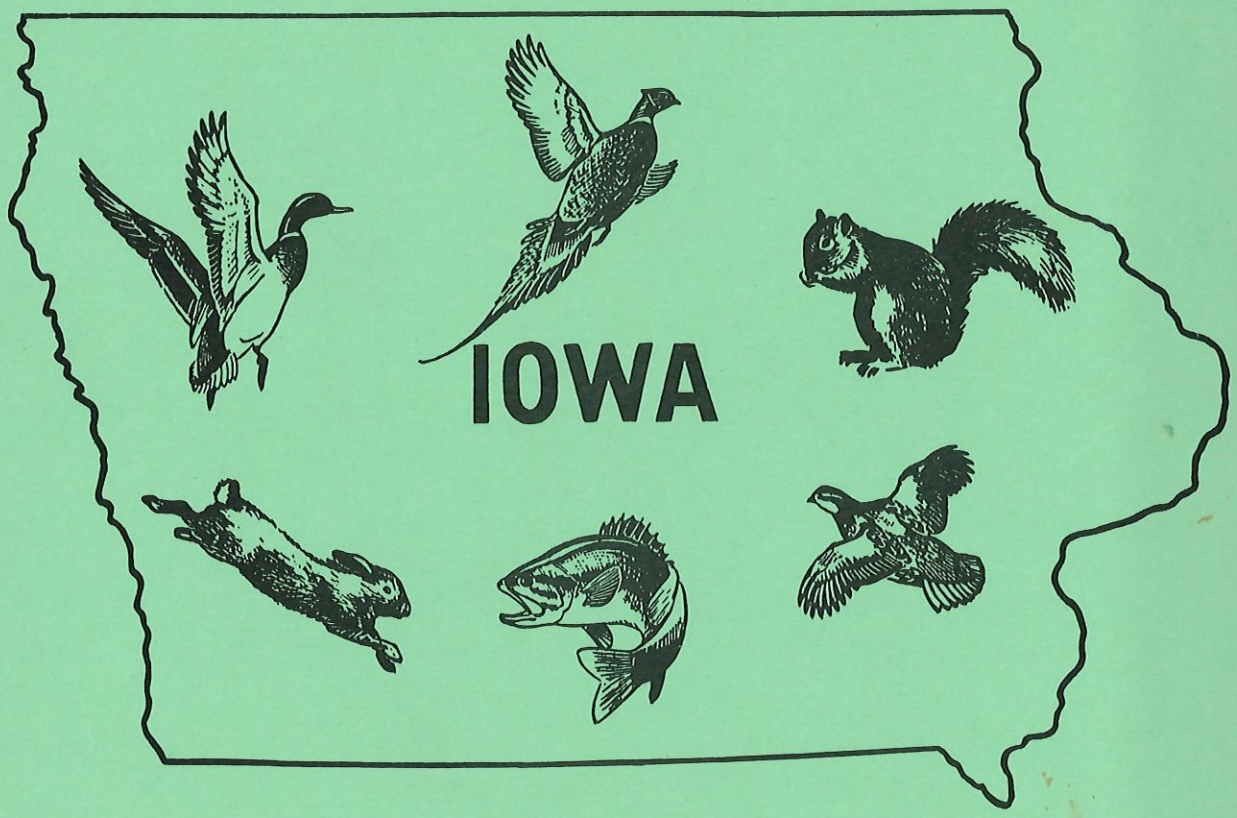
1964

QUARTERLY BIOLOGY REPORTS



FISH AND GAME DIVISION — BIOLOGY SECTION

STATE CONSERVATION COMMISSION

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YELLOW PERCH, Perca flavescens, IN WEST OKOBOJI LAKE, WITH SPECIAL REFERENCE TO THE 1960 YEAR CLASS

Terry Jennings
Tom Moen
Fisheries Biologists

An exceptional hatch of yellow perch was noted in West Okoboji Lake during the 1960 routine summer test nettings. The 1960 year class made up 55, 71, and 74 per cent of the adult perch in the survey hauls during 1962, '63 and '64, respectively. Members of this year class did not enter the creel in significant numbers until the winter of 1962-63. At this time they comprised 40 per cent of the perch taken home by fishermen. The following winter these fish made up 65 per cent of all the perch in the creel. A total of 273 scale samples was processed for age and growth data. The coefficient of condition C (T.L.) is discussed.

MOVEMENTS OF TAGGED CHANNEL CATFISH IN THE LITTLE SIOUX RIVER

Bill Welker
Fisheries Biologist

Since May of 1964, 8,607 channel catfish have been marked and released at the point of capture at nine stations along the Little Sioux River. Of these 8,107 fish were tagged with serially numbered internal tags while the remaining 500 individuals were marked by fin-clipping. To date 457 marked fish have been recaptured. One hundred fifteen were retaken at the point of release; 124 had moved upstream; and 218 had moved downstream. The maximum distance moved upstream was 36 miles; while the greatest movement downstream was 57 miles. The mean upstream distance traveled was about 13 miles while the mean downstream distance was 16 miles. A sample of 258 catfish were transported from the place of capture to a release point four miles above. Thirty-five of these were recaptured. Twenty-nine had moved upstream while six had moved downstream.

A SURVEY OF THE CEDAR RIVER IN THE VICINITY OF CEDAR RAPIDS

Gary Ackerman
Roger Schoumacher
Fisheries Biologists

A survey of the Cedar River in the vicinity of Cedar Rapids was undertaken to evaluate the effects of a low-head dam proposed by the Iowa Electric Light and Power Company. The fish population in the area is 95 per cent rough fish with carp and quillback predominating. Channel catfish are the most important game fish. The area receives a heavy pollution load, and fish kills occur frequently. The proposed dam could have numerous effects - some beneficial and some detrimental. The important problem in the area, however, is the gross pollution, which should be cleaned up so that fish populations can take advantage of the excellent physical habitat in the area.

CORALVILLE RESERVOIR AND LAKE MACBRIDE CREEL CENSUS - 1964

Don Helms
Jim Mayhew
Fisheries Biologists

A creel census of the Coralville Reservoir - Lake MacBride sport fishery was made during the 1964 summer season. It was determined that the two lakes attracted 486,981 fishermen. They traveled a combined distance of 5,613,359 miles, fished 898,177 hours, and caught 929,709 fish. The monetary value of the sport fishery during the summer of 1964 was calculated at $549,638. The primary species fished for and caught in the greatest numbers were crappie, channel catfish and bullhead.

WATERFOWL DRIVE-TRAP BANDING, 1964

Gene Goecke
Game Biologist

During three weeks of July this year, 1,822 birds were banded by Game Section personnel with assistance from Biology Section and Conservation Officer personnel. Approximately 66 per cent, or 1,196, of the birds banded were blue-winged teal. The production of young coot was down markedly this year. Ten previously banded blue-winged teal were recaptured this year. The number of shore birds banded this year was larger than in any previous year. Wood duck production was much higher in the prairie pothole region of Iowa this summer.

SPRING AND SUMMER QUAIL POPULATIONS, 1964-63

M. E. Stempel
Game Biologist

The July whistling quail count is our chief source of information on the quail population. It is supplemented by rural mail carrier surveys, Conservation Officer sight records and by information recorded on the July roadside rabbit and the August pheasant surveys. Winter, spring and summer weather favored quail, although the production period was somewhat later than that of 1963. Best populations are in the south central and southeast. The whistling quail counts indicated a statewide increase of 71 per cent in brood stock. Mail carrier reports show a 2 per cent gain. On the August roadside pheasant counts, which include a larger portion of the young quail, there was a 25 per cent increase in quail sighted over 1963. The general conclusion from the several surveys is that the quail population is significantly greater than last year.

IOWA'S LATE SUMMER PHEASANT POPULATION - 1964

Richard C. Nomsen
Game Biologist

The August roadside pheasant count is the primary source of information on the status of the pre-hunting season pheasant population. It is supplemented by the rural mail carrier survey and information recorded on the rabbit roadside and quail whistling count. The winter of 1963-1964 was relatively mild and spring weather conditions appeared to be favorable for a successful hatch. During the August count, observers recorded 12,130 pheasants or 2.70 birds per mile which is nearly equal to the high count of 2.72 in 1963. The highest pheasant population was in the north central region followed by the southwest region. Various indices to reproductive success indicated excellent production in all regions of the state except extreme northwest Iowa. The population decreased in the northwest region but was still above the state average.

HUNGARIAN PARTRIDGE POPULATION TRENDS IN IOWA, 1954-64

Eugene D. Klonglan
Ass't. Supt. of Biology

The number of hungarian partridge sighted on the late summer and spring roadside pheasant counts provides an index to hun population trends. During the 1954 to 1964 period, a steady increase in huns has been observed on the late summer counts in 24 northwest Iowa counties. About 5 huns per 100 miles were seen early in this period, but around 15 per 100 miles have been seen the last 2 years. Spring roadside counts have been taken only the last 3 years, but they depict the same trends. It is speculated that the presence of additional "grass-type" cover in recent years as a result of governmental farm programs may be an important factor in this gradual increase. Better than average nesting season weather is no doubt also a very important factor in the marked increase late in this period. There is good evidence the hun has extended its range during the past decade, particularly downward into west central Iowa.

RESULTS OF JULY, 1964, ROADSIDE RABBIT SURVEYS

Paul D. Kline
Game Biologist

July roadside surveys for 1964 revealed a sharp increase in cottontail populations over much of Iowa. The statewide index climbed from 5.61 in 1963 to 6.69 in 1964. All areas showed increased populations. The indices, higher than the 15-year average in all areas, indicate higher than normal populations of cottontails occur in most portions of Iowa. Lowest populations appeared, as is traditional, in the northeast counties. Production for 1964 as indicated by age ratios, (2.48 juveniles per adult), was higher than for 1963 (2.41) and 1962 (2.06), and near the average of 14 previous years of 2.51. Excellent carryover of adult rabbits through the winter of 1963-64 is believed responsible for the general increase in rabbits throughout Iowa in 1964. The fall population index of 4.79 is higher than that obtained any year since this index was calculated and signifies hunting prospects for the 1964-65 season are much better than average. The index of jackrabbits (0.15 per 10 miles) was near the indices obtained for 1963 and 1962, 0.17 and 0.11 respectively. Jackrabbits remain relatively low in numbers. The numbers of rabbits seen during the spring and summer pheasant surveys and quail whistling counts are recorded here and corroborate without exception the data from the regular rabbit surveys.

BIOLOGICAL DATA FROM THE 1963 SHOTGUN DEER SEASON

Keith D. Larson
Game Biologist

Biological data were obtained for 1,486 of the 7,151 deer killed in 1963. Data collected included sex, weight, age, antler measurement, and general condition. Age class criteria indicate that we did not overharvest the deer although the kill was 25 per cent greater than in 1962. Seventy per cent of the sample were fawns or 1 1/2 year olds. The sex ratio was 115 males per 100 females.

YELLOW PERCH, Perca flavescens, IN WEST OKOBOJI LAKE, WITH SPECIAL REFERENCE TO THE 1960 YEAR CLASS

Terry Jennings
Tom Moen
Fisheries Biologists

INTRODUCTION

West Okoboji Lake is a natural lake of glacial origin located in northwest Iowa. It is Iowa's third largest natural lake with surface area of 3,788 acres and a maximum depth of slightly over 130 feet. West Okoboji Lake is one of a chain of six lakes in Dickinson County that comprise what is locally known as the "Iowa Great Lakes." Fish with migrating tendencies have free passage to and from East Okoboji Lake through a narrow connecting waterway. West Okoboji has traditionally furnished excellent perch fishing, particularly during the late fall and winter periods. During the late 50's winter perch fishing suffered a decline, and routine summer surveys indicated a relatively low population of adults. An exceptionally good hatch of perch in the spring of 1960 presented an excellent opportunity to study the contribution of a strong year class to the sport fishery. Scale samples of perch captured in routine test seining and from the winter fishery provided age and growth information for correlation with this 1960 year class.

Test Seining

Summer survey hauls are made annually on the lake. Normally eight hauls are made with 500 feet of 1/4-inch seine twice each season. The first round of hauls is usually completed in late July and the second round in late August or early September. This type of test netting provides comparative data on a year-to-year basis. Young of the year and yearling fish are the most common age groups collected.

During the summer of 1960 the survey seine averaged 9,701 young perch per haul during the first series of hauls and 4,071 the second series. Except for 1960, young perch have never exceeded 5,000 per haul (1st round) in the past 12 years, averaging 2,110 per haul. Survey seining in 1961 failed to show proportionately higher numbers of yearling perch, but the 1960 year class made up 55, 71, and 74 per cent of the adults (fish in their 3rd year of growth or older) taken in the test netting during 1962, '63, and '64 respectively. This large year class apparently contributed to a marked increase in the number of adults captured by survey seining. During the period of 1956 through 1961 the survey reports indicated there were about 20 adult perch in each haul, while during the 3-year period of 1962 through 1964 the average adult catch increased to approximately 75 per haul.

Angler Harvest

During the 11 years prior to 1957, creel census data were obtained through a simple contact type census. Commencing in 1957 there has been a comprehensive type census in operation on this lake, as described by E. T. Rose and Tom. Moen in previous quarterly reports. This type of census provides estimated total numbers of fish (by species), anglers, and angling hours on a monthly basis.

The comprehensive census, during the winters of 1957-58, 1958-59 and 1959-60, showed a range of 16,000 to 18,000 perch taken by fishermen each year, at a rate of about 0.30 fish per hour. Data are not available for comparison of the summer or open water fishing for the same periods. In spite of the apparent low population of perch, the numbers taken by fishermen increased considerably in both the winter of 1960-61 and 1961-62, and continued upward during the next two winters (1962-63 and 1963-64) with fishing success averaging over 1.3 fish per hour.

The advent of an exceptionally strong year class during the summer of 1960, following the years of poor fishing, provided an excellent opportunity to study the contribution of this year class to the sport fishery in the succeeding years. The 1960 year class did not enter the hook and line fishery in any significant numbers until the winter of 1962-63. Due to local conditions and work assignments, the contribution to the fisherman's creel was not checked again until the winter of 1963-64.

Even though members of the 1960 year class were small during the 1962-63 winter, averaging 7.3 inches in total length and ranging from 6.3 inches to 8.5 inches, they comprised 40 per cent of the perch taken home by fishermen. Although fishermen exercised some selectivity, the average total length expressed above compares quite closely with the calculated total length of 7.2 inches for 3-year olds when all age groups were combined. The following winter this age class made up 65 per cent of all the perch in the creel. At this time there was no evidence of selectivity in size by the fishermen. Additional evidence of the strength of the 1960 year class and contribution to the fishing was noted in the winter of 1963-64 when only 4 per cent of the catch was made up of age group III (1961), 28 per cent of age group V (1959), and 3 per cent of age group VI (1958).

Age and Growth

Scale samples from representative perch were collected at various times in order to correlate length frequencies with age. These 273 scale samples were also processed for a limited age and growth analysis. Scales were mounted between glass slides, soaked in water, and the annuli determined with the aid of a microprojector. The location of each annulus was marked on a strip of stiff paper. The length at each annulus was determined through the use of a direct proportion nomograph as described by Carlander and Smith (1944) (Table I).

The growth of perch as shown in this study is similar to the growth reported by Parsons (1951) for a group of 85 perch collected from West Okoboji in 1949.

The relative plumpness or well being of a fish is often expressed by the coefficient of condition. The average coefficient of condition C (T.L.), for 135 perch from West Okoboji during the study period was 44. This figure meets the requirements for perch in "average" condition in Minnesota waters (Carlander, 1950). The coefficient of condition for West Okoboji perch increased as the fish increased in length, and was particularly apparent in those 9 inches long or longer.

TABLE I. Average calculated total length at each annulus for yellow perch collected from West Okoboji Lake, 1963

Age Group	No. in Sample	Average total length at capture	Average total length at each annulus					
			I	2	3	4	5	6
II	5	5.5	2.75	5.5				
III	60	7.53	2.08	5.0	7.53			
IV	173	8.55	2.08	5.05	7.02	8.55		
V	31	9.6	2.13	4.83	7.0	8.51	9.6	
VI	4	10.4	1.98	4.1	7.2	8.72	9.82	10.4
Total	273							
Average total length at each annulus			2.1	5.0	7.2	8.5	9.6	10.4

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Parsons, John W. 1951. Growth studies of the yellow perch, Perca flavescens (Mitchill), in three northwest Iowa lakes. Iowa State College Journal of Science. Vol. 25 (3): 495-500

MOVEMENTS OF TAGGED CHANNEL CATFISH IN THE LITTLE SIOUX RIVER

Bill Welker
Fisheries Biologist

INTRODUCTION

The channel catfish is the most important species living in Iowa streams. It, therefore, becomes important to know as much of its life history as possible. In keeping with this thought, a project to study the channel catfish in western Iowa streams was initiated in the spring of 1964. A part of this study concerns the movements of channel catfish. Tagging began in May and will continue for the next several years.

The purpose of this paper is to record the information gathered to date on catfish movements in the lower 60 miles of the Little Sioux River.

Description of Area

The Little Sioux River begins in Jackson County, Minnesota. It flows approximately 221 miles in a general southwesterly direction through Iowa until it joins the Missouri River at Little Sioux, Iowa. Above Cherokee County, Iowa, the river basin is characteristic of the original glacial drift plain with small lakes, marshes and irregular mounds and ridges. From this area the river flows approximately 75 miles southwest through the loess hills of western Iowa which is characterized by gullies, steep hillsides and ridges. The lower approximately 30 miles of river flow through the flat, alluvial flood plain of the Missouri River.

During 1956, the Army Corps of Engineers began work on relocation and channelization of the lower 35 miles of the Little Sioux River. The effect of this project, which was completed in 1961, was to make a uniform channel approximately 90 feet wide with a minimum number of bends along its 35-mile course to the Missouri River. Average water depths in the straightened area are often 3 feet or less during late summer. The old, unaltered river channel upstream has steep banks, frequent bends and many deep water areas around logs, brush or trees that have fallen into the river and formed obstructions.

Channel catfish are the most abundant game fish in the river. Reproduction of this fish in the unstraightened section of the river probably compares favorably with catfish reproduction in some of the finest catfish streams in this part of the United States. Walleye, sauger, bullhead, crappie and northern pike are other game fish found in the river. The rough fish population is composed of carp, carpsuckers, shad, and freshwater drum.

During the winter of 1963, the Army Corps of Engineers completed construction of a lowhead dam approximately 7 miles upstream from the mouth of the river. This structure was built to stabilize the bottom and sides of the straightened channel above the structure. There has been considerable erosion to the channel in this area, caused mainly by high water levels during the spring. Some of the eroded areas below this structure had water levels over 20 feet deep during this past mid-summer.

METHODS

All fish were collected with cheese-baited hoop nets of 1/2-inch or 3/4-inch bar measure at six locations. Two other temporary locations were also used. Aluminum tags, 1/5-inch by 4/5-inch, with a number on one side were inserted into the body cavity through a small incision just in front of the right pelvic fin. During the warmer summer months this incision healed within 7 to 10 days, leaving a small scar. The adipose fin on all tagged fish was clipped for a permanent mark. In addition, a different combination of the other fins was clipped to identify the release location. Although all clipped fins, except the adipose, did show regeneration, these fins could be identified until late summer. Approximately 500 fish were fin clipped but not tagged at the eight release locations.

Special emphasis was placed on finding any effect the dam might have on the upstream movement of catfish. Nets were set both immediately above and below the dam.

RESULTS AND DISCUSSION

Most of the recaptured fish (50.5 per cent) were recovered downstream. Hubley (1963) found 45.8 per cent of the tagged channel catfish in the Mississippi River moving downstream. Seaman (1948) and McCammon and La Faunce (1956) also found evidence of more downstream movement than upstream movement among tagged channel catfish. The range of downstream movement among the tagged Little Sioux River catfish was between .2 miles and 57.5 miles (Table 1).

Twenty-two per cent of the recaptured fish moved upstream between .2 miles and 36.2 miles (Table 1). Hubley found 18.8 per cent of tagged Mississippi River catfish moving upstream.

There was a pronounced upstream movement among the transported fish. These fish (258) were caught below the dam then tagged and released 3 miles above the dam. Almost 83 per cent of the recaptures moved upstream between 14.7 miles and 29.8 miles (Table 1). Hubley found 60.5 per cent of the recaptured transported fish moving upstream.

The newly constructed dam 7 miles upstream from the mouth appears to be an effective barrier to upstream movement of channel catfish. Over 1,000 tagged catfish were released below the dam but none were subsequently recaptured above the dam. Nineteen of the fish tagged and released above the dam have been recaptured below. Some of these tagged fish have moved over 57 miles downstream.

There was some difficulty trapping large numbers of catfish in most of the straightened area after the water level receded during mid-summer. Between one and three nets were constantly fished in this area, except for extreme high water when all nets were removed from the river. However fewer catfish were caught per net-day in the Turin area than at any other permanent netting location. Washta and Anthon were not permanent locations.

This report contains the first tabulation of tagged channel catfish movement since this study began. Other factors such as water levels, water temperature and fish size have also been measured and recorded during the study. Since these factors may affect fish movement, they will be discussed in future reports.

TABLE 1. Total number of tagged and/or clipped channel catfish, total recaptures, and the range and mean number of miles travelled by these fish from nine locations on the Little Sioux River [1]

Release Area	Total Tagged	Stationary Recaptures	Total Recaptures	Range	Mean	Total Recaptures	Range	Mean
Washta	1,497	1	17	.5-35.5	5.2	19	.5-57.5	20.0
Correctionville	783	18	5	2.0-14.0	5.0	59	.5-49.0	25.3
Anthon	29	0	0	-	-	7	3.0-37.0	21.1
Oto	1,214	2	9	.5-36.2	8.3	57	.2-37.0	18.5
Rodney	1,555	19	24	5.2-8.7	5.6	45	3.2-28.5	20.7
Turin	546	2	14	2.0-18.9	10.4	14	10.7-17.7	15.0
Above Structure	1,212	19	21	12.7-32.8	22.8	3	2.0	2.0
Below Structure	1,013	54	5	.5-1.5	1.1	8	1.0-4.0	1.7
Transported Fish[2]	258	-	29	14.7-29.8	23.1	6	3.0	3.0
TOTALS	8,107	115	124	.5-36.2	12.8	218	.2-57.5	16.3

1 All columns except the Total Tagged column contain information from approximately 36 fish that were fin-clipped and not tagged.

2 Captured below the dam then tagged and released 3 miles above dam.

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Hubley, Raymond C. 1963. Movements of tagged channel catfish in the Upper Mississippi River. Trans. Am. Fish. Soc. 92(2)

McCammon, G. W. and Don LaFaunce. 1961. Mortality rates and movements in the channel catfish population of Sacramento Valley, California, Fish and Game. 47: 5-23

Seaman, E. A. 1948. Channel catfish tagging in West Virginia. Prog. Fish. Cult. 10: 150-152

A SURVEY OF THE CEDAR RIVER IN THE VICINITY OF CEDAR RAPIDS

Gary Ackerman
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Fisheries Biologists

INTRODUCTION

A survey of the Cedar River in the vicinity of Cedar Rapids was requested in order to evaluate the effects of a low-head dam proposed by the Iowa Electric Light and Power Company, which will be built in conjunction with an enlargement of facilities of the Prairie Creek Power Station located at the southeastern edge of the city. This dam will be built in order to insure an adequate supply of cooling water for the new installations, and impounded water will extend upstream approximately 3.3 miles to the 8th Avenue Bridge.

Being concerned with the possible abuse of our aquatic resources, Iowa Electric Light and Power Company engineers presented the conclusions of a study based largely upon coincidental values of low flows and high water temperatures for the months of July and August from 1935 through 1963. Using these statistics and 97°F. as the maximum allowable river temperature, they concluded the coincidental periods of low flows and high temperatures have occurred only 14 days in the last 28 years. They also indicated they would make every effort to alleviate future occurrences of this condition by transferring generation from the Prairie Creek Station to other plants within IELP's system or purchasing energy from other electrical plants. In short, their approach was based upon one factor - lethal temperatures - without regard to other factors.

The following informational items were sought by this survey:

1. The existing physical features of this area.
2. The species composition of the fish population.
3. Sources and extent of pollution.
4. The value of this area for sport fishing and other recreational values.

METHODS AND RESULTS

Existing Physical Features

Presently, the greater portion of the proposed impoundment is quite shallow with depths under 4 feet being common. In these areas the bottom is predominately rock and gravel. Numerous riffle areas are present and small rock islands are numerous. There is an absence of rooted aquatic plants.

The upstream 1/3 of the proposed impoundment is located in an industrial and residential section of Cedar Rapids, and the banks are either rocked or cemented so trees and other natural vegetation are limited. Various waste disposal outlets are located in this area.

The middle 1/3 of the stream, from the Pleasant Valley Sewer Disposal Plant downstream to Prairie Creek, is quite deep, with a maximum depth of 30 feet and an average depth of 10 feet. In this area much of the bottom is composed of black sludge beds and silt several inches to several feet in depth. Rooted aquatic plants are absent. The banks are mud or rock and are covered with natural vegetation. This area is largely undeveloped and could be classified as semi-residential.

The lower 1/3, from Prairie Creek to the proposed dam site, is relatively shallow water with rock and gravel bottom and numerous riffle areas. The proposed dam site is located approximately 300 yards below the discharge outlet and the selected site is a riffle composed of exposed bedrock, rock and gravel. Rooted aquatic plants are absent. The banks are vegetated and undeveloped.

Species Composition

The species composition of this area was checked by using 230 volt A.C. electro-fishing gear. Four 30-minute shocking runs were made August 13, 1964 and two 60-minute shocking runs were made August 26, 1964. Sight and partial pick-up methods were used on the high concentrations of rough fish.

Approximately 95 per cent of the fish population consists of rough fish. Carp (42%) and quillback (37%) tend to predominate, with bigmouth buffalo (4%) and northern redhorse (8%) also present. Bigmouth buffalo are more abundant than electro-fishing gear indicates because of the relative ineffectiveness of this gear in taking that species.

Game fish constitute approximately 5 per cent by weight of the total population, with walleye, northern pike, largemouth bass, smallmouth bass, white crappie, black crappie, and flathead catfish present in limited numbers.

Extremely heavy concentrations of rough fish were found immediately below the outlet of the sewer treatment plant. Most of the game fish were taken above the sewer outlet. Quillback and redhorse were found in the warm 95°F. discharge water from the power plant.

Due to the ineffectiveness of electro-fishing gear in taking channel catfish, baited basket traps or slat nets were used to sample this species. Commencing July 13, 1964, ten slat nets were baited with cheese and soybean meal and set in the vicinity of the power station discharge house. One net was located in 94°F. discharge water from the electric plant to determine if catfish avoided this warmer water. Another net was located on the opposite side of the river in cooler water (82°F.) for comparison purposes. All catfish were measured, the adipose fin clipped, and some spines were taken for aging.

There appears to be an excellent population of channel catfish in this area. The largest length frequency group was between 11 and 12 inches, with good numbers of catfish from 8 to 16 inches.

During the first 48 hours, these nets caught at a rate of 1.17 fish per net hour and then rapidly fell off to 0.26 fish per net hour (Table 1). This was due to two factors: first, the fish were probably undergoing some stress due to low oxygen concentrations and, second, the nets became covered with a pollution fungus, Sphaerotilus natans, rendering them ineffective. During the second 48-hour period, 64 per cent of the total number of catfish

were dead and netting was discontinued.

TABLE 1. Results of channel catfish netting operations

Date	Total Number Channel Catfish	Number Dead	Per Cent Dead	Number of Fish Per Net Hour
July 13-15 480 net hours	567	0	00%	1.17
July 15-17 480 net hours	125	85	64%	0.26

The slat net set in the warm discharge water caught some catfish, but not as many as most of the other nets.

Upon discovery of the extreme numbers of dead catfish, oxygen checks were made. The average dissolved oxygen concentrations above the discharge outlet was down to 3.5 ppm. and below this structure it was at 4.5 ppm. A memo was sent to the Des Moines office predicting a major fish kill if low river flows and high water temperatures continued.

Fish Kills

The history of this area indicates that fish kills occur annually, and local residents apparently accept this as the usual with little concern or cause for alarm. This year low flows, high temperatures, and an organic pollution load caused a major kill in the area starting about 500 yards north of the C.R.I. & P. railroad bridge which is located in southeastern Cedar Rapids. Dead fish were observed along the banks and floating in the water southward from this area to highway #1 south of Mt. Vernon, a distance of 15 miles.

The date of the kill, or kills, is uncertain. Fish in various stages of decomposition were observed August 17, 1964, and local fishermen indicated there were dead fish along the banks in late July.

The estimated number of fish killed was 47,500 (Table 2). This is based on four sample areas which averaged 30 dead fish per 100 feet of shoreline. The species composition of the kill was over 99 per cent rough fish with quillback predominating. The few game fish that were reported or observed were walleye, northern pike, channel catfish, white bass, and crappie.

After the termination of the fish kill, this area was rechecked with electro-fishing gear. The results indicated little change in relative abundance of any species.

TABLE 2. Fish lost during 1964 fish kill near Cedar Rapids

Type of Fish	Per Cent	Estimated Number Killed
Quillback	77%	36,575
Redhorse	15%	7,125
Buffalo	5%	2,375
Carp	2%	950
Game Fish	1%	475
Totals	100%	47,500

Pollution

Excessive organic and/or chemical pollutants appear to be a most important factor when considering the probable causes of the fish kills. Numerous small storm sewer outlets empty into the river and other pipes of undetermined origin appear along the banks and under the surface. Their relative importance, their quantities, and the possible pollutant materials are unknown.

The large contributors in this area are the Pinick and Ford Corporation and the municipal sewer system. A further study of water quality and pollution abatement has been initiated by the State Health Department.

Present Recreational Value

The present value of this area for sport fishing is limited. Personal contacts with sport fishermen and the local conservation officer indicate that channel catfish is the most important game species with carp being second. Other game fish infrequently caught are walleye, crappie and some bass. Working in this area for one week during July, only eleven fishermen were observed.

Boating in this area is also little utilized. Only two access launching sites are located in the vicinity and only six boats were observed moored along the banks. This may be due to several factors: first, the physical features of this area limits boating to a confined area; second, sport fishing is poor; third, water skiing or swimming is undesirable due to the polluted conditions. In short, the over-all esthetic appeal of this area is poor.

Hunting in this area is prohibited because it is within the city limits of Cedar Rapids.

Few cabins or summer homes are located along this stream.

GENERAL DISCUSSION

If a dollar value of the aquatic resource within this area could be determined, the value of enlarged power facilities would no doubt be greater than this amount. Future industrial and commercial expansion is largely dependent upon electricity. However, the construction of a low-head dam and the preservation of aquatic resources need not be incompatible.

The proposed dam may be beneficial in some respects. The impoundment may offer Cedar Rapids boaters additional space, and it may create a holding basin for organic sediments. Thus, the resulting effects may be beneficial to downstream aquatic resources. This holding basin may create undesirable side effects, such as offensive odors which could lead to corrective measures concerning pollution abatement in this vicinity.

The proposed low-head dam cannot increase the fishery value of the area to be impounded. Because of the heavy organic pollution, the increase in water temperature caused by the additional cooling water may tend to augment fish kill, because of the chemical characteristics of water to hold less oxygen at higher temperatures. Fish kills can be expected whenever low flows, high temperatures and organic pollutants are combined. IELP has indicated that if thermal pollution should seriously endanger aquatic resources, they would construct a cooling tower.

The primary problem in the Cedar River in the vicinity of Cedar Rapids is gross organic pollution of the river by industrial waste and domestic sewage. This situation should be cleaned up so that fish populations can take advantage of the excellent habitat.

CORALVILLE RESERVOIR AND LAKE MACBRIDE CREEL CENSUS - 1964

Don Helms
Jim Mayhew
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The Coralville Reservoir - Lake MacBride complex is located on the Iowa River several miles upstream from Iowa City in Johnson County. An intensive investigation of this area is of prime importance to fisheries research in Iowa. It is the first of a series of large flood control reservoirs to be constructed in the state, and fundamental information can be obtained that will be valuable in the management of future areas of similar magnitude.

The present is a report on the second summer creel census conducted on the Coralville - MacBride complex.

METHODS

The sampling design was a modification of the method used by Mayhew (1956) in other artificial lakes and was essentially identical to the procedure followed during the 1963 census of this area.

The census began on May 15 and terminated September 15, and censusing was completed for 30 periods. Complete censuses were made at both impoundments on alternate time periods (8 A.M. to 2 P.M. -- 2 P.M. to 8 P.M.) at a predetermined census schedule. The census clerk interviewed all fishermen possible on the reservoir within 6 hours. He was instructed to leave at the end of the time period regardless of the number of fishermen that he failed to interview. Information was obtained from each fishing party on the number of people in the party, hours fished, number and kind of fish caught and kept, species desired, and distance travelled to the lake. Anglers at Coralville Reservoir were divided into 3 catagories: boat anglers, shore anglers, and tailwater anglers. Lake MacBride fishermen were divided into the first 2 groups only.

These data were then expanded by simple multiplication of the data by the number of uncensused periods.

RESULTS OF CORALVILLE RESERVOIR CREEL CENSUS

During the census period it is estimated that 204,138 fishermen used Coralville Reservoir. Forty per cent of the anglers were contacted in the tailwaters; whereas, 31 and 29 per cent were boat and shore anglers respectively. These fishermen caught 243,738 fish after fishing 426,838 hours, or at an average rate of 0.57 fish per hour. Shore and tailwater anglers had the best success with 0.62 and 0.66 fish per hour respectively. Boat anglers caught 0.43 fish per hour.

Crappie, channel catfish and bullhead comprised 87 per cent of the angler harvest (Table 1). Crappie were caught in greatest numbers by anglers of all three catagories, while

TABLE 1. Estimated catch rate and species composition of the sport fishery in Coralville Reservoir for the summer of 1964

Species	Number of Fish Caught by Type Contact				Per Cent
	Boat	Shore	Tailwaters	Combined	
Crappie	28,215	32,274	60,489	120,978	49
Channel Catfish	17,424	7,623	22,275	47,322	20
Bullhead	12,177	23,364	7,425	42,966	18
Carp	4,950	3,564	4,950	13,464	6
Bluegill	1,386	3,861	2,376	7,623	3
Buffalo	---	---	6,435	6,435	3
Largemouth Bass	297	1,584	99	1,980	1
Walleye	198	297	495	990	0.5
Miscellaneous*	---	---	1,980	1,980	1
Totals	64,647	72,567	106,524	243,738	

* Miscellaneous species included are: flathead catfish, yellow bass, white bass, green sunfish, etc.

the channel catfish and bullhead ranked second and third in importance to boat and tailwater fishermen. Bullhead and channel catfish ranked second and third to shore anglers. Carp, bluegill, bigmouth buffalo, largemouth bass and walleye were also recorded.

Forty-six per cent of the angling parties interviewed had no preference as to what species of fish they caught (Table 2). The remaining anglers indicated a preference for channel catfish, crappie, bullhead, carp, largemouth bass, walleye, buffalo and bluegill in that order.

RESULTS OF LAKE MACBRIDE CREEL CENSUS

During the census period, it is estimated that 282,843 anglers fished Lake MacBride. Thirty-nine per cent were boat fishermen and 61 per cent were shore fishermen. They caught 685,971 fish after fishing 471,339 hours, or at a mean rate of 1.23 fish per hour. Shore anglers had much better success as they caught 1.77 fish per hour, while boat anglers caught only 0.62 fish per hour.

Bullheads comprised 85 per cent of the catch (Table 3). Crappie and bluegill made up 14 per cent of the catch. Largemouth bass, walleye, channel catfish, northern pike and carp were insignificant to the fishery.

Fifty per cent of the angling parties interviewed expressed no preference as to what species of fish they caught (Table 4). The remainder expressed a desire for bullhead, crappie, bluegill, largemouth bass, channel catfish, walleye, northern pike and carp, in that order.

DISTANCES TRAVELLED

Distances travelled by anglers to fish in Coralville Reservoir were similar to the distances travelled by Lake MacBride anglers (Tables 5 and 6). There were also a similarity in the distances travelled by boat, shore and tailwater fishermen in the two lakes.

ECONOMIC VALUE OF THE SPORT FISHERY

An estimate of the monetary value of the sport fishery was based on previous studies in southern Iowa artificial lakes by Mayhew (op. cit.). According to his study, a sport fishery in southern Iowa was valued at $1.23 per pound of fish caught and the average fish caught weighed 0.48 pounds. At this rate, the sport fishery of the Coralville- MacBride complex is capitalized at $529,638 during the summer of 1964. This is a two-fold increase over the 1963 summer estimate of $220,335.

DISCUSSION

In the summer of 1964 it is estimated that 486,981 fishermen travelled a combined distance of 5,613,359 miles, fished 898,177 hours, and caught 929,709 fish in Coralville Reservoir and Lake MacBride. Generally, there was an increase in both fishing effort and success over the summer of 1963. This can be partially explained by the extension of the

TABLE 2. Species preference of fishermen in Coralville Reservoir

Species	Number of Parties Contacted				Per Cent
	Boat	Shore	Tailwaters	Combined	
No preference	82	120	199	401	46.7
Channel Catfish	86	71	79	236	27.6
Crappie	39	40	49	128	14.9
Bullhead	17	29	5	51	6.0
Carp	1	6	10	17	1.9
Largemouth Bass	3	7	1	11	1.3
Walleye	2	-	3	5	0.6
Buffalo	-	-	5	5	0.6
Bluegill	2	1	-	3	0.4

TABLE 3. Estimated catch rate and species composition of the sport fishery in Lake MacBride for the summer of 1964

Species	Number of Fish Caught by Type Contact			Per Cent
	Boat	Shore	Combined	
Bullhead	126,621	366,894	493,515	85.3
Crappie	5,247	40,194	45,441	8.0
Bluegill	5,652	26,136	31,788	5.6
Largemouth Bass	1,188	1,485	2,673	0.5
Walleye	495	693	1,188	0.2
Channel Catfish	--	990	990	0.2
Northern Pike	189	594	792	0.1
Carp	99	495	594	0.1
Totals	139,500	437,481	576,981	

TABLE 4. Species preference of fishermen in Lake MacBride

Species	Number of Parties Contacted			Per Cent
	Boat	Shore	Combined	
No preference	252	323	575	50.3
Bullhead	37	205	242	21.2
Crappie	90	109	199	17.5
Bluegill	50	19	69	5.4
Largemouth Bass	26	12	38	3.4
Channel Catfish	2	8	10	1.0
Walleye	8	-	8	0.7
Northern Pike	1	1	2	0.2
Carp	-	1	1	0.1

TABLE 5. Distance traveled by anglers to fish in Coralville Reservoir

Distance (miles)	Number of Parties Contacted				Per Cent
	Boat	Shore	Tailwaters	Combined	
0 - 10	41	46	27	114	13.3
11 - 25	164	189	282	635	74.4
26 - 50	8	17	26	51	6.0
51 - 100	13	11	18	42	4.8
Over 100	2	2	9	13	1.5

TABLE 6. Distance traveled by anglers to fish in Lake MacBride

Distance (miles)	Number of Parties Contacted			Per Cent
	Boat	Shore	Combined	
0 - 10	41	48	89	7.7
11 - 25	318	473	791	69.5
26 - 50	29	65	94	8.3
51 - 100	59	68	127	11.2
Over 100	20	17	37	3.3

census period to encompass spring and fall crappie and channel catfish fishing. The increase in size of bullheads over the past 3 years in Lake MacBride also increased the catch for that species by making them more attractive to fishermen.

LITERATURE CITED

Mayhew, Jim. 1956. Sampling design for Iowa artificial lakes creel census. Quarterly Biology Reports. Vol. VIII, No. 1. pp. 13-17 (mimeo.)

WATERFOWL DRIVE-TRAP BANDING, 1964

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INTRODUCTION

During a 3-week period in July of 1964, Game Section personnel with assistance from Biology Section and Conservation Officer personnel carried out drive-trap waterfowl banding operations on marsh areas in the northern part of Iowa. This was the fourth year that drive-trap banding operations have been carried out in the state. Several days prior to the actual banding operations were spent selecting areas to band. Areas were selected that had a good population of local birds and vegetative cover suitable for banding. Young birds can be extremely difficult to drive on heavily vegetated marshes of emergent vegetation, and marshes lacking emergent vegetation seldom produce very many young birds.

METHODS

In drive-trapping, an enclosed trap with a narrow entrance was set in shallow water or on land, and two leads from a few yards to 50 yards or more long were extended from the trap. The marsh was then surrounded by drivers, and the young ducks and molting adults were driven into the trap and banded.

The bands used were furnished by the U. S. Fish and Wildlife Service. A form furnished with the bands were used to record the species, location, date, age, sex, and band number of the waterfowl banded. This information is then sent to the U. S. Fish and Wildlife Service, Patuxent Wildlife Research Center, Laurel, Maryland, where it is recorded for future use.

RESULTS

A total of 1,822 birds were banded this year on 27 different areas (Table 1). Blue-winged teal again showed good production in Iowa this year, as 1,196 of the birds banded were teal. The number of wood duck banded in the prairie pothole region of Iowa increased from 89 banded in 1963 to 197 banded this year. The number of mallards dropped from 216 last year to 99 banded this year. Numbers of other birds banded remained about the same as previous years.

Of the total 1,553 ducks banded, 63 per cent of them were "Locals" (Table 2)*. This year more adult shore birds and coot were banded than young (Table 2). The production of young coot was down this year again, and was lower than in any previous year.

The ratio of young to adult female was up for blue-winged teal and wood duck, but was down for coot and mallard (Table 3). This production figure, while not indicative of the whole production of an area, does indicate that the production of wood duck and

TABLE 1. Total birds banded during waterfowl drive-trapping operations - 1964, by species and area

County	Area	Gr.W. Teal	Bl.W. Teal	Mallard	Wood Duck	Shoveler	Pin-tail	Ring-necked	Lesser Scaup	Ruddy Duck	Red-head	Coot	Misc.* Water-fowl	Total
Clay	Dan Green Slough	2	81	13	8					3	2	12	1	122
Clay	Mud Lake	2	280	9								116		407
Cerro Gordo	Ventura Marsh		28	4	20							5		57
Dickinson	Lily Lake	1	217	15	1		12	1		2			1	250
Dickinson	Jemmerson Slough		12		2	7					5			26
Dickinson	Grover's Lake		18									2		20
Dickinson	Christopherson Sl.		138	7	37								6	188
Dickinson	Center Lake		25		21									46
Emmet	West Swan Lake	2	77	10	14						2	33	9	147
Emmet	Ingham Lake		2		4				1		4			11
Emmet	Iowa Lake		19	8	30									57
Emmet	Cunningham Sl.		8		7		5					4	5	29
Greene	Goose Lake		10	3	1							10	4	28
Hancock	East Twin Lake		3	1							1	2		7
Hancock	West Twin Lake		26		19						1	1		47
Jackson	Green Island				18							2		20
Kossuth	Pothole			9								1		10
Osceola	Rush Lake		15				2						14	31
Palo Alto	Silver Lake		47		2									49
Palo Alto	Virgin Lake		14	1										15
Pocahontas	Lizzard Creek		18											18
Winnebago	Carlson Pond		19	1	6	4							2	32
Winnebago	Harmon Lake		74	15	1					1		31		129
Winnebago	Leland Pond		15		6									21
Worth	Elk Creek		25	1			1							27
Worth	Silver Lake		24	1										25
Wright	Morse Lake		1	1										2
TOTALS		7	1,196	99	197	11	20	1	1	6	15	219	49	1,821

TABLE 2. Age and sex by species of birds banded - 1964

Waterfowl Species	Local		Adult		Local	Total
	Male	Female	Male	Female	Unknown	
B. W. Teal	370	340	382	102	2	1,196
G. W. Teal	0	0	5	2	0	7
Mallard	34	27	20	17	1	99
Wood Duck	59	78	44	16	0	197
Redhead	6	5	1	3	0	15
Lesser Scaup	0	0	0	1	0	1
Pintail	12	4	1	3	0	20
Ruddy Duck	1	4	0	1	0	6
Shoveler	4	7	0	0	0	11
Ring-necked Duck	0	0	0	1	0	1
TOTAL	486	465	453	146	3	1,553

Other Species	Local	Adult	Total
Coot	101	118	219
Common Gallinule	1	6	7
Pied-billed Grebe	8	13	21
Killdeer	1	0	1
Sora Rail	2	5	7
Virginia Rail	6	8	14
TOTAL	119	150	269

TABLE 3. Ratio of young to adult female by species - 1964

Species	No. of Young	No. of Adult Female	Young per Adult Female
B. W. Teal	712	102	6.1
Mallard	72	17	3.6
Wood Duck	137	16	8.6
Coot	101 young	118 adult	0.8 young per adult

blue-winged teal was very good this year, but that production of mallard and coot was markedly lower.

Blue-winged teal were produced on practically all of the areas on which banding was done, but the production of mallard, wood duck, and coot was not as widespread (Table 1). On some of the areas, the take of adult males was quite high. These were usually areas with dense stands of emergent vegetation, and the adult males come to such areas to molt after the breeding season. On Mud Lake, for instance, 205 of the 280 blue-winged teal banded were adult males.

There were ten previously banded blue-winged teal recaptured during banding operations this summer (Table 4). These recaptures help to substantiate the idea that birds have the tendency to return to the same general area year after year.

The production of young males was higher than young females in all species except wood duck this year. This can be expected, as in waterfowl more young males will usually be produced than females.

DISCUSSION

The drive-trap banding operations carried on this summer were very successful and should be carried on in coming years. The production of blue-winged teal was very good this summer. The production of wood duck in the prairie pothole region this summer was up considerably and might be an indication that more wood duck nesting may be centering in this part of the state. Coot production was markedly down from previous years. An extremely windy spring during the nesting season might be a factor in this low production, as nest destruction seemed unusually high.

The lower number banded this year of other species indicates that production was lower for these species. However, this may not be the actual case as these other species are as a rule much harder to drive-trap than blue-winged teal, wood duck, or coot, and figures from these may not be as comparable on a year to year basis.

The recapturing of previously banded birds was very encouraging, as it helps substantiate the idea that birds have a tendency to return to the same general area year after year.

The number of shore birds banded this year was larger than in previous years. This population should be watched closely as some of these birds may be a harvestable resource in coming years.

* In reporting banding data, the term "local" refers to young birds banded on the area where they were hatched.

TABLE 4. Birds recaptured during 1964 waterfowl banding operations

Species	Area Banded	Age	Sex	Year Banded	Area Recaptured
B. W. Teal	Dan Greene Slough	L	M	1963	Dan Greene Slough
B. W. Teal	Dan Greene Slough	A	F	1963	Dan Greene Slough
B. W. Teal	Dan Greene Slough	A	M	1963	Dan Greene Slough
B. W. Teal	Jemmerson Slough	A	F	1963	Jemmerson Slough
B. W. Teal	Goose Lake (Kossuth)	L	F	1962	West Twin Lake
B. W. Teal	Goose Lake (Kossuth)	L	M	1962	West Twin Lake
B. W. Teal	Ventura Marsh	A	M	1963	Ventura Marsh
B. W. Teal	Harmon Lake	L	F	1963	Harmon Lake
B. W. Teal	Harmon Lake	A	F	1963	Harmon Lake
B. W. Teal	Goose Lake (Greene)	L	F	1962	West Swan Lake

SUMMARY

1. There were 1,822 birds banded this year in Iowa by drive-trapping.

2. Approximately 66 per cent of the birds banded were blue-winged teal.

3. Production of young coot dropped markedly this year in Iowa.

4. Ten previously banded blue-winged teal were recaptured while banding this year.

5. More shore birds were banded this year then in any previous year.

SPRING AND SUMMER QUAIL POPULATIONS, 1964

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INTRODUCTION

The July count of whistling cock quail is the primary means of determining breeding quail populations. A resume of this procedure is given in the 1963 July-September Quarterly Biology Reports. The method, as used in Iowa, is still undergoing changes to a uniform system of 10-stop routes.

Additional information used in calculating the prospective fall population is obtained each year for commission personnel game sight records on which quail are recorded. These censuses are taken from late April through August. In July, rural mail carriers also count quail, together with other small game species. Information from all these counts gives a fairly complete picture of post-winter survival, summer adult populations and of the production up to late summer.

Favorable weather preceeding pairing and nesting is necessary so that breeding quail will be in prime condition. In this respect the 1963-64 winter was favorable, with little snow. Thus the spring quail populations over the state were somewhat higher than in 1963. Quail were still further favored with April temperatures which were seasonably warm, though some days were cloudy. Rainfall was above normal.

May temperatures were warm. The month was windy and rainfall was light. There was some lag in warm weather, as indicated by a delay in the appearance of early vegetation, but by May 25 pastures were better than average. Corn was about the same stage as in 1963. June temperatures were seasonal, and there was only light rainfall in the southeast - the main quail range. Again a delay in arrival of warm weather was shown when corn growth was slightly behind that for 1963. Early July temperatures were normal with some rainfall, and by the end of the month the vegetation was slightly ahead of 1963. For the third time there was evidence of a belated season when denting of corn was slightly behind that for 1963. August temperatures were mostly hot with considerably dry weather.

(The above weather and crop information for dates concerned is from Iowa Climatological Data and Iowa Weekly Weather and Crop Report.)

METHOD

Most of the methods used this year in securing quail data are referred to in the introduction. In brief, the spring counts, primarily for pheasants, are made on 10-mile routes. July calling quail counts are along 10-stop routes in areas where quail habitat exists. On some longer old routes counts were taken for the last time this year, the switch to 10 stops to be made next year in these areas. Fourteen supplementary routes were run by commission personnel in 12 counties to get information on the amount of calling in June, July and August. This is an early aid in estimating production (the amount of calling parallels amount of nesting). These data are also used to determine variations in

the calling patterns in areas of high and low populations. The July rabbit census routes on which quail are recorded average about 30 miles each. The pheasant roadside counts with quail again recorded in late summer are along 30-mile routes. Mail carriers use a special post card to record game species seen in one week of late July on their usual routes. An average route would be about 60 miles. The 6 major regions of Iowa which are used in analyzing quail information are described in the 1963 July-September Quarterly Biology Reports pheasant report.

RESULTS

Whistling Quail Census: Statewide

This July count indicates annual variations in the Iowa breeding quail numbers (Table 1). The 1964 count was made on 53 10-stop routes. Thirteen more routes were of the older type and these were as long as 14 miles each. For all routes, on a total of 873 stops, 989 cocks were heard calling. This amounted to a mean of 1.13 per stop compared to 0.66 in 1963, which is a 71 per cent increase.

The increase in numbers of quail in prime range (south-central and southeast) was 79 per cent. In the areas which border the prime range (central, east and southwest) the increase ranged from 4 per cent to over 250; however, these areas have relatively few quail. In northern Iowa there was also an increase, but here again the number of quail heard is so small that a precise measure of the population change is difficult to obtain.

June, July and August Whistling Quail Routes

Additional 1964 calling quail counts were made by biologists, biologist aids and game managers along routes in central and southern Iowa. In 1964 on three comparable routes in this category, 37 whistling quail were counted in June, 30 in July and 24 in August. In 1963 on comparable routes 18 quail were heard in June, 27 in July, and 21 in August. More were heard and seen in 1964 in each of the three months. Earlier calling (in June) was higher in 1964, also the 1964 rate remained high over a longer period in all districts surveyed. Generally, strong calling activity (calling parallels production) was indicated both years. In 1964, there was a decline in Ringgold County. This may indicate either a localized down trend in production or a temporary dip in production.

Wapello Check Area

Sunrise whistling activity in quail begins in late March or in April. It ends in September. The activity is often checked by the biologist along a 5-stop route near Ottumwa.

In 1964 on the aforementioned route, sunup calling began in April, it peaked June 3; then there was a slight recession with another peak July 10; thence calling dwindled and it was seldom heard after August 19. In the 1963 season the sunup calling was prominent on April 12, thence it dwindled but picked up on May 18; then it peaked June 13 to remain high through July.

Of the 2 years, the 1964 calling peak was highest (24 callers in 1964, 18 in 1963). The amount of calling was also higher over a longer period in 1964.

Rural Mail Carrier Counts

Second in importance to the whistling quail census, because of the large number of quail reported (Table 2) is the rural mail carriers' count. The quail seen during one week of late July is reported. In 1964 the returned postcards showed 1,576 quail in 36,464 miles. This averages 4.32 per 100 miles compared to 4.23 in 1963. This is a 2 per cent gain. The north-west and north-central portions of Iowa have fewest quail and these areas were below the 1963 count. Within the fair to good quail range, the gain was up to a plus 26 per cent in the south.

QUAIL SIGHT RECORDS IN CONJUNCTION WITH OTHER COUNTS

On Spring Pheasant Counts

A measure of quail winter survival is obtained from the numbers of quail sighted on the April-May spring pheasant surveys. In 1964 this covered 1,730 miles of 10-mile routes with 52 quail seen, which was an average of 3.01 per 100 miles. In 1963 along 1,840 miles 52 quail were seen, which was an average of 2.83 per 100 miles. This is an increase of 6 per cent since 1963. The corresponding figures for 1962 were 14 quail in 1,170 miles, or 1.20 per 100 miles.

On Rabbit Counts

Quail are also counted on the regular July rabbit counts. These are made along roads that were selected because they are in rabbit territory which, in southern Iowa, is also quail range. The procedure is described in the 1963 July-September Biology Reports in the rabbit report. In 1964 this count was made on 3,139 miles of route throughout the state. Altogether 121 quail were reported seen for an average of 3.85 per 100 miles (Table 3). In 1963, on 2,217 miles, 156 quail were seen at the rate of 7.04 per 100 miles. While there was a gain of 98 per cent in central Iowa, there was a statewide 45 per cent decline from 1963. The decrease was evident in 3 of the 6 districts censused with no change in the two northern regions where no quail were sighted either year. For all of the state, it seems that the count was made at a time when birds were not using the roadsides at the same rate as in 1963; or else young had not yet appeared in numbers. Other information did show fewer coveys at this time in 1964. Data from this same count revealed that in 1964 there were only 3 occasions when 9 or more quail were seen during any single count. In 1963, 10 or more quail were reported on each of 7 individual counts. Thus, fewer coveys were in evidence in 1964 during the counting period.

On August Roadside Pheasant Count

A late summer pheasant count is made in August, with quail sighted also being counted. Along 5,250 miles of route, 218 quail were seen. This was an average of 4.15 per 100 miles, which is an increase of about 25 per cent over 1963 (Table 4). Of the 6 districts, there were increases in 5 in the number of quail seen, with none being seen in the northwest either year. Increase amounted to 27 per cent in the east and 22 per cent in the south central and

TABLE 1. July whistling quail counts, Iowa, 1964

Region of State	No. of Routes	No. of Stops	No. of Whistling Cocks	Mean No. Whistling Cocks per Stop	1963 Mean / Stop	Per Cent Change from 1963
NW	8	82	5	0.06	0.03	+100
NC	9	90	30	0.33	0.06	+450
C	14	159	93	0.59	0.57	+ 4
E	13	197	125	0.63	0.48	+ 31
SW	10	117	121	1.03	0.29	+255
SE & SC	17	228	615	2.70	1.51	+ 79
STATEWIDE	71	873	989	1.13	0.66	+ 71

TABLE 2. Quail counted by rural mail carriers, late July, Iowa, 1964.

Region of State	No. of Routes	No. of Miles Driven	No. Quail Seen	No. of Quail Seen/ 100 Miles	1963 No. of Quail Seen/ 100 Miles	Per Cent Change From 1963
NW	118	7,657	140	1.83	5.44	-66
NC	63	4,473	6	.13	2.29	-94
C	101	6,380	95	1.49	0.29	+414
E	109	6,521	246	3.77	2.21	+71
SW	79	5,209	203	3.90	3.88	0
SC & SE	94	6,224	886	14,24	11.30	+26
STATEWIDE	564	36,464	1,576	4.32	4.23	+ 2

TABLE 3. Quail observed on the July rabbit count, Iowa, 1964

Region of State	No. Routes	No. Miles	No. Quail Seen	Quail Seen/ 100 Miles	1963 No./ 100 Miles	Per Cent Change From 1963
NW	14	609	0	0.00	0.00	0
NC	11	366	0	0.00	0.00	0
C	15	509	12	2.36	1.19	+98
E	18	597	12	2.01	4.94	-59
SW	13	443	7	1.58	1.93	-18
SC & SE	20	615	90	14.63	27.95	-48
STATEWIDE	71	3,139	121	3.85	7.04	-45

TABLE 4. Quail sighted on the August pheasant count, Iowa, 1964

Region of State	No. Routes	No. Miles Driven	No. Quail Seen	No. Quail Seen/ 100 Miles	1963 No. Quail Seen/ 100 Miles	Per Cent Change From 1963
NW	20	600	0	0.00	0.00	0
NC	30	900	1	0.11	0.00	up
C	40	1,200	14	1.17	1.46	-20
E	24	720	18	2.50	1.97	+27
SW	22	660	18	2.73	2.28	+20
SC & SE	39	1,170	167	14.27	11.72	+22
STATEWIDE	175	5,250	218	4.15	3.31	+25

southeast.

On Calling Quail Surveys

Records are also kept of quail seen on whistling quail routes. In 1964, 112 quail were seen along routes comprising 934 miles, or almost 12 quail per 100 miles (Table 5). In 1963, 54 quail were seen in 982 miles for a mean of 5.5 per 100 miles. This indicates a 1964 gain of 118 per cent over 1963.

DISCUSSION

In late April and May, the first count is made of the adult quail which eventually produce the new coveys. This is done in conjunction with the spring pheasant survey, and indicated that more quail survived the 1963-64 winter than had survived the 1962-63 winter. Next to be taken is the whistling cock quail count in early July, and this too indicated an increase in brood stock. June, July and August surveys of calling quail along sample routes revealed that the 1964 production period lasted longer than that of 1963. July 10 to 20, additional sight counts of quail were made on the rabbit surveys. During this time the new coveys were not as much in evidence as in 1963. Delay in production of young or delay in their appearance is evident from my records for June, July and August, when in 1964 only 6 coveys were seen while in 1963, 14 were seen.

Because of the relatively small number of quail sighted on the quail, rabbit and pheasant surveys made during the summer by Commission personnel, it is possible a better idea of the overall quail picture would be obtained by combining the data from these three counts. When this was done, it was found that 4.84 quail were seen per 100 miles in 1964 as compared to 4.64 in 1963, an increase of 4 per cent (Table 6). This compares closely to the 2 per cent increase shown by the rural mail carriers July survey. It must be remembered that those counts made in July are actually not sampling the entire year's production, since the hatching season is not yet over at that time. Many of the birds counted then are adults, and thus still a measure of brood stock. The August pheasant surveys show a higher proportion of young birds, and it is possible the 25 per cent shown by this count may be the best estimate of the actual pre-hunting season population trend. However, a few more years data on these recently installed quail census methods will be necessary before their relative worth can be fully evaluated.

SUMMARY

1. The 1964 winter and spring weather were favorable to survival of quail.

2. Breeding quail were more numerous in 1964 than in 1963, as shown by the increase in quail sighted on the spring pheasant counts and in the calling counts.

3. Counts of adult and young quail were made in May, June, July and August. Of a total of 4 statewide counts, three showed increases and one a decrease. The rural mail carrier count showed a 2% increase; the combined number of quail sighted on the calling count, rabbit census and August pheasant survey showed a 4% increase over 1963.

4. The general conclusion is that there is a small increase in the 1964 fall quail population.

TABLE 5. Quail sighted on whistling quail counts, Iowa, 1964

Region of State	No. Routes	No. Miles Driven	No. Quail Seen	No. of Quail Seen/ 100 Miles	1963 No. Quail Seen/ 100 Miles	Per Cent Change From 1963
NW	8	83	0	0.00	0.00	0
NC	8	86	1	1.16	0.00	up
C	18	197	8	4.06	4.20	- 3
E	18	216	15	6.94	1.98	+250
SW	10	113	5	4.42	1.90	+133
SC & SE	20	239	83	34.73	14.84	+134
STATEWIDE	82	934	112	11.99	5.50	+118

TABLE 6. Summary of combined results of quail sighted on calling quail census, rabbit count and pheasant survey, July and August, Iowa, 1963 and 1964

Region	1964				1963				% Change 1963-1964
	No. Routes	No. Miles	No. Quail Seen	Quail/ 100 Miles	No. Routes	No. Miles	No. Quail Seen	Quail/ 100 Miles	
NW	42	1,292	0	0.00	39	1,072	0	0.00	0
NC	49	1,352	2	0.15	38	940	0	0.00	up
C	73	1,906	34	1.78	71	1,888	33	1.75	+ 2
E	60	1,533	45	2.94	52	1,307	39	2.98	- 1
SW	45	1,216	30	2.47	37	986	21	2.13	+16
SC & SE	79	2,024	340	16.80	66	1,626	270	16.61	+ 1
STATEWIDE	348	9,323	451	4.84	303	7,819	363	4.64	+ 4

IOWA'S LATE SUMMER PHEASANT POPULATION - 1964

Richard C. Nomsen
Game Biologist

INTRODUCTION

The roadside pheasant count made in August is the primary source of information on the status of the pre-hunting season pheasant population. A total of 150 routes are scheduled to be run in August by Conservation Officers, Unit Game Managers and Biologists.

Additional information is obtained from counts made by rural mail carriers during a 1-week period in late July. Pheasant broods are also recorded along rabbit and quail routes during July. Results of these early counts furnish preliminary figures pertaining to reproductive success.

The winter of 1963-1964 was relatively mild and the usual severe snowstorms did not occur. The statewide spring pheasant population increased 20-25 per cent and the hens should have been in excellent condition to begin nesting.

The spring of 1964 was slightly later than in 1963. Temperatures averaged near normal in April, although weather conditions were quite unsettled during the month. Normal weather conditions and above normal temperatures prevailed in May, and continued into June. Generally, spring weather was favorable for a successful pheasant hatch.

METHODS

The techniques used this year were the same as in 1963. Records were kept by regions in order to make comparisons with previous years. (See the July-September 1963 Quarterly Biology Reports for discussion of technique and map showing regions used).

One important factor should be noted - counts were again started at sunrise; however, daylight saving time was in effect this year. Most routes were not completed until after 8:00 A.M. where previously, they were done shortly after 7:00 A.M.. Many observers stated that traffic along check routes was heavier this year. This of course would tend to lower the number of birds sighted in 1964.

RESULTS AND DISCUSSION

Birds Per Mile

There were 12,130 pheasants sighted on the 150 routes (4,500 miles) censused, for an average of 2.70 birds per mile (Table 1). This was almost equal to the high count of 2.72 per mile obtained in 1963 and indicates another excellent pheasant population this year.

TABLE 1. Results of the 1964 August roadside pheasant counts, and comparison with 1963 results

Region of State	No. of Counts	No. Miles Driven	Total No. Birds Sighted	Birds Per Mile	1963 Birds Per Mile	% Change From 1963
Northwest	20	600	1,999	3.33	4.17	- 20%
North Central	24	720	3,711	5.15	4.09	+ 26%
Southwest	22	660	2,594	3.93	3.61	+ 9%
Central	27	810	1,962	2.42	2.73	- 11%
East	24	720	903	1.25	1.28	- 2%
South	33	990	961	0.97	1.24	-22%
STATEWIDE	150	4,500	12,130	2.70	2.72	- 1%

TABLE 2. Comparison of numbers of broods sighted on August roadside pheasant counts in 1964 and 1963

Region of State	No. Broods Sighted	Broods Per 30 Mile Count	No. Broods Sighted 1963	1963 Broods Per Count	% Change in Broods
Northwest	244	12.2	314	15.7	-22%
North Central	449	18.7	343	15.6	+20%
Southwest	341	15.5	288	13.7	+13%
Central	236	9.1	256	9.5	- 3%
East	107	4.5	120	5.0	- 10%
South	111	3.5	172	5.7	-38%
STATEWIDE	1,488	10.1	1,493	10.4	- 3%

The greatest pheasant population this fall will be found in the north central region - counts indicated a 26 per cent increase in this area of Iowa's primary pheasant range. Counts from the southwest region also showed more birds this year.

A population decrease was recorded in northwest Iowa - primarily in the northwest half of the region. Higher populations were reported from the eastern half of the central region and several counties in the southern part of the eastern region also experienced this increase. The counts varied considerably in the southern region, but as a whole was down about 22 per cent.

Broods Per 30-Mile Count

There were 1,488 broods sighted on the 150 counts, an average of 10.1 per 30-mile route (Table 2). This compares to the 10.4 average obtained in 1963, which was an excellent year for pheasant production. Increases were noted in north central and southwest regions with very little change in the central region. Fewer broods were recorded in opposite corners of the state - northwest and southeast sections.

Per Cent of Hens with Brood

There were 1,721 hens sighted and 1,213 (70.5 per cent) were with broods (Table 3). This is slightly higher than the 69.4 per cent of hens with brood reported in 1963. Highest success was reported in north central and southwest regions. Figures for central and eastern regions were also higher than the state average, indicating good production. Only 60.3 per cent of the hens were reported with broods in the northwest region, which was much lower than the state average and for other areas of the state. Apparently, neighboring states in the area experienced the same decrease in production, that is, many hens were reported without broods.

Young Per Hen

The statewide young per hen index for 1964 was 5.43 (Table 3). This was an increase over the 5.20 figure obtained in 1963 and indicates improved production for 1964. The young per hen figure was lowest in the northwest region - again showing the lower reproductive success in that area. Indices from all other regions of the state were above the state average and indicated excellent reproduction.

Average Brood Size

The statewide average brood size for 1964 was 6.28 chicks per brood (Table 3). This indice also represents an increase in production - there were 5.88 chicks per brood observed in 1963. The count in northwest Iowa showed only 5.50 chicks per brood compared to 6-plus chicks per brood in all other regions of the pheasant range.

Sex Ratio Index

The observed adult sex ratio on the 1964 August count was 1.72 hens per cock (Table 3) compared to 1.33 hens per cock recorded in 1963. The greater number of hens per cock in 1964 probably resulted from a higher rate of cock harvest during the extended 1963 season. This was also shown by previous counts taken during the winter and spring of

TABLE 3. Data from 1964 August roadside pheasant count

Region of State	No. of Cocks	No. of Hens	Sex Ratio Index M:F	Hens Without Brood	Hens With Brood	% Hens With Brood	No. of Young Chicks	No. of Young Per Hen	No. of Young Per Brood
Northwest	304	353	1:1.16	140	213	60.3%	1,342	3.80	5.50
North Central	234	520	1:2.22	135	385	74.0%	2,962	5.70	6.60
Southwest	146	337	1:2.31	83	254	75.4%	2,111	6.26	6.19
Central	175	263	1:1.50	75	188	71.5%	1,507	5.73	6.38
East	57	131	1:2.30	35	96	73.3%	715	5.46	6.68
South	83	117	1:1.41	40	77	65.8%	713	6.09	6.42
STATEWIDE	999	1,721	1:1.72	508	1,213	70.5%	9,350	5.43	6.28

this year.

Hatching Date Distribution

Personnel making the August roadside count also aged the broods sighted on their routes. The peak of hatching in 1964 appeared to be about 10 days later than in 1963 (Table 4). This year, a definite peak was noted during the mid 10-day period of June. A year ago, hatching was more evenly distributed over a longer period.

About 73 per cent of the hatch occurred during June this year - almost 22 per cent in July and only 5 per cent in May. In 1963, 65 per cent hatched in June, 20 per cent in May and 13 per cent in July.

Rural Mail Carrier Counts

Iowa rural mail carriers made their annual count during the week of July 27 - August 1. Results of this survey serve as a preliminary indicator of pheasant reproductive success.

According to this survey, pheasant reproduction was excellent again this year (Table 5). Production appeared to be very good in all regions of the state except the extreme northwest area. Only 37 per cent of the hens sighted in northwest Iowa were with broods compared to the statewide average of 47 per cent.

TABLE 5. Statewide results of rural mail carriers July pheasant counts, 1962-1964

Year	Young Per Hen	Average Brood Size	% of Hens With Broods
1962	2.1	5.3	39%
1963	2.6	5.7	45%
1964	2.7	5.8	47%

Pheasant Broods Sighted on Rabbit and Quail Counts

Pheasant broods sighted along rabbit and quail survey routes were recorded again this year (Table 6). These surveys are taken during mid-July which is too early for specific data on pheasant production. It may serve as an early indication of hatching success.

More broods per 100 miles were reported in 1964. This year, 8.1 broods were checked compared to 7.5 per 100 miles in 1963. Highest count was in north central Iowa followed by southwest and northwest regions.

TABLE 4. Distribution of the 1964 Iowa pheasant hatch by region and statewide for 1963 and 1964 (figures given are percentages by 10-day periods)

Date of Hatch	Northwest	North Central	Southwest	Central	East	South	1964 Statewide	1963 Statewide
May 1-10	-	-	-	-	-	-	-	0.7
11-20	-	0.6	-	0.3	-	0.6	0.3	6.0
21-31	3.8	5.4	5.9	5.1	1.0	5.9	4.9	13.5
June 1-10	23.1	20.0	22.8	16.3	46.1	16.4	21.4	24.8
11-20	38.2	27.2	35.0	31.8	28.4	25.7	31.0	23.1
21-31	11.8	21.4	19.0	24.8	14.7	25.7	20.3	17.2
July 1-10	16.8	17.1	14.8	13.3	4.9	15.8	14.9	7.2
11-20	5.0	6.4	1.7	5.6	2.9	8.6	5.3	4.6
21-31	1.3	1.3	0.8	2.5	2.0	1.3	1.6	1.4
August 1-10	-	0.6	-	0.3	-	-	0.3	0.6
11-20	-	-	-	-	-	-	-	0.8
21-31	-	-	-	-	-	-	-	0.1
No. Broods in Sample	238	486	237	355	102	152	1,570	1,743

TABLE 6. Pheasant broods observed on 1964 mid-July rabbit roadside survey and quail whistling counts

Region of State	Rabbit Survey			Quail Survey			Combined		
	No. Miles	No. Broods	Broods per 100 Miles	No. Miles	No. Broods	Broods per 100 Miles	No. Miles	No. Broods	Broods per 100 Miles
Northwest	421	40	9.5	82	12	14.6	503	52	10.3
North Central	332	43	13.0	90	18	20.0	422	61	14.5
Southwest	409	26	6.4	117	28	23.9	526	54	10.3
Central	478	36	7.5	219	13	5.9	697	49	7.0
East	598	47	7.9	207	30	14.5	805	77	9.6
South	519	8	1.5	258	3	1.2	777	11	1.4
STATEWIDE	2,757	200	7.2	973	104	10.7	3,730	304	8.1

SUMMARY

1. The August roadside pheasant count is the primary source of information on the status of the pre-hunting season pheasant population. It is supplemented by the rural mail carrier survey and information recorded on the rabbit roadside and quail whistling survey.

2. The winter of 1963-1964 was relatively mild and spring weather conditions appeared to be favorable for a successful hatch.

3. A total of 150 routes was checked in 1964. Observers recorded 12,130 pheasants or 2.70 birds per mile. This was almost equal to the high count of 2.72 per mile in 1963.

4. The highest pheasant population was in the north central region followed by the southwest region. The population decreased in northwest Iowa but was still above the state average.

5. Various indices to reproductive success indicated excellent production in all regions of the state except northwest Iowa. Many hens were sighted without broods in this area. The hatching peak was about 10 days later than in 1963.

6. Rural mail carrier counts indicated excellent production throughout the primary pheasant range except extreme northwest Iowa.

7. More pheasant broods per 100 miles were sighted on the mid-July rabbit and quail surveys than in 1963, further evidence of a good production year.

HUNGARIAN PARTRIDGE POPULATION TRENDS IN IOWA, 1954-64
(As depicted by number of huns sighted on late summer and spring roadside pheasant counts)

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INTRODUCTION

The hungarian partridge was introduced throughout Iowa in the early 1900's, or about the same time ringnecked pheasants were being introduced. Though "huns" have never succeeded to the extent true of the pheasant, they did become well established in the northwest and north central parts of the state. Population densities of the hun have never approached those of the ringneck, but they do furnish considerable sport for hunters. During the 1963 hunting season, approximately 8,000 huns were bagged. Most of these are taken incidental to pheasant hunting. However, there are many hunters who make hunting trips on which huns are their primary interest, and most pheasant hunters who are fully aware that they are in potential hun territory are hopeful of an opportunity to shoot one.

Because of the rather limited range of the species and its habits, no special population survey is made for huns alone, in the manner done for pheasants, quail, rabbits and some other species. The necessary personnel and time that would be necessary to obtain a valid measure of yearly trends has so far precluded such an attempt. However, field personnel involved in making surveys on other game species are asked to record any observations on huns they make in the course of running these other surveys. It is hoped that this type of information will give at least a general picture of annual trends in hun numbers, and also illustrate any major changes in the range of the hun that might take place. In this report, the hun data from the late summer and spring roadside pheasant counts for the past decade will be analyzed.

METHODS

In August of each year, a large number of pheasant roadside counts are made, and these are at present the best source of information on yearly hungarian partridge population fluctuations. For the past 3 years, about 150 routes have been run statewide. However, only those counts made in a 24-county northwestern Iowa area are used in tabulating hun trends (see map - Figure 1). These include all counties in which huns have been sighted on these particular pheasant counts since 1954. It should be pointed out that very scattered reports of huns have been received from counties outside this area, but their numbers here are so low there is little chance any would be seen on the pheasant counts.

The method used in making these August pheasant counts has been summarized in detail in the July-September 1962 and 1963 Quarterly Biology Reports. Basically, a 30-mile route is driven at a speed of about 20 mph., beginning at sunrise on clear calm mornings with considerable dew present. Though detailed information on the pheasants is recorded, only the number of huns sighted is written down.

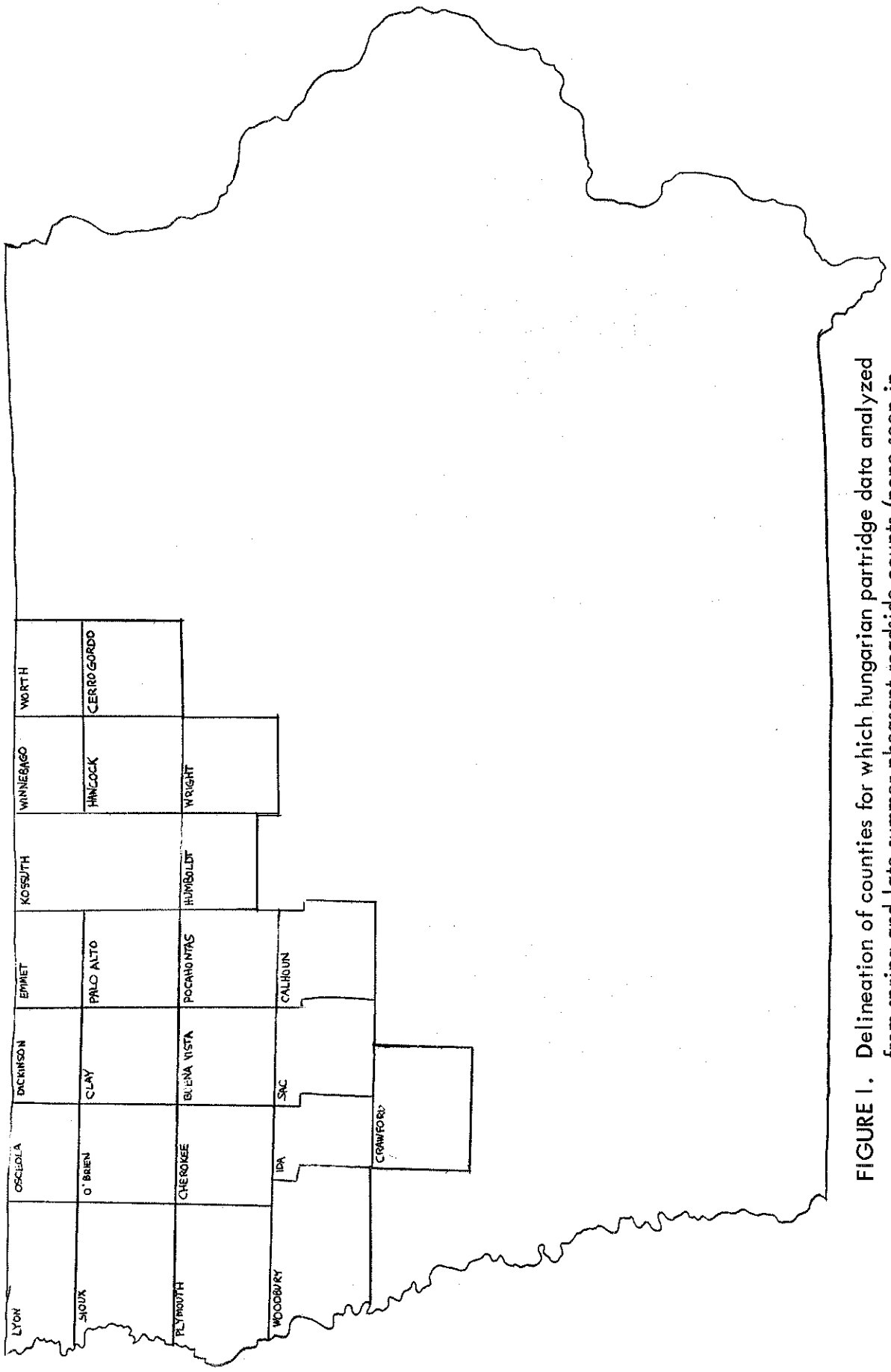

FIGURE 1. Delineation of counties for which hungarian partridge data analyzed from spring and late summer pheasant roadside counts (none seen in remainder of state)

Beginning in 1962, a spring pheasant roadside count has also been taken, with huns again being recorded. These are made in late April and early May on 10-mile routes (see April-June 1962 and 1963 Quarterly Biology Reports for details). To maintain continuity with the late summer, or August, count data, all routes run within the previously described 24-county area were tabulated for number of huns sighted.

RESULTS

There has been a gradual increase since 1954 in the number of hungarian partridge sighted on the late summer roadside pheasant counts (Figure 2). An average of 8.1 huns per 100 miles has been seen over this 11-year period in the 24 counties, ranging from a low of 2.8 in 1954 to a high of 16.4 in 1963 (Table 1). Seven years showed an increase over the previous years population, three a decrease. It should be remembered that this particular census was not designed specifically to sample hun populations. This, together with the fact that the total number of miles driven and huns sighted is relatively small for any given year, means that the birds per 100 miles and percentage change should not be interpreted too strictly. However, it is believed that a general idea of hun population trends will be depicted by this data.

Only 3 years of data are available for the spring period. However, the trend depicted by this data follows the same trends shown by the late summer counts (Figure 1 and Table 1). An increase in the late summer count from 1961 to 1962 was followed by an increase in the following spring of 1963. The same was true of the following year's comparison. If the trends continue to stay in step, there should be a slight decline in the number of huns observed on next spring's counts. The mean number of huns sighted per 100 miles on the spring pheasant roadside counts was 7.3 birds. This compares to 13.8 per 100 miles sighted during late summer of the same 3 years. These figures cannot be compared directly, though, because of differences in cover condition, birds activities at different seasons of year, etc..

The data were also analyzed by county for the period under study, to gain an idea of relative population densities within the 24-county area. Sioux and Plymouth counties in far northwestern Iowa consistently have the best hun populations, as indicated by the data from these counts (Table 2). Other counties in the extreme northwestern corner of the state and extending east to Hancock and Winnebago counties rank next in importance. The counties along the southern and eastern fringe of the 24-county area have fewer huns, as might be expected. The county-by-county data from the spring counts are also included in Table 2, but the number of miles involved is as yet too small to give any valid comparisons.

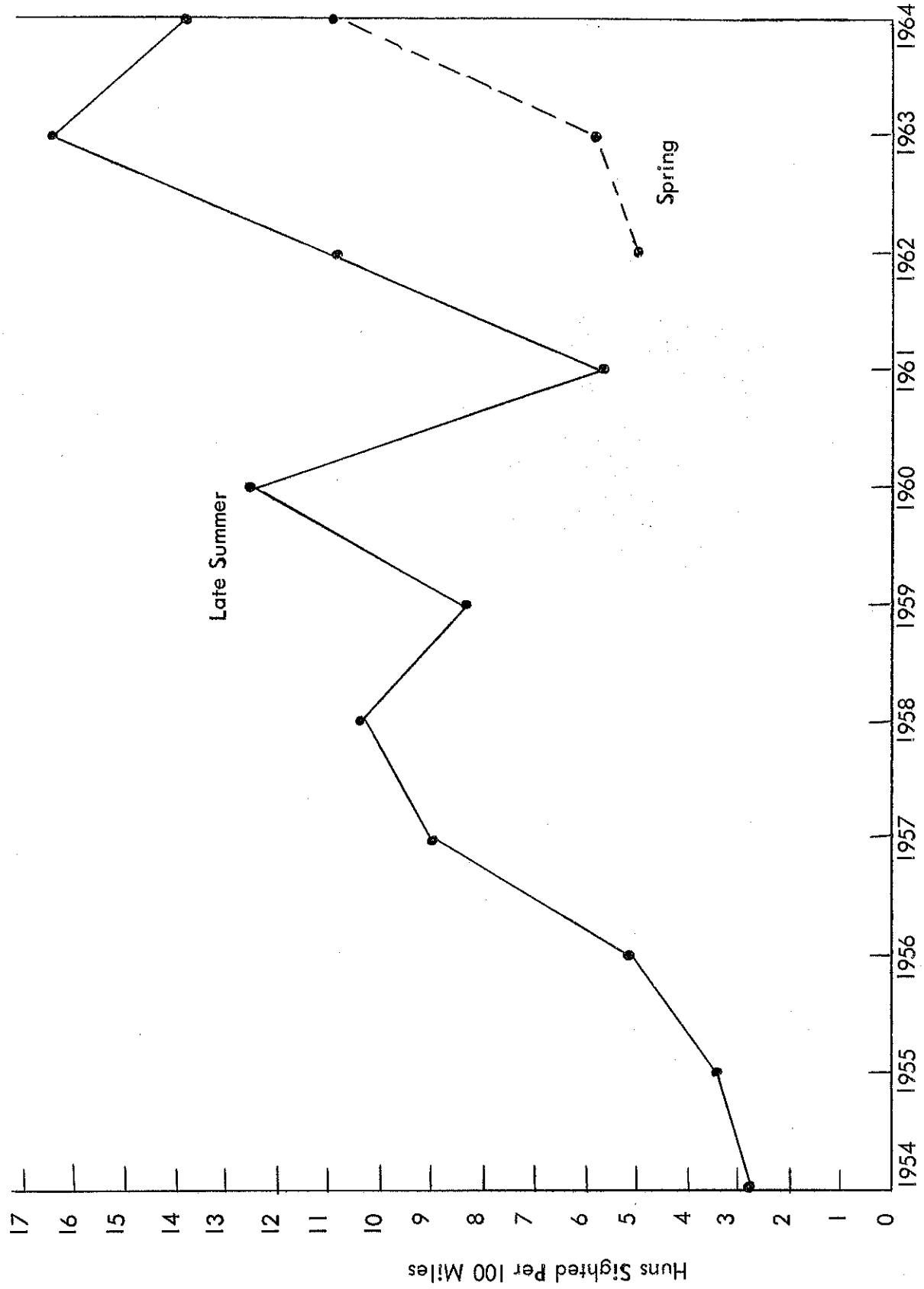

FIGURE 2. Hungarian partridge population fluctuations as depicted by number sighted on late summer and spring roadside pheasant surveys, Iowa, 1954-1964

TABLE 1. Hungarian partridge sighted on late summer and spring roadside pheasant surveys, by year, 1954-1964, in 24 northwestern Iowa counties

Year	No. 30-Mile Routes Run	Total Miles	No. Huns Sighted	Huns Per 100 Miles	% Change From Previous Year
		Late Summer			
1954	95	2,850	80	2.81	----
1955	69	2,070	68	3.29	+17%
1956	60	1,800	91	5.06	+54%
1957	66	1,980	176	8.89	+76%
1958	66	1,980	204	10.30	+16%
1959	64	1,920	159	8.28	-20%
1960	67	2,010	251	12.49	+51%
1961	54	1,620	93	5.74	-54%
1962	30	900	97	10.78	+88%
1963	37	1,110	182	16.40	+52%
1964	41	1,230	169	13.74	-16%
Totals	649	19,470	1,569	8.06	----
		Spring			
	10-Mile Routes				
1962	28	280	14	5.00	----
1963	38	380	22	5.79	+16%
1964	34	340	37	10.88	+88%
Totals	100	1,000	73	7.30	----

TABLE 2. Hungarian partridge sighted on late summer and spring roadside pheasant surveys in Iowa, by county, 1954-1964

County	Late Summer 1954-1964			Spring 1962-1964		
	No. Miles	No. Huns	Huns Per 100 Miles	No. Miles	No. Huns	Huns Per 100 Miles
Sioux	810	221	27.3	30	12	40.0
Plymouth	780	183	23.5	30	2	6.7
Buena Vista	810	129	15.9	30	4	13.3
Hancock	750	102	13.6	50	2	4.0
Dickinson	720	94	13.1	20	0	0.0
Palo Alto	810	104	12.8	60	8	13.3
Lyon	420	52	12.4	30	0	0.0
Clay	840	98	11.7	60	10	16.7
Emmet	810	79	9.8	60	4	6.7
Osceola	420	41	9.8	30	0	0.0
Winnebago*	2,580	225	8.7	100	10	10.0
O'Brien	720	50	6.9	30	5	16.7
Crawford	330	14	4.2	30	2	6.7
Cherokee	810	32	4.0	30	2	6.7
Humboldt	690	26	3.8	30	2	6.7
Worth	870	32	3.7	90	0	0.0
Ida	810	25	3.1	30	2	6.7
Pocahontas	690	19	2.8	30	4	13.3
Kossuth	900	23	2.6	50	2	4.0
Cerro Gordo	780	11	1.4	20	0	0.0
Woodbury	900	6	0.7	60	0	0.0
Calhoun	750	2	0.3	30	0	0.0
Wright	660	1	0.2	40	0	0.0
Sac	810	0	0.0	30	2	6.7
TOTAL	19,470	1,569	8.1	1,000	73	7.3

* The many counts made each year on the Winnebago Pheasant Research Area are reflected in the greater mileage figures for Winnebago County.

RESULTS OF JULY, 1964, ROADSIDE RABBIT SURVEYS

Paul D. Kline
Game Biologist

INTRODUCTION

The annual July roadside counts were continued in 1964. This survey has been conducted with slight modification every summer beginning in 1950. It is made from July 10 to 20 by Conservation Officers and Biologists who drive predetermined routes 30 to 40 miles long on gravelled roads. In 1964, for the first time, additional routes were driven by District and Unit Game Managers. Participants drive 25 miles per hour, starting at sunrise, and record all rabbits seen along the routes. The July counts were developed for use in surveying cottontail populations. However, starting in 1958, jackrabbits were counted as well.

The age of rabbits was recorded as adult or juvenile to obtain ratios and for computation of the fall population index. Numbers of quail, Hungarian partridge, and numbers of pheasant broods seen during each survey were also recorded. These data were given to the quail and pheasant biologists for their evaluation. Similar data on cottontails and jackrabbits taken in conjunction with quail and pheasant surveys were received from those biologists and are reported in this paper.

RESULTS

Ninety routes totaling 3,033.5 miles were surveyed. This is an increase of about 30 per cent in total miles and results from the additional routes run by Game Section personnel. In all, 2,030 cottontails were seen for an index of 6.69 cottontails per 10 miles of route (Table 1). Cottontails were most abundant in the Southern Loess area where they have been most abundant since 1953 (Table 2). Populations of cottontails in the other three areas ranked in descending order were: Western Loess, Northern Glaciated, and Eastern. Relative abundance was similar to the 15 year average for the four areas (Table 2).

The statewide index indicates populations have increased sharply over 1963. From a high of 6.86 in 1958 the index of cottontails dropped to 6.33 in 1959 and 4.56 in 1960, climbed slightly to 4.79 in 1961, dropped to 3.88 in 1962, and climbed again in 1963. The increase this year represents the second straight season this has occurred. Average index for all years, including 1964, has been 4.78 cottontails seen per 10 miles of route. All of the four areas used in compilation of the data showed increases over 1963. Populations in 1964 were higher in all parts of the state than the 15-year means.

Forty-seven jackrabbits were counted during the surveys. The index of jackrabbits seen per 10 miles was 0.15, very nearly the same as indices obtained for 1963 and 1962, 0.17 and 0.11 respectively. These data indicate a decline in jackrabbit populations since the 1958-61 period when indices were, 0.23 for 1958, 0.44 for 1959, 0.33 for 1960, and 0.20 for 1961. These indices may or may not be truly indicative of populations of jackrabbits, as the survey is designed specifically for cottontails and not for jackrabbits. As is normal, most jackrabbits were seen in northern and western sections of Iowa.

TABLE 1. Results of July roadside rabbit surveys for 1964

Area	No. of Routes	Total Miles	Cotton-tails Observed	Jack-rabbits Observed	Cottontails Observed/ 10 Miles	Jackrabbits Observed/ 10 Miles
Northern Glaciated	38	1,324.8	634	31	4.79	0.23
Western Loess	14	480.4	334	16	6.95	0.33
Southern Loess	25	773.8	872	--	11.27	----
Eastern	13	454.5	190	--	4.18	----
STATEWIDE	90	3,033.5	2,030	47	6.69	0.15

TABLE 3. Age ratios of cottontails observed during July 1964 surveys

Area	Number of Adults	Number of Juveniles	Juveniles/ Adult
Northern Glaciated	188	455	2.42
Western Loess	130	204	1.60
Southern Loess	204	666	3.26
Eastern	63	127	2.02
STATEWIDE	585	1,452	2.48

TABLE 2. Comparison of July roadside rabbit surveys for years 1950 through 1964: Cottontails seen per 10 miles

Year	Area				
	Western Loess	Northern Glaciated	Southern Loess	Eastern	Statewide
1950	4.75	3.87	6.83	2.22	4.29
1951	6.69	3.37	5.68	2.13	3.92
1952	6.74	3.70	6.14	1.78	4.18
1953	4.26	2.70	4.23	3.33	3.31
1954	3.90	2.97	4.55	2.36	3.35
1955	3.55	4.60	6.03	5.31	4.96
1956	3.51	3.06	5.99	4.44	4.07
1957	4.72	3.32	7.59	4.79	4.87
1958	8.46	4.68	12.95	4.65	6.86
1959	7.92	4.36	10.46	4.66	6.33
1960	5.07	4.62	5.41	1.80	4.56
1961	6.12	4.25	6.58	2.19	4.79
1962	3.53	2.94	6.97	1.80	3.88
1963	5.27	4.19	10.17	3.87	5.61
1964	6.95	4.79	11.27	4.18	6.69
Average	5.43	3.83	7.39	3.30	4.78

Of 2,037 cottontails aged, 1,452 were juveniles for a ratio of 2.48 juveniles per adult (Table 3). This ratio is up from 1963 (2.41) and 1962 (2.06) and near the 1950-63 average of 2.51. Best production appeared in the Southern Loess area where the index was 3.26 juveniles per adult. This near average statewide population indicates that the increase in cottontail populations must be due to a relatively high population of breeding adults held over during the winter of 1963-64.

The fall population index, which is obtained by dividing the number of juvenile cottontails seen along the survey routes (1,452) by the number of miles surveyed (3,033.5) and multiplying by ten, was 4.79 as compared to 3.94 for 1963, 2.33 for 1962, 3.79 for 1961, 2.73 for 1960, 4.07 for 1959, and 4.51 for 1958. This indicates rabbit hunting will be better than during any season since 1958-59, and perhaps the best season of which we have record.

Numbers of cottontails seen during the spring pheasant surveys averaged almost twice as many in 1964 (3.39 per 10 miles) as in 1963 (1.78 per 10 miles) and much greater than in 1962 (1.43 per 10 miles). This corroborates my belief that the breeding stock starting in 1964 was unusually high. Highest populations as indicated by these spring pheasant surveys occurred in the Western and Southern Loess areas (Table 4).

On the quail whistling surveys, made during the same approximate time as the rabbit counts, 7.34 cottontails were recorded per 10 miles. Again highest indices were obtained from the Southern and Western Loess areas (Table 5). The statewide index of 5.00 obtained in 1963 from the quail surveys is considerably less than that obtained for 1964 and corroborates the population increase indicated by the rabbit surveys.

The index of cottontails seen during the 1964 August roadside pheasant surveys was 2.44 as compared to 2.50 for 1963 and 1.91 in 1962. Highest indices appeared from the Southern and Western Loess areas.

DISCUSSION

Conditions have been favorable for cottontail rabbits during the past year. Iowa experienced a moderate winter. Deep snow combined with extended periods of high winds and sub-zero cold did not occur. As a consequence the carry-over of cottontails to spring was excellent. Most breeding started at the normal time, early in March. However, the heavy rains of early spring came about the time the first litters were still in the nests and as a consequence, production was not as high as it might have been if weather conditions had been more favorable. Despite this, rabbit populations have flourished in Iowa during 1964 and we can expect an excellent hunting season for 1964-65.

TABLE 4. Rabbits seen during 1964 spring pheasant surveys

Area	Number Miles	Cotton-tails Observed	Jacks Seen	Cottontails / 10 Miles	1963 Index	Jack/ 10 Miles
Western Loess	1,033	402	45	3.89	1.51	0.44
Northern Glaciated	2,861	464	134	1.62	1.23	0.47
Southern Loess	1,864	458	16	2.46	1.53	0.09
Eastern	668	118	4	1.77	1.41	0.06
STATEWIDE	6,426	1,442	199	2.24	1.38	0.31

TABLE 5. Rabbits seen on quail whistling surveys, July 1964

Area	Number Miles	Cotton-tails Observed	Jacks Observed	Cottontails / 10 Miles	1963 Index	Jacks/ 10 Miles
Northern Glaciated	359	140	6	3.90	3.52	0.17
Western Loess	137	148	9	10.80	6.01	0.66
Southern Loess	295	337	-	11.42	7.07	----
Eastern	142	60	8	4.23	3.06	0.56
STATEWIDE	933	685	23	7.34	5.00	0.25

TABLE 6. Rabbits seen during 1964 August roadside pheasant surveys

Area	Number Miles	Cotton-tails Seen	Jack-rabbits Seen	Cotton-tails/10 Miles	1963 Index	Jack-rabbits/ 10 Miles
Northern Glaciated	2,520	345	66	1.37	1.59	0.26
Western Loess	690	230	15	3.33	3.75	0.22
Southern Loess	1,410	627	1	4.45	4.08	0.01
Eastern	630	78	0	1.24	1.85	0.00
STATEWIDE	5,250	1,280	82	2.44	2.50	0.16

BIOLOGICAL DATA FROM THE 1963 SHOTGUN DEER SEASON

Keith D. Larson
Game Biologist

A sample of the deer killed during the 1963 shotgun deer season was taken to determine the physical condition and reproductive success of white-tailed deer in Iowa. Data were taken from deer located in the field and at locker plants. Commission personnel from the Biology and Game Sections participated in the collection of data from all but nine counties of the state.

RESULTS

Various data were obtained from 1,386, or 22.2 per cent, of the 6,234 deer reported killed by permit and non-permit hunters in 1963. Distribution of the sample was good, with the sample of the more critical short zone being 32 per cent of the kill in that area. Data are analyzed by regions (Kline, 1958), based on apparent ecological differences. The short zone comprises 25 counties of Region 2 (37 counties).

Sex Ratios

The sex was determined for 1,303 of the 1,386 deer examined. A sex ratio of 118 males:100 females was found for all deer. This is equal to the 10-year mean of check station data and therefore no special significance is attached to the increases in males over the 103 males:100 females reported for 1962. The 1962 figures represented a 10-year low. Officers' reports of farm-killed deer indicated a sex ratio of 102:100 based on 619 deer examined.

Age Ratios

Age was determined for 1,319 deer, but 40 deer were listed only as adults. The below zero temperatures caused an increase in deer that could not be aged because jaws were frozen together. The fawn:100 adults ratio of 77:100 and the fawns per 100 adult females ratio of 171:100 indicates extremely high reproduction in 1963. The fawn:100 adults ratio of farm-killed deer as indicated by Conservation Officer reports was 55:100.

The percentage of deer in each age class and the cumulative percentage of deer in the sample are given in Table 1, for the years 1961-1963. Seventy per cent of the sample was composed of fawns and 1 1/2 year olds. The distribution of the age classes has not changed significantly during this period, though the kill was 39 per cent higher in 1963 than in 1961.

A comparison of sex and age classes by region and zone is presented in Table 2. Data are also given for Monona County as the sample size represented 90 per cent of the kill. A high percentage of young age classes are represented in this particular sample.

General Condition Factors

Deer checkers were asked to judge the condition of deer checked as being good, fair or poor. Fifteen deer were considered to be in fair or poor condition.

Weights were taken from only 36 deer. It was not intended to collect weight data for 1963 but these weights were provided by locker plant operators. The average weight was 138 pounds.

The number of antler points by age class is given in Table 3. The mean number of points per antler for 1963 was 4.14. This is an increase over the 3-year mean of 3.80 points per antler for the 3 preceding years. The mean number of points for 1 1/2-year old males has increased to 3.36 from last years 3-year low of 3.05.

Beam diameters for all deer averaged 1.19 in 1963 compared with 1.08 in 1962 and 1.13 in 1961. The means by age class are given in Table 3.

CONCLUSIONS

The white-tailed deer in Iowa appear to be in excellent physical condition as reflected by apparent reproductive success and general condition factors such as antler points, beam diameters, and body fat.

With 70 per cent of the sample composed of fawns and 1 1/2-year old deer (42.4 per cent fawns), the obvious conclusion is that we are not over-harvesting our deer herd. The sample size of 1,386 deer or 22 per cent of the kill is much higher than previously taken and still shows approximately the same distribution of age classes. I believe that this indicates that the harvest is not cutting into the breeding herd needed to maintain our good deer population.

SUMMARY

1. Biological data were obtained for 1,386, or over 22 per cent, of the total shotgun kill in 1963.

2. The sex ratio observed by deer checkers was 118:100. The sex ratio observed by Officers of farm-killed deer was 102:100.

3. The age composition of the sample was 42.4 per cent fawns and 27.6 per cent 1 1/2-year olds, for a cumulative percentage of 70 for the two youngest age classes.

4. The fawn:100 adults ratio was 77:100 and the fawn:100 adult doe ratio was 171:100 indicating excellent reproductive success in 1963.

LITERATURE CITED

Kline, Paul D. 1958. A report of the 1958 deer season based on data from checking stations, Iowa State Conservation Commission, Quart. Biol. Repts. 10(4): 19-26

TABLE 1. Comparison of age classes represented in deer samples during three shotgun deer seasons, 1961-1963

Age Class	Per cent of total sample			Cumulative Per Cent		
	1961	1962	1963	1961	1962	1963
Fawn	43.1%	41.8%	42.4%	43.1%	41.8%	42.4%
1.5 yrs.	24.5	25.5	27.6	67.6	67.3	70.0
2.5	17.5	19.8	16.5	85.1	87.1	86.5
3.5	7.4	8.2	6.5	92.5	95.3	93.0
4.5	3.1	2.5	2.4	95.6	97.8	95.4
5.5	0.8	0.8	1.1	96.4	98.6	96.5
6.5	0.4	0.3	0.1	96.8	98.9	96.6
6.5 plus	0.7	0.4	0.1	97.5	99.3	96.7
Unknown Adults	2.6	0.6	2.9	100.1	99.9	99.6

TABLE 2. Comparison of deer sex and age classes by area, Iowa, 1964 shotgun season

Region	Sample Size	Percentage of each age class								
		Fawn	1.5	Cum.	2.5	3.5	Cum.	4.5 & Older	Unk. Ads.	Sex Ratio
#1	193	38.8	29.5	68.3	14.5	7.2	90.0	6.9	3.1	103
#2	327	44.0	28.1	72.1	14.7	7.3	94.1	2.5	3.4	115
#3	378	43.4	22.8	66.2	19.3	8.2	93.7	5.0	1.3	131
#4	421	46.1	21.1	67.2	19.5	5.0	91.7	4.0	4.3	116
Statewide	1,386	42.4	27.6	70.0	16.5	6.5	93.0	4.1	2.9	118
Short Zone	179	40.7	31.8	72.5	14.5	7.8	94.8	1.3	3.9	136
Long Zone	1,207	42.6	26.9	69.5	16.7	6.3	92.5	4.8	2.7	113
Monona Co.	113	46.9	31.8	78.7	13.3	6.2	98.2	1.8	0.0	121

TABLE 3. Mean number of antler points and mean beam diameters by age class, 1963

Age	Antler Points	Beam Diameters
1.5 years	3.36 (127)*	0.92 (114)
2.5	4.06 (75)	1.15 (67)
3.5	4.47 (40)	1.23 (33)
4.5	4.05 (12)	1.13 (9)
4.5 plus	4.58 (14)	1.54 (10)
Mean	4.14 (268)	1.19 (233)

* Sample size