77	.84	.07	20
12.0-12.4	12.2	48	.88	.93	.05	34
12.5-12.9	12.7	47	.97	1.05	.08	34
13.0-13.4	13.2	48	1.10	1.14	.04	49
13.5-13.9	13.7	48	1.23	1.25	.02	50
14.0-14.4	14.2	48	1.37	1.36	-.01	40
14.5-14.9	14.7	46	1.46	1.48	.02	29
15.0-15.4	15.1	49	1.68	1.58	-.10	7
15.5-15.9	15.7	45	1.73	1.74	.01	5
16.0-16.4	16.2	50	2.14	1.88	-.26	4
16.5-16.9	16.7	45	2.10	2.03	-.07	1
17.0-17.4	17.1	45	2.25	2.16	-.09	2
19.0-19.4	19.2	44	3.10	2.87	-.23	1
21.5-21.9	21.7	55	5.60	3.89	-.71	1

Table 2. Calculated lengths of carpsuckers in the Des Moines River, 1967.

Year Class	Number in Group	Age Group	1	2	3	4	5	6	7	8	9
1966	5	I	3.2								
1965	23	II	2.8	6.5							
1964	23	III	3.3	6.6	9.2						
1963	43	IV	2.9	5.4	7.9	10.2					
1962	107	V	3.1	5.5	7.6	9.8	11.7				
1961	40	VI	3.0	5.3	7.4	9.6	11.5	13.1			
1960	1	VII	2.8	5.4	7.2	9.6	11.6	13.3	14.8		
1959	2	VIII	2.6	4.0	5.4	8.8	11.2	13.4	15.1	16.2	
1958	1	IX	3.5	6.0	8.0	10.1	11.7	12.8	14.4	15.6	17.6
Grand Ave. Cal. Length			3.0	5.6	7.5	9.7	11.5	13.2	14.8	16.0	17.6
Increment of Grand Ave.			3.0	2.6	1.9	2.2	1.8	1.7	1.6	1.2	1.6
Grand Ave. Cal Increment			3.0	2.6	2.1	2.4	2.0	1.7	1.6	1.2	1.9
Sum of Increments			3.0	5.6	7.7	10.1	12.1	13.8	15.4	16.6	18.5
Total Length at Capture				6.0	9.2	10.9	11.8	13.1	14.4	16.3	17.1
Weight at Capture				0.2	0.4	0.6	0.8	1.1	1.5	2.3	2.5
Empirical Weight Increment					0.2	0.2	0.2	0.3	0.4	0.8	0.2
Cal. Weight based on Sol			.03	0.2	0.3	0.9	1.9	1.7	2.0	2.0	2.6
Cal. Weight Increment				0.17	0.1	0.3	0.3	0.4	0.4	0.3	0.6

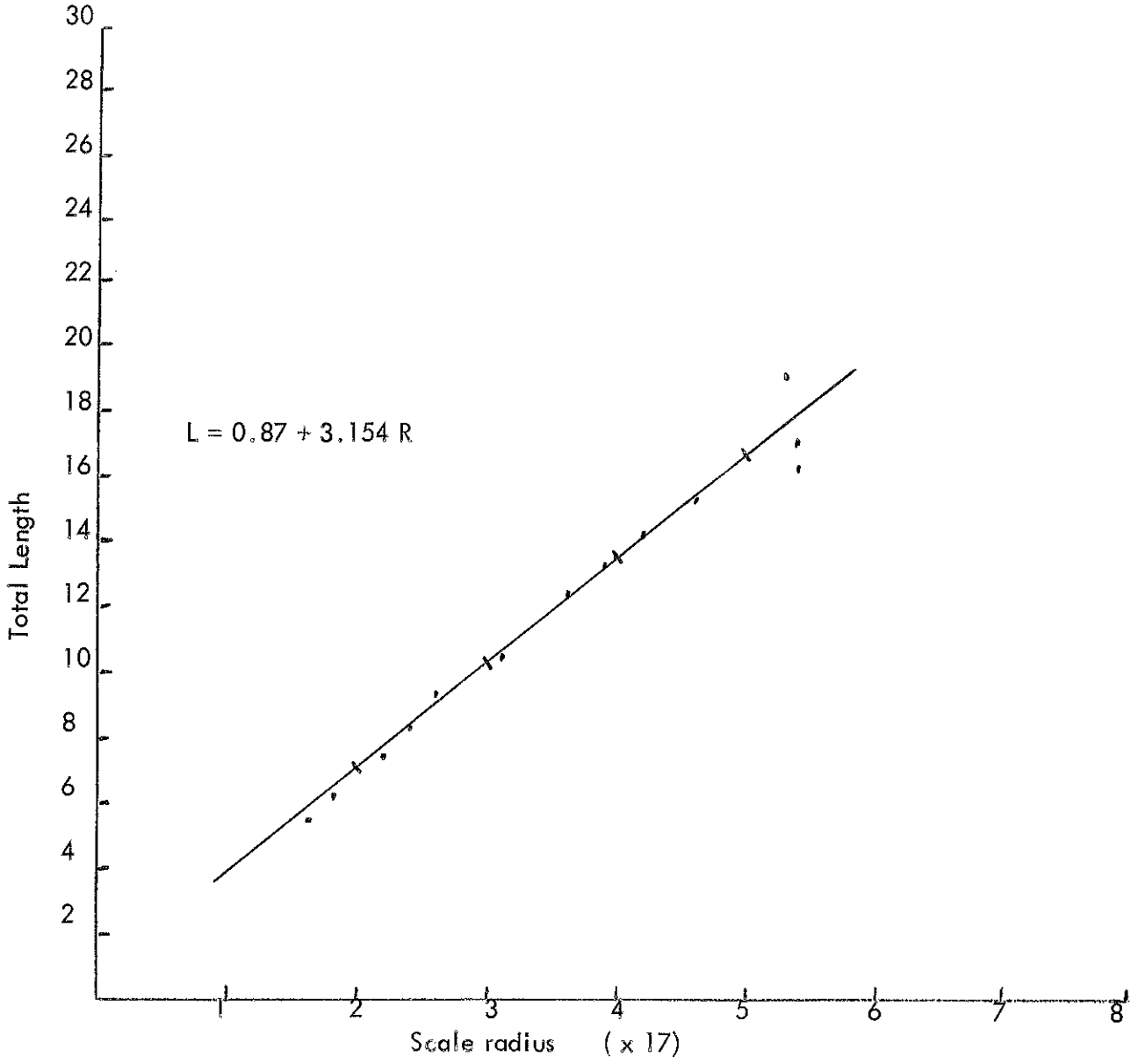

Figure 2. Body-scale relationship of carpsuckers caught in the Des Moines River, 1967.

BODY-SCALE RELATIONSHIP

The body-scale relationship was computed by the least squares procedure and resulted in the equation:

$$L = 0.87 + 3.154\ R.$$

Length (L) in 1 inch size intervals and scale radius (R) by 0.1 inches were plotted on Figure 2 . A straight line was fitted to these points using this equation. An intercept of 0.87 on a straight line nomograph was used to compute total length at the end of each year of life.

AGE AND RATE OF GROWTH

Based on the sample, few carpsuckers reach 7 years of age or older (Table 2).

Carpsuckers in this sample were 12 inches long and weighed 1.0 pounds in the fifth year of life. Annual length increments systematically decreased with increased age. The sum of the grand average calculated increments for 9 years of life were 3.0, 5.6, 7.7, 10.1, 12.1, 13.8, 15.4, 16.6, and 18.5 respectively. Corresponding calculated weights were .03, .20, .30, .60, .90, 1.30, 1.70, 2.00 and 2.60 pounds.

SUMMARY

Carpsuckers were the third most important fish in the 1967 catch of commonly valuable fish in the Des Moines River.

Few carpsucker reach 7 years of age or older.

Growth was best in the first year of life with a systematic decrease in growth increments as age increased

1968 OFFICERS DEER ESTIMATES

Paul D. Kline
Game Biologist

INTRODUCTION

Conservation Officers have been making winter estimates of deer since 1947. This has been an annual survey; only during one year, 1949, was it not conducted.

In accepting the results of this survey it is fully realized that precise counts of deer are impossible to make, even by men who are unquestionably familiar with the people and wildlife of their territories as are the majority of Conservation Officers. However, I believe, over any large portion of Iowa and during a period of three years or more, that these surveys do show population trends, whether up, or down, or stable. The numbers may not be precise but the trends will appear.

METHODS

The method used in this survey has not altered through the years. In winter, following the deer season, officers are sent county maps of their respective territories and requested to mark on these maps locations of deer herds and numbers of deer in each herd. The maps are then returned to the Biology Section where the results are tabulated.

In compiling the results of the 1968 survey, Zones from the 1967 gun season are used. This was done so the data might be related more readily to other deer research work-hunter success statistics for example. Also, because 1963 was the first year during which hunting Zones were used, comparisons are drawn with data from 1963 and from 1967.

RESULTS

A list of counties with estimates for years 1963, 1967, and 1968 appears in Table 1. Sixty counties show population increases since 1963; 39 show decreasing populations. Increasing populations appear in Zone 1, 2, and 3; or roughly western and southern Iowa (Table 2). Declining populations appear in Zones 4, 5, and 6, northern and eastern Iowa.

The statewide estimated population of 22,870 was down 10.1 percent from the 1967 population (Table 3). Fewer deer were reported from all Zones. This represents the second successive year a population decline is indicated. The fall population (multiplying 22,870 x 1.7) will be less than 38,679 deer.

DISCUSSION

During two successive years we have reports of declining deer populations from Conservation Officers. These reports cannot be ignored. I believe the one major factor controlling deer populations in Iowa is hunting. If populations have declined, then we have been too permissive in our hunting controls. We will have to watch hunting success and age structure of the deer herd carefully to refute or verify the officers reports. If these surveys substantiate the officer reports, then we will have to reduce numbers of deer hunters in the future.

Deer have increased dramatically during five recent years in south central (up 52.7 percent) and southeast (up 60.1 percent) areas. This increase was foreseen several years ago. It logically should have occured, as much lightly occupied habitat existed in those areas during the fifties and early sixties. Now I believe this population boom has expired and we will need to watch those areas too in an effort to detect evidence of too heavy hunting pressure.

Table 1. Conservation Officer Deer Estimates by Counties for 1963, 1967, and 1968.

County	Estimates*		
	1963	1967	1968
Adair	189	370	295
Adams	70	170	83
Allamakee	750	1,500	1,500
Appanoose	84	175	161
Audubon	87	130	105
Benton	39	63	65
Black Hawk	139	91	81
Boone	106	130	121
Bremer	117	35	60
Buchanan	138	80	70
Buena Vista	51	54	53
Butler	220	73	60
Calhoun	30	24	25
Carroll	35	62	56
Cass	220	248	160
Cedar	77	75	155
Cerro Gordo	25	33	40
Cherokee	111	161	126
Chickasaw	120	50	45
Clarke	450	520	550
Clay	112	160	122
Clayton	1,150	670	765
Clinton	160	218	217
Crawford	375	800	550
Dallas	242	400	400
Davis	89	300	237
Decatur	590	720	750
Delaware	283	170	140
Des Moines	410	695	686
Dickinson	75	39	65
Dubuque	200	115	90
Emmet	80	112	88
Fayette	80	155	87
Floyd	155	144	143
Franklin	135	56	47
Fremont	224	185	274
Greene	88	149	117

Table 1. continued

County	Estimates*		
	1963	1967	1968
Grundy	5	6	9
Guthrie	527	1,020	773
Hamilton	111	130	99
Hancock	33	61	32
Hardin	115	127	113
Harrison	260	700	550
Henry	153	170	250
Howard	165	120	100
Humboldt	80	120	104
Ida	57	31	26
Iowa	127	135	130
Jackson	595	565	280
Jasper	106	103	145
Jefferson	192	75	112
Johnson	130	130	140
Jones	160	150	370
Keokuk	146	153	122
Kossuth	73	130	185
Lee	237	725	525
Linn	220	207	170
Louisa	85	168	136
Lucas	530	740	515
Lyon	155	250	140
Madison	300	540	600
Mahaska	139	398	150
Marion	129	122	131
Marshall	133	64	76
Mills	264	493	386
Mitchell	135	160	129
Monona	775	1,025	705
Monroe	285	690	620
Montgomery	194	333	313
Muscatine	80	75	72
O'Brien	35	94	74
Osceola	21	33	25
Page	188	232	219
Palo Alto	44	105	130

Table 1. continued.

County	Estimates*		
	1963	1967	1968
Plymouth	315	152	220
Pocahontas	45	41	40
Polk	120	155	135
Pottawattamie	1,385	1,120	1,109
Poweshiek	65	55	55
Ringgold	85	300	196
Sac	87	70	55
Scott	58	74	77
Shelby	215	500	375
Sioux	205	93	114
Story	72	54	66
Tama	63	95	114
Taylor	38	110	113
Union	85	275	215
Van Buren	109	550	650
Wapello	162	325	310
Warren	144	178	166
Washington	240	125	168
Wayne	120	218	199
Webster	160	140	140
Winnebago	60	100	85
Winneshiek	775	540	350
Woodbury	370	421	440
Worth	70	97	83
Wright	72	35	50

* In some instances officers gave maximum and minimum estimates for individual counties. Means of these estimates are used in the table.

Table 2. Officers Deer Estimates: A Comparison by Zones of 1963, 1967, and 1968.

Zone	1963	1967	1968	Percent Change 1963-68*
1	4,628	6,028	5,121	+ 10.7
2	2,706	4,778	4,132	+ 52.7
3	3,511	5,929	5,621	+ 60.1
4	3,141	3,122	2,829	- 9.9
5	3,072	2,985	2,802	- 8.8
6	2,507	2,608	2,365	- 5.7
Statewide	19,565	25,450	22,870	+ 16.9

* The statewide change from 1963 to 1967 was plus 30.7 percent.

Table 3. Deer Population Estimates 1958-68.

Year	Number Deer Reported	Percent Change from Previous Year
1958	10,643	------
1959	11,705	+ 10.0
1960	13,101	+ 11.9
1961	14,155	+ 8.0
1962	15,938	+ 12.6
1963	19,565	+ 22.8
1964	21,580	+ 10.3
1965	25,573	+ 18.5
1966	28,482	+ 11.4
1967	25,450	- 10.6
1968	22,870	- 10.1

FOX MOVEMENT STUDIES IN IOWA

Ron Andrews
Game Biologist

INTRODUCTION

In order to properly manage the red fox (Vulpes fulva) as a game animal and predator in Iowa it is necessary that we have a current knowledge of its population status, productivity, movements, mortality and food habits. In 1966, Bob Phillips, former Fur Bearer Biologist with Iowa, initiated a fox tagging study in an attempt to determine the movement and dispersal of foxes prior to and during their breeding season.

In 1966 a total of 85 foxes were tagged and released at the den site. During 1967, 249 foxes were tagged. The tagging operations in 1968 were supervised by Richard Bishop and Ron Andrews, Game Biologists at Clear Lake. George Good, farmer and fox trapper from Randall, was in charge of all field operations. A total of 388 foxes were tagged this year.

Methods and Materials

A mechanical wire ferret was used to removed fox pups from their dens. The ferrets are made from spring steel wire varying in length from 20-60 feet. A spring 8 inches long is turned on one end of the ferret while a handle is bent at the other end. A wooden plug placed in the spring of the ferret creates a thumping noise as the ferret is twisted into each den. The noise either scares the young foxes from the den or their fur becomes entingled in the wire and the fox pups can be pulled out. A couple of men stand ready with stand ready with dip nets to catch any foxes that the ferret scares out.

Near the end of the tagging period, when pups are a third to half grown, padded traps are set to catch adults as well as pups at dens where the ferret does not work successfully.

Button-type ear tags are placed in each ear and each tag has an indentifying number on one side and the words "Notify Iowa Conservation Commission, Boone, Iowa" on the other. Metal band type tags were used in 1966 but these proved to be less effective because they were less noticeable to persons taking a tagged fox.

Den locations were found by contacting State Conservation Officers and interested fox hunters and trappers.

Results and Discussion

Foxes were tagged in 25 counties across Iowa this year. A breakdown of the foxes tagged in 1968 is shown on Table 1. The male to female ratio of fox pups is 1.16:1. We must be cautious of the above figure because at very few dens were we able to tag the entire litter. At one den in Northeast Iowa we tagged 9 female pups.

At some dens farmers requested that we take all foxes caught from their property. In 1966 and 1967 most of these pups were taken to the Wildlife Research Station at Boone and raised until late summer when they were released in various parts of the state. In 1968 we introduced all but five of these unwanted foxes into other dens. Limited tag returns from 1967 indicates that the majority of the transplanted fox are readily adopted into the new litter.

Early analysis of the first two years of data by Phillips indicates that, on the average, female foxes moved nearly 20 miles from the original denning areas while the males dispersed on average of 30-35 miles from the original den site. However, the extremes of these movements have ranged from less than a mile to 115 miles. Dispersal is apparently randomly distributed in all directions, but further analysis of future returns may or may not show some directional preference. Physical barriers, such as the Mississippi River in Northeast Iowa, naturally have some effect on fox dispersal in that area of the state.

In 1966 we had a 45 per cent direct return from the 85 tagged foxes, while in 1967 we had only a 20 per cent return from 249 tagged foxes. The lower return in 1967 is generally attributed to the light snowfall and mild winter weather across the state of Iowa which resulted in a lower hunter kill on Iowa foxes.

In 1966 and 1967 fox tagging efforts were concentrated in North-Central and Northeast Iowa. In 1968 we attempted to tag a few foxes in Central and Southern Iowa. Because of the lack of adequate contacts, differences in terrain and cover, and differences in denning locations and habits, we were unable to tag a large number of foxes in these southern areas.

TABLE 1. Foxes captured and ear-tagged in Iowa, by county, 1968

County	Males	Females	Total
Appanoose	4	6	10
Boone	6	5 + 2 AF	13
Bremer	20	15	35
Carroll	4	-	4
Cerro Gordo	19	17 + 1 AF	37
Chickasaw	11	10	21
Clayton	7	14	21
Crawford	3	2	5
Decatur	1	1	2
Fayette	17	8 + 1 AF	26
Floyd	14	23 + 1 AF	38
Franklin	11	8 + 1 AF	20
Hamilton	5	1	6
Hancock	15	15 + 1 AF	31
Howard	3	1	4
Kossuth	18	14	32
Marion	6	5 + 2 AF	13
Mitchell	6	3	9
Polk	3	3	6
Poweshiek	5	4	9
Story	5	-	5
Wayne	1	2	3
Winnebago	4	1	5
Winneshiek	7 + 1 AM	3	11
Worth	9	8	17
In Captivity	3	2	5
Total	208 + 1 AM	170 + 9 AF	388

RESULTS FROM LEAD POISONING STUDIES AT FORNEY'S LAKE

Richard Bishop
Game Biologist

Introduction

Forney's Lake in Fremont County is a favorite concentration area for mallards and blue and snow geese during the fall migration. Thousands of mallards stop at Forney's Lake and many remain in that vicinity all winter. The past two winters have been mild, and approximately 70,000 mallards wintered on an open water ditch south of the lake. This area has had a history of lead poisoning when conditions were ideal for such. High mallard concentrations on areas with dense lead deposits can create a very serious problem. It was thus decided that more information on waterfowl losses, lead deposition, and conditions surrounding the times of losses would be of value for documentation and possible management implications.

The problem of lead poisoning is wide-spread and considered quite important in the Mississippi Flyway. A committee was set up to document problem areas and extent of losses to lead poisoning and to examine ways to curtail this waste. This study will supply data to the committee on lead poisoning losses in Iowa and yield information that will enable us to make management recommendations on this problem area.

Procedure

Stratified random bottom samples were collected throughout areas where loafing populations of waterfowl were observed. They were randomly selected from each 50-yard zone from the "retrieve line" to the middle of the marsh. The majority of the samples were 1 foot square and 2 inches deep. Some samples were taken to depths of 4 inches to check for a difference in settling. Samples were taken in the spring on the dry lake bed using a 1 foot ruler and a small shovel. One foot areas were marked off and the dirt was removed to depths of 2 or 4 inches, depending on the sample. The dirt was placed in numbered heavy plastic bags and returned to Clear Lake. The samples were then washed through a screen and the number of lead pellets recorded.

Data were recorded on waterfowl losses, habitat conditions, and weather conditions during the last 3 years. Thirty mallards were collected and analyzed in 1965 and 90 ailing geese were collected in December of 1967 to determine the agent involved. All mallards were termed positive for lead poisoning by the Iowa State University Veterinary Diagnostic Laboratory, but I do not have the results from the geese at this time.

Results

Waterfowl losses amounting to 1500 mallards were reported in December of 1960 at Forney's Lake. Prior to this, several other instances of sick and dying waterfowl were reported at Forney's Lake. Game Supervisor Ward Garrett witnessed a severe outbreak of lead posoning prior to 1960 at Forney's Lake. During the winter of 1965 and 1966 approximately 1800 mallards died in Fremont County. Conditions surrounding this period of kill were ideal for lead poisoning. Forney's Lake had open water and about 75,000 mallards were using Fremont County.

The fact that mallards were dying from lead poisoning at this location was definite, but where the lead was being picked up was not certain. Thus bottom samples of Forney's Lake were taken to see how much lead was available. Sixty-three samples were collected in the spring of 1967. Each sample was 1 foot square and 2 inches deep. An average of 0.8 pellets per square foot was found. Table 1 gives the number of pellets found per sample and the distance from the shooting line. Data collected in 1968 are presented in Table 2. A total of 80 samples averaged 2.2 pellets per square foot. Twenty 4-inch samples were taken and these samples averaged 2.6 pellets per square foot, while the 2-inch samples averaged 2.1 pellets per square foot. These data indicate a high lead deposit on this area which would be conducive to high waterfowl losses during periods of ideal conditions.

Discussion

Bottom samples indicate that a large amount of lead is available to waterfowl at Forney's Lake. A total of 143 samples averaged 1.6 pellets per square foot, which is considered quite high. Heron Lake in Minnesota has suffered considerable losses from lead poisoning and samples indicated 1 pellet per square foot. Horicon Marsh in Wisconsin has had a loss of Canada geese and bottom samples showed 0.7 shot per square foot. Other areas of loss indicate much lower lead deposits than are mentioned here.

The deposit of lead shot is not a random system but a clustering type situation. Therefore, the data can not be completely analyzed on a random basis. Also, hunter concentrations and the range of the shot pattern also determine the areas of high lead deposition. Much higher lead densities could likely be found if more samples were taken.

All birds that die at Forney's do not necessarily pick up the lead there, but some pick up the lead further north and arrive at the lake before they get too sick to fly. The dead birds that were observed in 1967 died in late December and January, indicating that most birds picked up the lead at Forney's Lake. Many birds die in November and December, but should not be credited to the lake.

Losses that occured at Forney's Lake in 1965 are not annual. Conditions must be right for lead poisoning. We must have a large number of ducks present, warm weather to keep the lake open, and the birds must be on a corn diet. These conditions will occur after the hunting season closes during years of mild winters. However, during the past two years we have drained the lake after the hunting season or allowed it to go dry, which moved the ducks south a few miles to an open water drainage ditch. Just a few ducks and geese were observed suffering from lead poisoning during these two years. Proper management of this area by draining in the winter can keep the losses at a minimum.

Mallards have been the main species affected by lead poisoning; however, numerous blue and snow geese showed signs of lead poisoning. Due to the high crippling loss of geese on this area, it is difficult to say what caused the death of most birds. Many of the 90 geese that were collected in 1967 appeared to be dying from lead poisoning.

Table 1. BOTTOM SAMPLES TAKEN IN 1967, Forney's Lake, Fremont County, Iowa

Yards from Shooting Line	No. Samples	No. Pellets	Pellets/ Samples*
70-120	12	13	2-4-4-3
120-170	12	15	3-3-3-6
170-220	12	13	3-2-6-2
220-270	12	7	2-1-2-2
270-320	12	1	0-0-1-0
320-370	3	1	1

*Average - 0.8 pellets/sq. foot

Table 2. BOTTOM SAMPLES TAKEN IN 1968, Forney's Lake, Fremont County, Iowa

Yards from Shooting Line	Size of Sample	No. of Samples	No. of Pellets	Pellets/ Sample*
70-120	2"	6	14	2.3
	4"	4	8	2.0
120-170	2"	22	28	1.3
	4"	6	28	4.7
170-220	2"	4	2	0.5
	4"	6	7	1.2
220-270	2"	6	1	0.2
	4"	2	4	2.0
270-320	2"	8	30	3.8
	4"	2	4	2.0
320-370	2"	14	52	3.8

*Average - 2.2 pellets/sq. foot sample
2" samples - average 2.1/sq. foot
4" samples - average 2.6/sq. foot

IOWA'S SPRING PHEASANT POPULATION - 1968

R. C. Nomsen
Game Biologist

The crowing cock count, which includes a 10 mile roadside survey, is the primary method for obtaining information on the spring pheasant population in Iowa. There were 176 routes checked this year by Conservation Officers, Unit Game Managers and Biologists.

The winter of 1967-1968 was relatively mild and snowfall was very light -- averaging only 12 inches for the state. Dust storms were common during late winter and early spring. Generally, pheasants experienced a mild winter.

METHODS

The technique for conducting the spring crowing and roadside counts remained the same as in previous years. Results are given for the six major regions as well as statewide.

The winter pheasant count was conducted from January 1 to March 15, 1968, to determine the sex ratio of Iowa's post-season pheasant population. These results are presented and are used to complete the crowing cock count interpretation.

RESULTS AND DISCUSSION

Sex Ratio Count

Conservation Officers, Unit Game Managers and Biologists reported a total of 4,644 pheasants during the winter survey (Table 1). This total was the lowest ever recorded and reflects the extremely poor checking conditions caused by lack of snow cover. The average snowfall of 12 inches nearly equalled the least reported during the past 76 years. Because of the very small sample, the reliability of these results must be viewed with caution.

The observed statewide sex ratio of 4.1 hens per cock indicated that hunters harvested 75 per cent of the cocks last fall compared to 64 per cent in 1966. The rate of harvest appeared to be quite low again in Northwest and North Central Iowa but was quite favorable in other areas of the pheasant range.

Crowing Cock Count

The 1968 crowing cock count showed a slight decrease (-7 per cent) in crowing intensity when compared to the results obtained in 1967 (Table 2). Counts from the Central and East regions averaged more calls per stop while all other areas indicated a lower rate of crowing. The statewide average of 11.8 calls per stop was equal to the previous 5-year average.

Censusing conditions were generally favorable in 1968 although wind disrupted some counts. The average wind velocity in 1968 was 2.1 mph compared with 2.9 mph in 1967 (Table 3). The average completion date this year was May 6th - same as in 1967. Early spring weather conditions were favorable so crowing activity began earlier than usual.

The statewide hen index indicated that the 1968 population of hens was 18 per cent higher than in 1967 (Table 4). The hen was determined by multiplying the average number of calls per stop by the observed sex ration from winter observations. The hen index this year was 48.1 compared to 40.6 in 1967.

Spring Roadside Count

Results of the 1968 spring roadside count also showed a slight increase in Iowa's spring brood stock of pheasants (Table 5). There were 4,800 birds sighted on the 176 roadside routes censused this spring - an average of 2.73 birds per mile compared to 2.66 birds per mile in 1967. Fewer cocks were reported but the number of hens increased by 7 per cent. The spring pheasant population appeared to be the same or higher in the Southeast half of Iowa and lower in the Northwest half of the pheasant range. This trend was similar to the results of the 1967 August roadside count.

Thus, when all counts are considered, Iowa's 1968 statewide spring pheasant population was slightly higher than in 1967. Although the 1967 August roadside counts indicated a 14 per cent decrease in the fall pheasant population, Iowa's mild winter of 1967-1968 was apparently kind to the birds. As a result, the carry over of pheasants were higher than normal. The mild weather continued in March and April which prompted early nesting activity.

Table 1. Observed sex ratios, by regions, during the winter survey, 1967 - 1968

Region	Number Of Hens	Number Of cocks	Sex Ratio 1968	Sex Ratio 1967
North west	332	135	2.5	2.9
North central	309	105	2.9	3.6
South west	1,307	316	4.1	2.4
Central	781	152	5.1	3.2
East	325	65	5.0	3.9
South	678	139	4.9	2.6
STATEWIDE	3,732	912	4.1	3.2

Table 2. Results of the 1968 spring crowing cock counts made by Conservation Officers, Unit Game Managers, and Biologists, and comparison with 1967 results.

Region of State	1968 No. of Counts	1968 Mean Calls per stop	1967 No. of Counts	1967 Mean Calls per stop	Change From 1967
North west	28	12.8	27	14.2	-10%
North central	26	13.8	26	16.7	-11%
South west	23	16.9	23	17.5	-3%
Central	27	14.8	31	13.3	+11%
East	34	9.0	34	7.2	+25%
South	38	8.0	41	10.7	-25%
STATEWIDE	176	11.8	182	12.7	-7%

Table 3. Comparison of dates on which spring pheasant counts were taken and mean wind velocity during counts 1968 vs. 1967

Region of State	Mean Date of Counts 1968	Mean Date of Counts 1967	Mean Wind (mph) 1968	Mean Wind (mph) 1967
North west	May 11	May 11	2.7	2.2
North central	May 16	May 10	2.3	3.5
South west	Apr. 30	May 1	1.0	2.0
Central	May 5	May 8	2.1	3.5
East	May 4	May 8	2.4	2.3
South	Apr. 30	May 5	2.2	3.7
Statewide	May 6	May 7	2.1	2.9

Table 4. Results of spring population counts, 1962 - 1968

Year	Calls Per Stop	Hen Index	Cocks per mile	Hens per mile	Birds per mile
1962	11.6	36.0	0.74	1.02	1.77
1963	12.9	38.7	0.95	1.36	2.31
1964	11.9	42.8	0.80	1.96	2.76
1965	9.4	32.9	0.61	1.36	1.97
1966	13.1	41.9	0.80	1.77	2.57
1967	12.7	40.6	0.85	1.81	2.66
1968	11.8	48.1	0.81	1.92	2.73

Table 5. Results of the 1968 spring roadside counts

Region of State	Number of Miles	Number of Cocks	Number of Hens	Total Birds	Cocks per Mile	Hens per Mile	Total Birds per Mile	Observed Sex Ratio
North west	280	175	227	402	0.63	0.81	1.44	1.3
North central	260	247	493	740	0.95	1.90	2.84	2.0
South west	230	242	778	1,020	1.05	3.38	4.43	3.2
Central	270	306	755	1,061	1.13	2.80	3.93	2.5
East	340	238	501	739	0.70	1.47	2.17	2.1
South	380	220	618	838	0.58	1.63	2.21	2.8
STATEWIDE	1,760	1,428	3,372	4,800	0.81	1.92	2.73	2.5

WOODCOCK SINGING-GROUND SURVEY, 1968

Gene Hlavka
Game Biologist

Woodcock singing-ground surveys are conducted each spring to obtain an index of abundance to the size of the breeding population. The Iowa survey, in cooperation with the U. S. Fish and Wildlife Service, has been conducted since 1961. Iowa has a closed season on woodcock.

The male woodcock courtship performance consists of "peenting" on the ground and "twittering and chirping" in the air. The males begin their performances from 10 to 30 minutes after sunset, depending on the amount of cloud cover. The number of different woodcock heard "peenting" in a 2-minute listening period forms the basis for the singing-ground survey.

Survey dates specified for Iowa were April 15, to May 10. Established routes along roads were used. Selected stops on the routes are at least 0.4 mile apart. The counts are limited to 35 minutes and are conducted by experienced Game and Biology Section personnel.

Twelve counts were made in the eastern half of Iowa. Woodcock were heard on 8 routes. A mean of 0.22 birds per stop was computed from 20 woodcock heard at 93 stops (Table 1). The 1968 index of 0.22 woodcock heard per stop equals the 8-year average (Table 2). Four routes need to be revised for the 1969 survey.

One woodcock brood was reported in 1968, this on the Wilson Island State Game Area near Missouri Valley in far western Iowa. This report plus previously recorded brood sightings further indicate that woodcock are widely distributed in Iowa, as shown by the singing ground counts.

Table 1. Results of spring, 1968, woodcock singing-ground counts in Iowa

Route	County	No. of Countable Stops	No. of Woodcock Heard	Woodcock Heard per Stop
Point Creek	Allamakee	8	4	0.50
Luster Heights	Allamakee	8	1	0.13
Wapsie Bottoms	Bremer	7	2	0.29
Buck Creek	Clayton	10	4	0.40
Sny Magill	Clayton	7	4	0.57
Rock Creek	Jasper	4	0	0.00
Sugar Creek	Lee	Not run because of wind		---
Klum Lake	Louisa	9	3	0.33
City Lakes	Lucas	9	1	0.11
Colyn Area	Lucas	8	1	0.13
Otter Creek	Tama	10	0	0.00
Blakesburg	Wapello	8	0	0.00
Canoe Creek	Winneshiek	5	0	0.00
TOTALS (12 routes)		93	20	0.22

Table 2. Indexes to the size of the woodcock breeding population in the eastern half of Iowa, 1961-1968

Year	No. of Stops	No. of Woodcock Heard	No. of Woodcock Heard Per Stop	No. of Routes
1961	46	10	0.22	4
1962	42	9	0.21	5
1963	92	32	0.35	10
1964	108	17	0.16	12
1965	84	14	0.17	10
1966	113	26	0.23	13
1967	99	22	0.22	13
1968	93	20	0.22	12
8-yg. Avg.	85	19	0.22	10

POSTAL CARD SURVEYS OF IOWA QUAIL HUNTERS FOR THE 1967-68 SEASON

M. E. Stempel, Game Biologist
Gene Hlavka, Game Biologist

INTRODUCTION

This report of quail hunting success for the past season is based on a hunter post-card survey. About 5,000 hunters were contacted and data are here expanded to represent the 1967-68 quail hunting success of all Iowa quail shooters.

Also included is information from a special research area and data from a survey of a group of experienced southern Iowa quail shooters. Since 1960, Iowa winters and most other seasons have favored survival and production of bobwhites. Hence, Iowa could offer increasingly longer hunting seasons due to the comparatively high quail populations. The 1967-68 quail hunting season extended from October 21, 1967 to January 28, 1968; shooting hours, 8:00 a.m., to 4:30 p.m. daily, bag limit 8, possession limit 16. For 1966-67 the season was October 22, 1966 to January 31, 1967, shooting hours 8:00 a.m. to 4:30 p.m., bag limit 8, possession limit 16. For 1965-66 the season was November 6, 1965 to January 31, 1966, shooting hours 8:30 a.m. to 4:00 p.m. For 1964-65 the season was October 31, 1964 to January 3, 1965, with shooting hours from 8:30 a.m. to 5:00 p.m. Bag and possession remained the same and the entire state was open for shooting.

The methods of survey are outlined in the 1965 April-June Quarterly Biology Report, with about 2 per cent of resident hunters and 2 per cent of non-resident hunters being contacted.

RESULTS

Resident Licensees, Statewide

From the entire state, residents returned 1,595 cards of which 319 contained information on quail shooting. Twenty per cent had thus shot quail. Resident hunters' bagged 624,340 quail (Table 1). The 58,900 hunters made 318,060 trips involving 1,207,450 hours.

The average Iowa resident hunter who shot quail made 5.4 quail hunting trips during the 1967-68 season. The average outing for the individual was 20.5 hours, with 2.4 quail per trip, and a success rate of 1.9 hours per quail bagged.

The material for the 1967-68 season is presented here on a statewide basis. In a similar 1966 quail hunting report, success was discussed for various portions of Iowa. Since there were few significant regional weather variations the past 2 years, the trends in the different areas of the state were similar. For this reason the various parts of Iowa will not be discussed here. A survey of comparative success in various parts of the state is also set forth in the 1965 April-June Quarterly Biology Reports.

Non-Resident Hunters

In addition to licensed resident quail shooters, 68 non-residents returned hunting reports, and 22, of these (32 per cent) shot quail. Non-residents bagged 112,179 quail last year (Table 1) with 3,584 such hunters making 22,221 quail hunting trips involving 135,475 hours. Non-resident quail shooters recorded an average (per-man) hunting trip of 6.1 hours with 5.6 birds per trip at a rate of 1.1 hours per quail (0.91 bird per hour).

Since there were so few of these cards, the figures may not represent very precisely the true results of hunting by the non-residents.

January Quail Hunting

Because the month of January was added to the season in 1965-66 a special question was added regarding hunting during this month. It was found in the 1967-68 season that 53 per cent of reporting hunters went quail hunting in January with 27 per cent of the total season's trips being made during January. Eighty-three per cent of those who hunted during the month had bagged quail, with thirty-three per cent of the total take occuring in January (240,886 quail).

The January hunting for 1966 through 1968 is shown in Table 2. The three-year January averages include about one-third of the statewide bag and one-third of the statewide trips, with 51 per cent of all quail hunters participating. The above figures are both resident and non-resident shooters. Only a few non-residents reported, hence their records are not entered separately.

DISCUSSION AND COMPARISON WITH RELATED SURVEYS.

The 1967-68 postcard survey showed a statewide quail hunting season which was nearly as good as that of the previous season and well above average. This was due to a succession of favorable production years. The postcard survey indicated that the statewide quail bag was down 20 per cent from the all-time high of 1966-67. Even experienced hunters reported a slight decrease in hunting success. The concensus was that hunting was satisfactory; and further decrease in success would undoubtedly be noticed. It has been observed that more than a 20 per cent change in success is readily observed by the shooters.

An extremely late corn harvest may have contributed to the reduced statewide quail bag. Average shooters, or those contacted through the postcard survey, took birds at a rate of 1.9 hours per bird. Experienced shooters took quail at a rate of 0.96 hour per quail.

This survey indicated that 20 per cent of all licensed resident hunters do shoot some quail. Of these residing in the primary quail country, about 50 per cent hunt quail. The latter figure was taken from an earlier survey.

Further information was obtained from interviews with farmers living on a 7,000-acre research area in quail range. This indicated that during the eleven days the season was open in October, 10 per cent of the season's quail hunting occurred; in November the figure was 41,, in December 31 and January 18. These results differ somewhat from the postcard survey figures. However, the farmers do not know of all hunting that takes place on their farms, so their impressions have considerable room for error.

Table 1. Results of 1967-68 Iowa quail hunting season (from hunter postcard questionnaire)*

	Resident	Non-Resident	Total
Statewide quail bag	624,340	112,179	736,519
Total hunting hours	1,207,450	135,475	1,342,925
Total hunting trips	318,060	22,221	340,281
No. hunting this species	58,900	3,584	62,484
Per cent hunting this species	20	32	21
Avg. no. of trips per hunter	5.4	6.2	5.5
Avg. no. of gun hours per hunter	20.5	37.8	21.6
Avg. no. of hours per trip	4.5	6.1	4.6
Avg. no. bagged per hunter per season	10.6	31.3	11.9
Avg. no. bagged per trip	2.4	5.6	2.6
Avg. no. bagged per gun hour	0.53	0.91	0.57
Avg. no. hours per bird bagged	1.9	1.1	1.8

*Based on 294,500 resident hunting and combination hunting an fishing licenses and 11,200 non-resident licenses.

Table 2. Iowa January quail hunting

Year	% of Statewide Bag	% of Total Trips	% of all Quail Hunters Active
1966	29	34	42
1967	33	37	59
1968	33	27	53
3 year average	32	33	51

SUMMARY

1. A sample of 2 per cent of resident hunters and 2 per cent of non-resident Iowa hunters was contacted in early 1968 by mail.

2. Cards were filled out, and returned by 1,595 resident licensees and 68 non-resident licensees.

3. Twenty per cent of residents and 32 per cent of non-residents hunted quail.

4. Residents took 624,340 quail at 1.9 hours per quail; the non-resident rate was 1.1 on a bag of 22,221 birds.

5. Thirty-three per cent of the total quail bagged during the 1967-68 season, were taken in January.

6. According to farmer interviews, about 10 per cent of the total season hunting effort took place in October (first 11 days of the season) while the remaining effort was for November, December and January as follows; 41, 31 and 18.

POSTAL CARD SURVEYS OF RABBIT AND CROW HUNTERS FOR THE 1967-68 SEASON

M. E. Stempel
Game Biologist

Gene Hlavka
Game Biologist

INTRODUCTION

This paper contains the results of the 1967-68 Hunter Postcard Survey for cottontail rabbits with a lesser amount of information on results of jackrabbit and crow hunting. Details of the method are explained in the 1965 April-June issue of Quarterly Biology Reports, which also has additional information on relationship of snow to rabbit hunting.

RESULTS

Response. In 1967, 294,500 hunting and combination resident licenses were sold and about 2 per cent of these were contacted in this survey. Of the 11,200 non-resident license purchasers about 2 per cent were contacted. Resident hunters returned 1,589 cards, about 32 per cent; non-residents returned 67, or about 45 per cent.

Cottontails. For both residents and non-residents, of these reporting, 49 per cent hunted cottontails. Tabulation of information on the cottontails is contained in Table 1. When information from the cards is expanded for cottontails, all licensed hunters expended 2,484,110 hours taking 1,548,035 cottontails during 894,420 trips at a rate of 0.63 per gun hour, compared to a success rate of 0.73 in 1966-67.

In 1966-67, 2,180,523 cottontails were bagged; the take of rabbits in 1967-68 was probably similar to that for the previous years because of similar weather. During the past two winters there were only a few days of light to moderate snowfall with a nominal amount of cold weather.

Jackrabbits and Crows. Jackrabbit hunters made up 7 per cent of licensed resident hunters (7 per cent in 1966-67) with jackrabbits being harvested during 91,481 trips involving 296,856 hours (Table 2). The bag per gun hour averaged 0.20 as compared to 0.38 in 1966-67. Data on non-residents are few as only one card was returned with information on non-resident hunting of jackrabbits.

Crows were shot by 9 per cent of resident licensed hunters (Table 3). Non-residents did not report any crow hunting. A total kill of 230,594 was shown, with 328,662 hunting hours being spent in pursuit of crows; the bag rate was 0.76 per gun hours.

Table 1. Statewide results of 1967-68 postal card survey of cottontail hunting success

Item	Resident	Non-resident	Total
Statewide bag - cottontails	1,516,675	31,360	1,548,035
Total hunting hours	2,444,350	39,760	2,484,110
Total hunting trips	883,500	10,920	894,420
No. hunting this species	147,250	2,800	150,050
Per cent hunting this species	50%	25%	49%
Avg. no. trips per hunter	6.0	3.9	6.0
Avg. no. gun hours per hunter	16.6	14.2	16.6
Avg. no. hours per trip	3.5	3.9	3.5
Avg. no. bagged per hunter per season	10.3	11.2	10.3
Avg. no. bagged per trip	2.2	3.3	2.2
Avg. no. bagged per gun hour	0.63	0.84	0.63
Avg. no. hours per animal bagged	1.6	1.2	1.6

Table 2. Statewide results of 1967-68 postal card survey of jackrabbit hunting success

Item	Resident Hunters*
Statewide bag jackrabbit	55,661
Total hunting hours	296,856
Total hunting trips	109,260
No. hunting this species	20,615
Per cent hunting this species	7%
Avg. no. trips per hunter	5.3
Avg. no. gun hours per hunter	14.4
Avg. no hours per trip	3.1
Avg. no. bagged per hunter - per season	2.7
Avg. no. bagged per trip	0.63
Avg. no. bagged per gun hour	0.20
Avg. no. hours per animal bagged	5.0

* One non-resident hunter reported taking 2 jackrabbits incidental to pheasant hunting.

Table 3. Statewide results of 1967-68 postal card survey of crow hunting success

Item	Resident Hunters*
Statewide bag, crow	230,594
Total hunting hours	328,662
Total hunting trips	124,574
No. hunting this species	26,505
Per cent hunting this species	9%
Avg. no. trips per hunter	4.7
Avg. no. gun hours per hunter	12.4
Avg. no. hours per trip	3.2
Avg. no. bagged per hunter per season	8.7
Avg. no. bagged per trip	2.4
Avg. no. bagged per gun hour	0.76
Avg. no. hours per animal bagged	1.3

* No non-residents reported hunting crows, so this represents all resident hunters.

Ruffed Grouse 1968 Spring Drumming Survey

Eugene D. Klonglan
Asst. Supt. of Biology

Spring roadside drumming surveys of the ruffed grouse population in northeastern Iowa have been conducted on a systematic basis since 1961. In 1968 there were 15 counts completed on 11 routes by Biologists and Conservation Officers. Data from nine of these routes were suitable for comparison with counts from previous years. The mean of 1.46 drums per stop heard on the best count from each of these nine routes compared closely with means from previous years (Table 1, detail of individual counts in Table 2.) There has thus been no appreciable change in the grouse population in northeast Iowa over the past 8 years, at least not as measured by this survey technique. There is certainly no evidence of any cycling of grouse populations in this area. It should be kept in mind in interpreting these data, however, that the routes are laid out primarily in the best grouse areas. Thus they may not reflect population changes that might be occurring in more marginal areas.

Table 1. Indices to ruffed grouse population density in northeast Iowa, 1961-1968, as measured by the spring roadside drumming count (comparable routes only.)

Year	No. of Routes	No. of Stops	Total Drums	Drums per Stop	Change
1961	6	89	137	1.54	------
1962	8	111	189	1.70	+ 10%
1963	9	130	217	1.67	- 2%
1964	9	133	203	1.53	- 8%
1965	9	135	227	1.68	+ 10%
1966	(2)	(30)	(54)	(1.80)	(Insuff. Data)
1967	7	105	154	1.47	- 12%
1968	9	130	190	1.46	None
8 years	59	863	1,371	1.59	Little

Table 2. Results of Spring 1968 Ruffed Grouse Drumming Counts in Northeast Iowa

Route	County	No. Stops	Drums Heard	Drums Per Stop
Yellow River State Forest	Allamakee (SE)	15	24	1.60
Village Creek	Allamakee (C)	13	27	2.08
Harpers Ferry-Wexford	Allamakee (E)	15	28	1.87
Upper Iowa	Allamakee (N)	15	46	3.07
Highlandville-North Bear	Winneshiek (NE)	15	32	2.13
Sny Magill-Bierbaum	Clayton (NE)	15	9	0.60
Bloody Run	Clayton (NE)	13	6	0.46
Lower Yellow River	Allamakee (SE)	15	13	0.87
Frankville-Yellow River	Winneshiek (SE)	14	5	0.36
TOTALS		130	190	1.46
Other counts made but not used for long term comparisons-poor weather, lower counts, other reasons				
Yellow River State Forest	Allamakee (SE)	15	9	0.60
Bloody Run	Clayton (NE)	15	2	0.13
Sny Magill-Bierbaum	Clayton (NE)	15	4	0.27
Highlandville-North Bear	Winneshiek (NE)	15	20	1.33
Garnavillo-Buck Creek	Clayton (EC)	12	6	0.50
Malanaphy Springs	Winneshiek (NC)	15	2	0.13