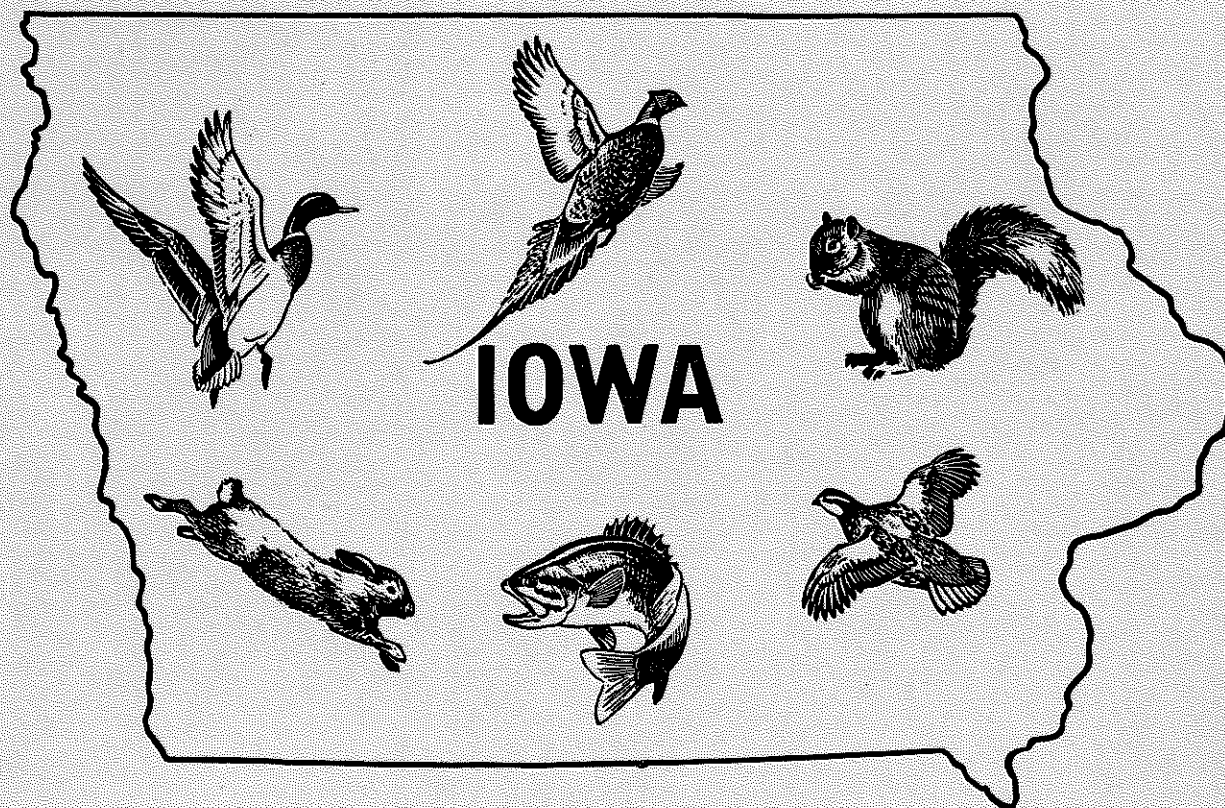


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RECOVERIES OF "EXPERIMENTAL" WATERFOWL RELEASED IN IOWA LAKES
AND MARSHES IN 1955

by

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Game Biologist

The Iowa Conservation Commission banded and released 675 mallard ducks as "experimentals" during the spring and summer of 1955. This was an attempt to bolster or repopulate areas depleted of wild nesting waterfowl, anticipating the return of young gravid females to their natal home (Hochbaum, 1944). Reproduction of subsequent generations of offspring of the original stocked birds would theoretically repopulate a depleted nesting area. Both wild wing-clipped adults, and young "hand-reared" semi-wild ducks were released on state owned areas.

Forty-seven wild mallards captured by Robert Barratt at Green Valley Lake near Creston, Union county, Iowa, were banded, wing-clipped, transported and released at Goose Lake, a rehabilitated lake and marsh area near Jefferson, in Greene county on July 1-4, 1955. Eight known recoveries have been tabulated via the Bird-Banding Office from this release (table 1). Recovery data indicated a northward movement of these experimentals after regaining their power of flight following the post nuptial molt when new primaries replaced those which had been clipped off. Briefly, this northward movement may have indicated a response resembling reverse migration (Mann, 1950); or simply a search for more favorable circumstances because of local drought conditions at Goose Lake.

One hundred and twenty-eight wild mallards captured by Barratt were similarly released as experimentals by Jack McSweeney on Sweet Marsh, a recently impounded marsh area near Tripoli in Bremer county. Twenty-nine of the 33 known recoveries from this release were killed on or near Sweet Marsh. The other four recoveries were scattered; one near Waverly, Iowa, the second from Carver county, Minnesota, the third near Unity, Saskatchewan, and the fourth from Creole, Louisiana. Again, here is indication of northward movement following the post nuptial molt.

One hundred young mallards $5\frac{1}{2}$ weeks old were released on Sweet Marsh on July 1, 1955. Only ten known recoveries have been tabulated from this release so far, and nine of these were killed on or near Sweet Marsh. Only one duck was recovered outside of Iowa, and that near Danville, Illinois. According to Unit Manager McSweeney, these young ducks were vulnerable to predation on the marsh prior to the hunting season, and consequently their survival was assumed to be proportionately less than the survival of the wild caught adult experimentals. This difference may account for the reduced recovery rate of the

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The per cent of mallards recovered from each area cannot be directly compared with one another because of other influencing factors. Utilizing a multiplier or factor found by the Illinois Natural History Survey (Bellrose 1945) to represent waterfowl recovered, but not reported to the United States Fish and Wildlife Service, calculated estimates of total recovery can be deduced (table 2). The Illinois figures are not wholly applicable to this project, but represent the only known data source available for comparison. Evaluation of the calculated estimates of total recovery more clearly indicate that the Ingham-High area releases have been successful, and on the other extreme, that the releases at Brown's Slough were probably wiped out. Caution must be exercised when evaluating total recovery data for areas such as Sweet Marsh where there was a presumed heavy loss of young birds prior to the open season. These pre-season losses which are not reflected in the recovery figures could obscure the true picture. This further emphasizes, that valid field observations coupled with recovery data are the only means to adequately evaluate the effectiveness of a stocking program such as this.

Table 2.--- Calculated estimates of the percent of total recovery of "experimental" waterfowl released in Iowa in 1955.

Area	Number Released	Known Recoveries		Calculated Estimates of Recovery			
		Ratio	Per Cent	Minimum		Maximum	
Goose Lake	47 wild captures	8:47	17.2%	2.5 x 17.2	or 43%	3x 17.2	or 52%
Sweet Marsh	128 wild captures	33:128	25.7%	" 25.7	64%	" 25.7	77%
Sweet Marsh	100 young releases	10:100	10.0%	" 10.0	25%	" 10.0	30%
Rice Lake	100 young releases	14:100	14.0%	" 14.0	35%	" 14.0	42%
Ingham-High	200 young releases	18:200	9.0%	" 9.0	22%	" 9.0	27%
Brown's Slough	100 young releases	55:100	55.0%	" 55.0	100%	" 55.0	100%

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A SELECTED 1956 QUAIL KILL SAMPLE

by

M. E. Stempel*
Game Biologist

Last summer it was decided to try a new method of collecting data during the quail hunting season. This decision was made for the following reasons:

1. Collecting information on quail hunting season by means of field bag check records is difficult because quail shooting parties are not often seen when in the field.
2. While it is desirable to sample the take of the very numerous average hunter who goes out only a few times for quail, it is also desirable to know about the take of the hunter who specialized in quail: His dog usually is well trained, the gun used is open bored, and suitable ammunition is used.
3. Each officer's selection of gunners came from a different strata of sportsmen. Some contacted the best shots, some found the occasional gunner, and some recorded the take of mixed groups.
4. When trying to get records from the field, and at the same time getting an even distribution throughout the season, difficulties were encountered.

Officers in Wapello and Appanoose counties volunteered to make the checks on an experimental basis. The officer having Appanoose and Monroe counties agreed to check 24 parties. In Wapello, 20 parties were to be located.

Special effort was made to contact men having the most experience, though they were not necessarily to be contacted on days when they had the best luck. Contacts were to be made at the most opportune time whether in the field or in town. A record was made only when the hunt ended.

The following table is a summary of the information that was gathered by the officers.

County	No. of : Hunters	Party : Hours	Was a Dog : Yes	Used: : No	No. of : Conveys	Quail : Bagged	No. of : Parties
Appanoosa	55	68	23		74	189	23
Wapello	<u>67</u>	<u>67</u>	<u>13</u>	<u>7</u>	<u>40</u>	<u>169</u>	<u>20</u>
Total	122	135	36	7	114	356	43

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Hunting parties were classed as local when one or more of the group was hunting within 25 miles of home.

Average size of the parties from Appanoose and Monroe counties was 2.4 men; in Wapello the average size was 3.3. Average size for the three counties was 2.8. All parties were within 25 miles of home.

The men reported having been out for 378 man-hours. Eighty-four per cent were using dogs. They spent 1.2 hours per covey located.

For the three counties it took 1.1 man-hours per bird, and in comparison, in the southeast the time per quail was 1.4. In the south-central, 1.6 man-hours were needed to bag one bird.

RESULTS

1. The officers did not find it difficult to get results on any day they wished.
2. The officers liked some field contacts as this furnished them a sound reason for making contacts: The hunters felt they were making a contribution by giving information.
3. The sample from hunters appears to be a good method of securing reasonably accurate samples of actual increases or decreases. These changes could be either in the number of it could be in the availability of the quail.

THE 1955 IOWA QUAIL SEASON

by

M. E. Stempel

Standardized figures on individual hunter success are obtained from a study of data gathered during the open quail season in Iowa. These figures, along with pertinent facts, are preserved in order to have a means of measuring the take of quail in following years. This paper sets forth the information gathered during the 1955 quail shooting season. In addition, some comparisons are made with other years.

Quail hunting began in 62 counties on Saturday, November 5th. In 44 of these, the last day of shooting was December 15, while in the remaining 18, the shooting was legal through November 19. This opening date was a change from the November 1st beginning in 1954 because of a new policy of having seasons start on a Saturday. The December 15 closing date corresponded to that of the past fall, but the November 19 closing in short season counties was a change from a November 15 closing the previous fall. Shooting hours were from 8:30 a.m. to 4:30 p.m.

METHOD

The data are compiled from census cards provided the conservation officers by the biology section. These cards were filled out by the officers as they contacted hunters. The information sought included: The number of hunters in each party, number of hours hunted, number of coveys seen, birds taken, the opinion of the party as to how the season compared to that of last fall, date of hunt, county hunted, distance hunters were from home, and whether a dog was used. The minimum number of contacts requested from an officer was 20 for a county in the long season area and ten in the short season district.

RESULTS

Statewide Success

The 354 report cards returned in 1955 indicated that the average party size was 2.4 hunters. The majority travelled less than 25 miles to hunt. The season was described as the same as 1954 by 41 per cent of the men interviewed, while 39 per cent thought it was better, and 20 per cent believed it was poorer than the previous fall. In 1954 it was indicated by 423 report cards that the average group size was 2.3. Most of these drove less than 25 miles to hunt. Thirty-four per cent described the season as the same as that of the previous fall while 56 per cent believed it was better, and 10 per cent

thought it was poorer. Results of party hunting appear below in table one.

Table 1. Party Hunting Success, 1953, 1954, 1955
Quail Hunting Seasons

Season	Hour per Convey	No. Coveys Flushed	Birds Shot per Covey	Hour per Quail	Number of Quail per Trip
1953	2.0	1.8	2.8	.7	5.0
1954	1.8	1.9	2.7	.6	5.3
1955	1.8	1.9	2.6	1.7	5.0

There was a 1955 decrease in quail shot per covey. This may have been due to the dryer 1956 fall when birds were more wild. The table shows that while hunters saw the same number of coveys as in 1954, it took more time per kill. Less were shot per trip.

Success per Period

Since during most seasons corn husking reduces the cover in tilled fields, and there is a progressive loss of other vegetation because of freezing weather, the hunting of 1955 and 1954 will be compared during three periods that represent advancing deterioration of cover used by quail. In 1955, during the first period which ended November 15, concealment thinned rapidly. At this time, the officers reported on about half the total number of parties that were interviewed. These 163 groups hunted 584 hours, took 799 quail, and spent an average of 1.7 man-hours per bird. In 1954, the success amounted to 1.5 hours per quail taken.

During the November 16 to 30 period, most leaves fell, and weeds collapsed. One hundred and four parties were interviewed who had been afield 332 hours and taken 553 quail. Gunners averaged 1.4 man-hours per quail. In 1954, they averaged 1.4 hours per bird.

During the December portion of the open season only the woody type shelter remained. Although the quail had become more wary as the winter came on, the places they used were always identifiable, hence, hunting success was not extremely variable. The 219 groups reported spending 305 party hours in the field and they bagged 511 quail. One bird was shot each 1.9 man-hours.

Hunting Success by Districts

South-central and southeastern Iowa have the best quail coverts of the range. The top shooting was in the southeast during 1955. Here 143 hunters spent 502 hours to kill 371 birds, while in the south central, 454 men were afield for 1,472 hours and they bagged 925 birds. In the east-

central, 34 sportsmen invested 162 hours in order to bring in 56 quail. In border counties, 227 shooters put in 780 hours time and netted 409 birds.

Areas ranked as follows in man-hours per bird: Southeastern Iowa, 1.4; south central, 1.6; east central, 2.9; and border counties, 1.9.

In the south central, the southeast and in border counties, most shooters thought the season was as good or better than in 1954. In the east central, only slightly more than half the men interviewed believed the 1955 season was the best.

Hunting success has been studied by districts and seasons since 1950. Table two gives the results of this work.

Table 2.-- Hunting Success in Hunter Hours per Quail by Agricultural Districts, 1950 through 1955.

District	1950	1951	1952	1953	1954	1955
South Central	1.5	2.1	1.3	1.7	1.4	1.6
Southeast	1.5	2.4	1.3	1.4	1.4	1.4
East Central	1.2	2.1	3.5	2.1	1.5	2.9
Border Counties	2.5	2.6	1.8	1.8	1.8	1.9

The 1955 hunting was generally good throughout the quail range. There was some complaint that birds were scarce, but several parties that have shot quail in southern Iowa for many years, reported that they saw game every time out. This they considered an unusually good record.

Counties Newly Opened to Hunting

Cass, Story, Pottawattamie, Mills, Montgomery, Chickasaw, and Howard counties, which recently were opened for hunting quail, had practically no hunting according to the officers.

In Harrison and Monona counties shooting was permitted for the first time in years. A limited number of quail were shot.

Results of Using Dogs

The 1955 interviews revealed that 287 parties used dogs. These were made up of 691 hunters who spent 1,053 party-hours, flushed 567 coveys and killed 1,571 birds. Eighty-one per cent of the total number of interviewees were using dogs in 1955 while seventy-nine per cent were using dogs in 1954.

Those not using dogs made up 67 parties in which there were 167 men.

They worked for 178 party-hours to flush 94 coveys and get 190 quail.

Very likely the dry conditions in 1955 made finding birds difficult. It is believed that the available number of quail was about the same in 1955 and 1954. In table three is shown a comparison of success from 1952 through 1955.

Table 3. -- Quail Hunting Success in Hours per Bird for Hunters Using Dogs, Hunters not using Dogs, and for all Hunters, 1952 through 1955.

Year	Hunters Using Dogs	Hunters Not Using Dogs	All Hunters
1952	1.4	1.7	1.4
1953	1.4	2.9	1.6
1954	1.5	1.7	1.5
1955	1.6	2.7	1.7

Records of Selected Hunting Groups

In Wapello, Monroe and in Appanoose counties, the officers volunteered to make a definite portion of the checks entirely with those who had several years experience shooting. This effort was made in order to have available a set of figures that would represent the success of this class.

Information was of the same type collected in the state-wide check. Contacts were made with 122 men. Of these, 84 per cent were using dogs; 1.2 party-hours were spent per covey flushed, while 1.1 hunter-hours were spent per bird taken. The success per hour was 1.4 for the average shooter contacted in the southeast.

SUMMARY

1. Data from 354 quail hunting report cards which were filled out by conservation officers indicate the average 1955 party, took five quail per trip. Most hunters thought the season was as good or better than in 1954.
2. Success was highest the latter part of November.
3. South central and southeastern Iowa reported the highest success.
4. Few hunters were interested in quail shooting in recently opened counties.
5. Highest success was enjoyed by those using dogs.

OBSERVED SEX RATIOS AS SHOWN BY
WINTER PHEASANT COUNTS

by

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Game Biologist

Conservation officers and rural mail carriers conducted their regular winter surveys during January and February to determine the sex ratio of Iowa's post-season pheasant population. The observed sex ratio was used to calculate the harvest of cocks for the 1955 hunting season. The hens per cock figure will also be needed to complete the spring brood stock population survey.

Conservation Officers Winter Count

The biology section contacted all conservation officers late in December. Forms and instructions were similar to the ones used in 1955. The necessity of a complete snow cover and the importance of a large sample were again stressed.

A total of 46,404 pheasants was recorded during the census. According to this survey, the ratio of hens to cocks was 3.3, which was slightly lower than the 3.5 figure obtained during the winter of 1955.

As calculated from these results, hunters shot 62 per cent of the total available roosters last fall. Method used to determine kill followed that described by Petrides (1954), and was based on a preseason sex ratio of 1.2 hens per cock. This estimate of the autumn sex ratio is necessary because of the absence of fall field data and it is believed that the figure is close to the actual sex ratio. The fall sex ratio has been previously estimated to be 1.1 hens per cock, but after further consideration of the spring sex ratio, nesting losses and reproduction success, it was thought that a more accurate figure would be 1.2 females per male. In the future, the preseason sex ratio will be calculated each year in order to more accurately determine the season kill percentage.

The number of birds reported from each district varied considerably and should not be used for population comparisons (table 1). The higher totals of northwest and north central Iowa indicate not only greater populations, but also more favorable checking conditions over a longer period of the winter. The lack of adequate snow cover usually limits the sample size throughout the rest of the state. For example, only about 500 birds were reported in southwest Iowa this year compared to nearly 3,500 a year ago.

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Table 1. -- Observed Sex Ratios and Pheasants Reported by
Agricultural Districts - 1956.

District	Hens	Cocks	Sex Ratio
1. Northwest	10,848	3,824	2.8
2. North central	12,757	3,841	3.3
3. Northeast	4,518	1,196	3.8
4. West central	2,732	689	4.0
5. Central	2,851	619	4.6
6. East central	1,261	329	3.8
7. Southwest	397	134	3.0
8. South central	286	122	2.4
Total for State	35,650	10,754	3.3

The proportion of hens to cocks decreased in all parts of the state except the north central district (table 2). Southern Iowa indicated substantial decreases in the number of hens per cock, however, the small sample involved could have caused an error in these figures. There was little change recorded in the results for northwest, west central and central Iowa. The low hen per cock ratio in the northwest district again this year indicates a lighter harvest for that area of the state. This survey also shows that a lower percentage of the cocks were harvested in eastern Iowa in 1955.

Table 2.- Comparison of Observed Sex Ratios by Agricultural Districts.

District	Observed Sex Ratios		
	1954	1955	1956
1. Northwest	3.1	2.9	2.8
2. North central	2.0	2.7	3.3
3. Northeast	2.6	4.4	3.8
4. West central	2.5	4.1	4.0
5. Central	3.3	4.8	4.6
6. East central	4.5	4.5	3.8
7. Southwest		4.9	3.0
8. South central		3.3	2.4
State average	2.8	3.6	3.3

Sex ratio figures obtained each year during the winter have consistently indicated an adequate supply of cocks for the spring breeding season. Even though hunting pressure has increased, hunters have shot only about two thirds of the available cocks during the past two seasons.

Rural Mail Carriers Winter Count

The rural mail carriers were contacted by the biology section late in January for their winter survey. Forms and instructions were the same as last year.

There were 67,497 pheasants recorded by 443 carriers during the week of January 24 through January 30. These men reported an average of 3.1 hens for each cock recorded, which was slightly less than a year ago.

Table 3. -- Birds Reported and Observed Sex Ratios by Agricultural Districts Mail Carriers, 1956.

District	Hens	Cocks	Sex Ratio
1. Northwest	10,919	4,089	2.7
2. North Central	17,153	6,027	2.8
3. Northeast	15,176	4,141	3.7
4. West Central	1,830	591	3.1
5. Central	4,315	1,149	3.8
6. East Central	1,186	367	3.2
7. Southwest	180	64	2.8
8. South Central	72	41	1.8
9. Southeast	128	69	1.9

Trends in sex ratio figures as reported by officers and carriers have been similar each year but carriers consistently report a higher percentage of cocks in the winter population. However, their counts were made during mid-day and cocks are more easily seen than hens during that period. Hens remain in groups while the roosters range farther from the roosting cover.

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Journal of Wildlife Management 18(3):294.

A CREEL CENSUS FOR SIX ARTIFICIAL LAKES

by

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In modern fisheries management, there is little doubt as to the value of a scientifically and statistically conducted and designed creel census. The knowledge of harvest by hook and line is, and should be, one of our basic fundamentals. Ideally the creel census would encompass a tally of total fishing pressure and harvest on any body of water. This, of course, is virtually impossible because of the numerous access areas available to Iowa waters.

During the summer fishing seasons of 1953, 1954, and 1955, a creel census was conducted on several state-owned artificial lakes in southern Iowa. This censusing was done by the various boat liverymen at each impoundment. Before the fishing season started the boat liverymen were contacted by the area fisheries manager and requested to fill out special creel cards for boat anglers as they returned from fishing. These cards were designed to obtain such pertinent data as number of hours fished, number of fishermen in the party, number of each species of fish caught and kept, weather conditions, and county where angler lives.

In tabulating and interpreting the data received from the boat liverymen, several biases were encountered. Several of the more important were:

- (1) Small deviation in the number of fishermen checked in one day, but a wide variation in the number of days censused.
- (2) There was no effort made to contact shore fishermen, hence, we know nothing about the importance of this type of angling in the artificial lakes fishery.
- (3) On several of the lakes, only successful parties were checked, thus accounting for an unusually high catch rate.
- (4) Several of the selected lakes did not have enough fishermen contacted to represent a good sample.

Although several lakes in the past had excellent creel checks, it is felt much was left to be desired. Thus, from the review of past years, the following sampling design was selected to work in concurrence with the former program in 1956.

The Nature of the Problem

In general, it was thought that the creel census program would have to, in short, distribute allocated time to as many lakes as possible,

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represent equal coverage of the lakes, and still permit the personnel to conduct other duties. From this, six lakes were selected to be censused by one biologist. These lakes were not selected at random but rather by their geographical location, size, past creel census history, and general importance to the fishermen in southern Iowa.

The fishing day was divided into six equal time intervals of two hours. These were: 8-10 a.m., 10-12 a.m., 12-2 p.m., 2-4 p.m., 4-6 p.m., and 6-8 p.m. In the selection of time periods, the hours 6-8 a.m. were forfeited since it is believed that a representative segment of the early largemouth bass fishing can be sampled if censusing is started at eight a.m. on each lake.

Admittedly, a year around creel census would be the best type to use on any lake, but other duties in the summer prevent such a census. To further equalize the time available, an eleven week period between April 15 and June 21 were selected for censusing.

In order to distribute time equally to all lakes involved, three lakes would have to be censused in one day. The time periods as described above were prorated throughout the census period (Appendix table 1). In this manner each lake would be checked twelve times, or in other words, two complete fishing days. As an example, Lake Ahquabi would be censused as follows: April 15, 8-10 a.m.; April 21, 12-2 p.m.; April 27, 4-6 p.m.; May 3, 10-12 p.m.; May 9, 2-4 p.m.; May 15, 6-8 p.m.; and the same schedule repeated during the second period of the census.

The number of times each day of the week is censused was also taken into consideration. All creel cards from the 1955 census were placed in day-of-the-week categories and counted. It was found, as expected, the peak of fishing pressure occurred on Saturday, Sunday, and Thursday. The low appeared on Tuesday, with Monday, Wednesday, and Friday falling between. In this test of fishing pressure it is assumed that all days received equal attention from the liverymen. To compensate for this fluctuation of fishing pressure it was thought peak days should be censused more because of the probability of contacting the maximum number of fishermen during the time of maximum fishing pressure. Thus, the plan to census two days in every six was selected. By these means, Thursday, Friday, Saturday, and Sunday are censused four times, Tuesday twice, Monday and Wednesday three times in the eleven weeks.

A Sample Census Day

At exactly eight A. M. on a census day, the personnel will be at a designated lake. Immediately he will count all the anglers present from a vantage point. A car-top boat will then be used in an effort to contact as many of the fishermen as possible within two hours. The per cent of fishermen contacted will then be recorded in the field notes. Miscellaneous data such as, miles driven to the lake, species fishing for, hours expected to fish, and the value of tackle will be asked of anglers whenever possible.

After two hours of censusing is completed, the clerk will immediately drive to the next lake, within two hours, and repeat the process.

The Choice of Lakes

In the selection of census lakes several important items were taken into consideration. Paramount among these were geographical location, past creel census history, and general importance to the southern Iowa angler. It was, of course, most desirable that the lakes selected were relatively close to each other in order to keep driving distance at a minimum. Thus, from such criteria the following lakes were selected to be censused.

Nine Eagles Lake

Creel censusing has been rather poor in this lake during the past several years. It was thought that in the past, only successful fishing parties have been contacted, and it seems expedient to check into this matter. The lake is located some distance from other water making it very important to the surrounding counties.

Green Valley Lake

This is one of Iowa's newest artificial lakes. Public angling was permitted for the first time in 1955. It was desired a more effective measure of angler's harvest from this area be made during the current season.

Lake Ahquabi

This lake is located only a short distance from metropolitan Des Moines. In view of fishing pressure this is probably one of the most important artificial lakes. Since creel censusing has been very good in the past years, the lake will be used primarily as a check for both methods.

Red Haw Hill Lake

The lake is located very close to biology headquarters in southern Iowa. A very close check of both censusing methods is anticipated.

Lake Wapello

Creel censusing has been good here in the past, and it was selected principally as a control lake to check both methods.

Lake Keomah

In 1955, more fishermen were contacted by the boat livery on the lake than any other area. This lake was also selected as a control lake.

Discussion

It should be kept in mind that the sampling design presented is purely in the experimental stages. Beyond a doubt much can be added during actual operation, and after final data is received. However, it is expected the basic design will remain nearly the same.

In conducting the two types of creel censuses concurrently we hope to accomplish three goals. First, as stated before, a check of accuracy of both methods against each other. Principally to obtain the actual difference in fishermen success as indicated by each type.

During the past three years the boat livery operators have conducted the creel census along with routine bait minnow inspection. For these services they have received payment from the State Conservation Commission. Actually it is believed the success of the census was wholly dependent upon the individual interest of these people and not from the incentive of monetary rewards. At some lakes the censusing was excellent and completed at a reasonable cost. The minimum cost during the 1955 season was \$0.07 per fishermen contacted; however, at one impoundment the cost was \$1.32 per contact. In the outlined census design, if 30 fishermen are contacted on each lake in a census day average cost will be approximately \$0.09 per contact. This is well below the average cost of the voluntary type census.

The third purpose in operating the two creel censuses simultaneously is to test the difference in catch rate between incomplete and complete fishing trips. Censusing by the biologist is based on incomplete fishing days; whereas, the boat livery censusing is done on the return of the rental boats.

Obviously, the ultimate goals of a creel census is to accurately and economically check a segment of hook and line harvest. There are undoubtedly sampling vagaries in both methods. It is hoped by trial and error these can be eliminated or kept at a minimum, and improve the basic design. Perhaps after both sets of data are received at the conclusion of the fishing season we can determine the effectiveness of both methods.

Appendix

Table 1.--Time periods and date of creel census on six southern Iowa artificial lakes.

Date	8-10 A.M.	10-12 A.M.	12-2 P.M.	2-4 P.M.	4-6 P.M.	6-8 P.M.
April 15	A		B		C	
April 16	D		E		F	
April 21	B		C		A	
April 22	E		F		D	
April 27	C		A		B	
April 28	F		D		E	
May 3		A		B		C
May 4		D		E		F
May 9		B		C		A
May 10		E		F		D
May 15		C		A		B
May 16		F		D		E
May 21	A		B		C	
May 22	D		E		F	
May 27	B		C		A	
May 28	E		F		D	
June 2	C		A		B	
June 3	F		D		E	
June 8		A		B		C
June 9		D		E		F
June 14		B		C		A
June 15		E		F		D
June 20		C		A		B
June 21		F		D		E

A. Nine Eagles Lake
 B. Green Valley Lake
 C. Lake Ahquabi
 D. Red Haw Hill Lake
 E. Lake Keomah
 F. Lake Wapello

AN EFFICIENCY ANALYSIS OF A DIRECT-CURRENT SHOCKER

by

R. E. Cleary*
Fisheries Biologist

The direct-current electro-fishing gear used in eastern Iowa trout streams is powered by a 2,500 watt Homelite portable generator rated as capable of producing a current of 20.5 amperes at 120 volts. The power plant is cradle-mounted in an 8-foot "Michigan Shocker Boat" and is manually pulled upstream when covering a section of stream.

The generator was rewired so as to provide for two negative and three positive outlets. The negative grid is a rectangular piece of heavy-gauge sheet copper (2 x 6 feet) affixed to the bottom of the boat. The positive grids are shoe-type in shape and made of half-inch copper tubing, strung in a tennis racket style with copper aerial wire. In normal operation only two positive grids are used, but in wide streams three may be employed.

The positive or "fishing" grids are individually connected to the generator by means of 25 feet of No. 12 - 2 conductor rubber-coated cable. The negative grid is right-angled up the bow of the boat, preventing the connecting lugs from being knocked loose or off by bottom obstructions. The cable connecting the negative grids to the generator was passed through a 20-amp. circuit-breaker, which in the light of subsequent tests proved unnecessary.

In order to assay the potential of this shocker, a functional analysis of the capabilities of the device under actual field conditions was made. Over a sand and silt bottom, at water depths of two to four feet and with a single electrode some 20 feet from the boat the completed circuit registered 2.2 amps and 118 volts. If the positive grid was held less than one foot from the negative plate, the volts remained the same but the amps rose from 2.2 to 2.5. Intermediate distances from one foot to full cable extension (25 feet) made no appreciable changes in the strength of the circuit. When two positive electrodes were used the circuit registered 2.5 amps and 118 volts. No attempt was made to rate the use of three positive grids.

The horizontal field of electricity was probed to get an idea of its effective range and it was found that the strongest portion of the field was confined to a circle, five feet in diameter, around the positive grid. In this area the field had a constant strength of 100 to 102 milli-amps and 7 to $7\frac{1}{2}$ volts. Ten feet from the grid the current had fallen off to an unregistrable figure.

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No attempt was made to assay the other physical factors which affected the operational efficiency of this electro-fishing set-up. Field observation indicated that efficiency varied inversely with depth, turbidity, temperature over 50° F. and the amount of solid rock in the stream bed. (The conductivity of various waters may have biased these observations to an unknown degree).

Table I indicates that the time interval between the mark and recovery stream coverages has seemingly no influence on the efficiency of the shocker. In all cases except one, resident trout were used in the experiments. In order to test the effect that unacclimated, freshly-stocked trout might have on the results, fifty were stocked in Richmond Springs. The recovery ratio was slightly lower than in tests using resident trout but hardly significant. All the tests were conducted on a "once-over" basis and no effort was made to rework these areas to try to remove all trout for marking or for recovery. This was done to standardize the operating procedure of the field tests and the actual field surveys, all our electro-fishing surveys being made on this same "once-over" basis. Only natural barriers such as steep and shallow riffles were used as area blocks in these efficiency tests. All tests were conducted either during the months of March or October.

Table I - Shocker Efficiency in Different Trout Streams

<u>Stream</u>	<u>Area Covered</u>	<u>Number Marked</u>	<u>Reshocking Interval</u>	<u>Number Recovered</u>	<u>Efficiency</u>
Spring Br.	80 Yds.	26	18 hrs.	20	77%
Spring Br.	100 yds.	48	1 hr.	31	65%
Richmond Springs*	120 yds.	50	24 hrs.	25	50%
French Cr.-A	300 yds.	87	1 hr.	50	57%
French Cr.-A	300 yds.	220	1 hr.	149	68%
French Cr.-B	800 yds.	56	2 hrs.	30	54%
French Cr.-B	<u>800 yds.</u>	<u>59</u>	2 hrs.	<u>19</u>	<u>32%</u>
Totals	2,500 yds.	546		324	59%

*Hatchery trout used in this test. All other tests used acclimated trout.

The Spring Branch test area averaged 18 feet in width and 18-24 inches in depth; Richmond Springs, 25 feet in width and 12-18 inches in depth; French Creek-A, 15 feet in width and 12-15 inches in depth; and French Creek-B, 25-30 feet wide and 24-30 inches in depth.

The low average efficiency figure of 59 per cent may have been the partial result of the following factors:

1. Insufficient voltage for the efficient capture of trout in varying habitats.
2. Electro-physical fatigue of latent electro-narcosis causing little or no positive reaction to subsequent electrical stimulus.
3. Populations dominated by the apparent highly resistive brown trout.

Items 1 and 2 are certainly not constant variables of effectiveness; however, Item 3 may be almost considered as a constant factor in reducing shocker efficiency. The brown trout takes a lot of "pulling" to get out of its various "hides." Table 2 indicates this phenomenon quite graphically. Equally interesting, in addition to the disparity in the retakes of brown trout as to either rainbow or brook, is the close agreement in the retake per cent of fingerling and adult brown trout. This low brown trout recovery ratio is evidently a racial characteristic and not a morphometrical one.

Table 2 also illustrates that despite the higher proportion of fish, available "hides," and current in the pool and riffle type of habitat, the shocker is 20 per cent more effective here than in the Pool and Flat habitat. This is probably caused by the increased problem of getting complete coverage in large, deep-water areas. Areas dealt with as Habitat 1 and 2 are the same as described under French Creek-B and A respectively.

Table 2 - Shocker Efficiency by Species, Size, and Stream Habitat in French Creek

<u>Habitat</u>	<u>Adult</u> <u>Rainbow</u>	<u>Adult</u> <u>Brown</u>	<u>Fingerling</u> <u>Brown</u>	<u>Adult</u> <u>Brook</u>	<u>Total Trout</u>
1. Pool & Flats	8/18(44%)	14/24(58%)	8/14(57%)	-	30/56(54%)
2. Riffle & Pool	63/70(90%)	44/84(52%)	21/42(50%)	21/24(83%)	149/220(68%)
3. Stream Run	71/88(81%)	58/108(54%)	29/56(52%)	21/24(83%)	179/276(64%)

SUMMARY

1. The electro-fishing gear, as described, is capable of producing an 118-volt, 2.5 amp. circuit in conditions normally found in northeast Iowa trout streams.

2. The strength of the electric field varied from 100 to 102 milli-amps in a circular area with a five-foot diameter around each positive grid. At a diameter of ten feet, the charge had fallen off to an unregisterable figure.

3. Field observations (unsupported) indicated that the efficiency of the shocker varied inversely with water depth, turbidity, temperature rises above a 50° F. threshold, and the amount of solid rock in the stream bed.

4. In seven field tests in which stream areas ranging from 80 to 800 yards in length were given "once-over" coverages, the average shocker efficiency was 59%.

5. This low efficiency figure may be the result of inadequate electrical stimuli; electro-physical fatigue causing little or no positive reaction to subsequent electrical stimulus; and racial or habitat resistance to electric charges.

6. Brown trout were 35 per cent less capable of being recovered after an initial shocking than were either rainbow or brook.

7. Since both adult and fingerling brown trout were equally resistant to retaking after an initial shocking, this resistance is thought to be racial rather than morphometrical.

8. The incidence of recovery was higher in the small pool and riffle habitat than in the large pool and flat water habitat.

ANNUAL REPORT OF THE IOWA LAKES CREEL CENSUS

(D-J PROJECT NO. F-24R)

by

E. T. Rose*
Fisheries Biologist

Introduction

The Biology Section of the Iowa Conservation Commission has conducted creel censuses on several important fishing lakes since 1946. The purpose of the census is to determine by interview with anglers on the lake, either while actively fishing or having just completed fishing, the success of their efforts. Census methods and periods have changed considerably since 1946. Originally voluntary reporting by the major boat liveries was incorporated with personal contact data, and the census was confined to a period from May 15 to July 1 of each year. In 1950, winter fishing was permitted and a census was included. A year-round census was started in 1953 on Spirit Lake and the Okoboji lakes, and the short term census (May 15-July 15) census continued on several other important lakes. At this time all voluntary reporting was discontinued due to inaccuracies involved.

This paper briefly summarizes the objectives, methods and results of the past year's census work on each lake, and in order to indicate one phase of use, the year-round census data are compared with the previous two years.

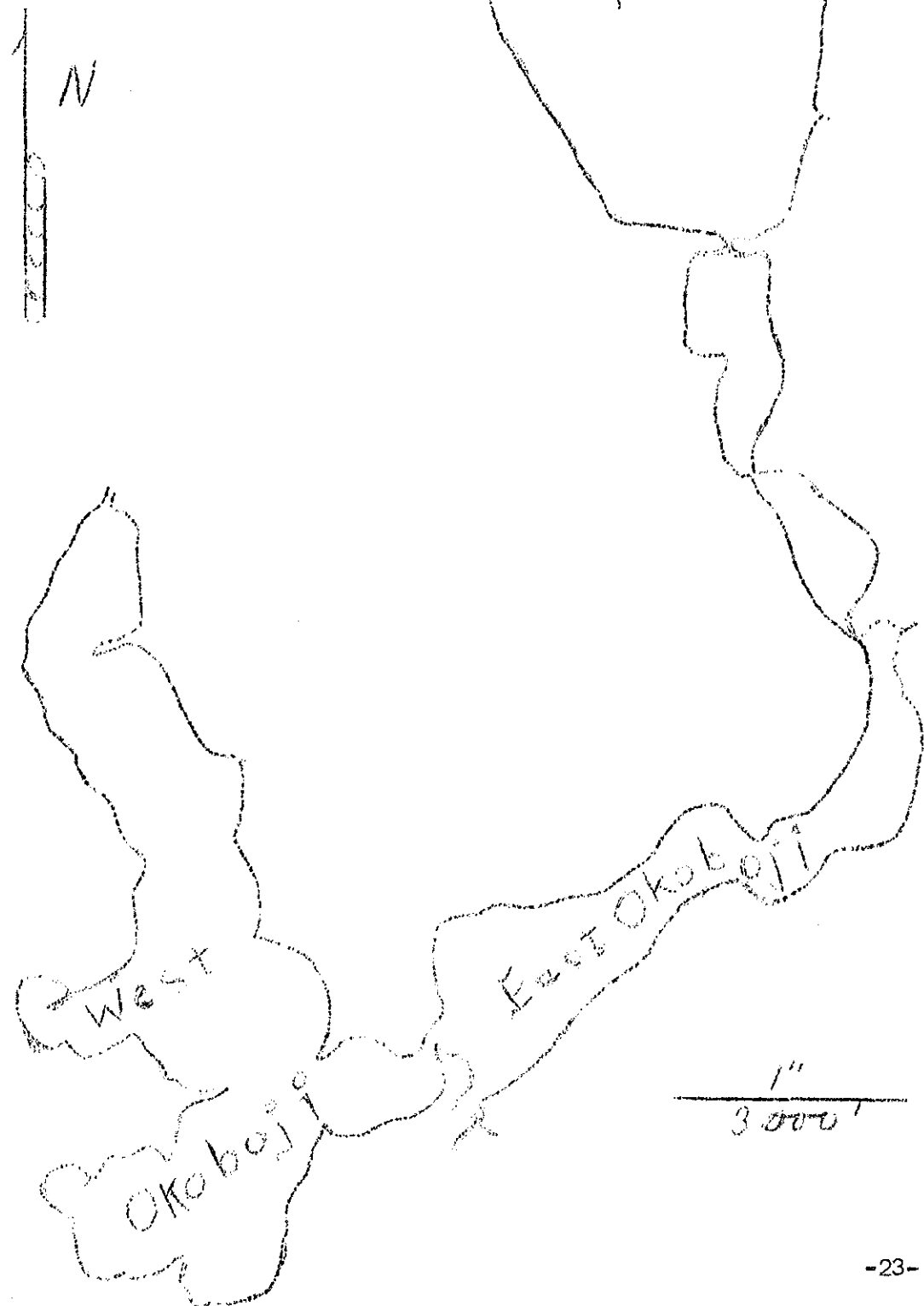
In 1955 the creel census was established under the Dingle-Johnson program; however, personnel and supervision involved has remained with the Biology Section.

Description of Lakes Censused Year-Round

The following comments are included as pertinent to the census and methods used. Spirit and the Okoboji lakes, in Dickinson County, are in the heart of the Iowa lakes region and have moderately heavy fishing pressure each year. At Spirit Lake there are sixteen public boat liveries and twelve public access areas, plus hundreds of cottages and a few private resorts. It is Iowa's largest lake covering nearly 6,000 acres. East Okoboji is a lake of about 1,700 acres and is heavily fished especially in the spring and fall. Due to algal blooms in midsummer, private developments such as resorts, cottages, private docks and boats are not so plentiful as on the other lakes. It has nine public boat liveries and seven public accesses. West Okoboji, the principal resort lake, has 3,939 acres with twelve public accesses and sixteen boat liveries. The highly irregular shore lines and elongated contour

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of these lakes together with other factors have influenced the census methods used by Iowa. (see following map)



Methods of Census

Statisticians term the type of census used in Iowa as the "spot census" as distinct from the "complete" type. In the spot census emphasis is placed on contact with a large daily sample of anglers whether through fishing or actively engaged in fishing and recording essential catch statistics from personal interviews. In the complete type, either all of the anglers who fish the body of water are interviewed, or a sample of completed fishing trips are recorded and these data expanded to include a calculated total number of trips. The latter type is feasible on small lakes or where census clerks can readily count all types of fishermen from one or two vantage points. Due to the configuration of these lakes we have been limited to the spot census methods.

One census clerk is employed for Spirit Lake and one for both of the Okoboji's. These men are required to work six days each week for a minimum of eight hours per day, including Sundays and holidays. No definite pattern of hours for censusing has been used; however, experience has shown the following periods include greatest fishing pressure and the best utilization of time.

Open water (spring, summer, and fall):

Week days,	9:30 a.m. to 8:00 p.m.
Holidays,	7:00 a.m. to 9:30 a.m.
	2:30 p.m. to 8:00 p.m.

Ice Fishing (winter)	8:00 a.m. to 10:00 a.m.
	11:00 a.m. to 4:00 p.m.
	6:00 p.m. to 7:00 p.m. (varies)

Often certain "hot-spots" of especially good angling occur around inlets, bridges or rock points and these attract many anglers in evening or night periods. Special efforts are made to census these areas by altering the above schedule.

Most of the data are collected by means of a boat equipped with an outboard motor. Every fishing boat in every section of the lake is contacted by the clerk who stops his motor and paddles within easy hailing distance with the anglers. The census boat is readily identified with a sign "State Fish Census" on the bows. The anglers are asked to display their catch, count each species, and give the hours of actual fishing time spent by the party. If any tagging has been done, the clerk personally examines the catch of any in their possession. This is incidental to the census, but is an important phase in population and harvest studies. All of the catch data are recorded on IBM cards at the time of interview or transferred from field notebooks at the end of each day. One card is made

APPENDIX TABLE II

LAKE SPIRIT ANNUAL SUMMARY BY TYPE OF CONTACT (JANUARY 1, 1955 to JANUARY 1, 1956)

SPECIES	SHORE	DOCK	WADER	BOAT	WINTER	TOTAL EACH SPECIES	PER CENT OF GRAND TOTAL
CRAPPIE	4,339	455	517	2,083	289	7,683	6.5
PERCH	3,698	3,351	467	16,166	19,015	42,697	36.0
NO. PIKE	181	82	4	341	171	779	0.1
L. M. BASS	432	22	54	43	43	594	0.1
WALLEYE	854	774	62	7,822	1,977	11,489	10.0
S. M. BASS					3*		
BULLHEAD	13,402	6,402	3	27,110	8	46,925	39.7
WHITE BASS	1,037	2,119	363	1,595		5,114	4.3
BLUEGILL	772	465	132	637	2	2,008	1.7
SHEEPSHEAD	184	359	2	661		1,206	1.0
MISC.*							
YEARLY TOTAL BY TYPE	24,899	14,029	1,604	56,458	21,508	118,498	
PER CENT OF GRAND TOTAL	21	12	1	48	18		
YEARLY TOTAL ANGLERS	6,937	3,742	318	14,952	6,126	32,075	
YEARLY TOTAL HOURS EFFORT	16,693	9,190	634	41,728	17,399	85,644	
AVERAGE NO. FISH/ANGLER	3.6	3.7	5.0	3.8	3.5	Av. 3.7	
AVERAGE NO. FISH/HOUR	1.5	1.5	2.5	1.4	1.2	Av. 1.4	

* Error in species separation by clerk. All bass included in one type except largemouth on IMB cards.

APPENDIX TABLE III

LAKE EAST OKOBOJI

ANNUAL SUMMARY BY TYPE OF CONTACT

(JANUARY 1, 1955 to JANUARY 1, 1956)

SPECIES	SHORE	DOCK	WADER	BOAT	WINTER	TOTAL EACH SPECIES	PERCENT OF GRAND TOTAL:
CRAPPIE	1,238	827	91	316		2,472	5.9
PERCH	122	358	17	1,418	2	1,917	4.5
NO. PIKE	2	5	1	34	1	43	0.1
L. M. BASS	7	14	4	15		40	0.1
WALLEYE	227	190	15	2,914	133	3,479	8.3
S. M. BASS							
BULLHEAD	4,924	1,376	86	26,211		32,597	77.7
WHITE BASS	11	19	15	395		440	1.0
BLUEGILL	29	147	45	122		343	0.8
SHEEPSHEAD	93	124	2	410		629	1.5
MISC.							
YEARLY TOTAL BY TYPE	6,653	3,060	276	31,835	136	41,960	
PER CENT OF GRAND TOTAL	15.8	7.5	0.6	75.9	0.3		
YEARLY TOTAL ANGLERS	1,671	1,038	49	7,359	54	10,171	
YEARLY TOTAL HOURS EFFORT	4,552	2,122	89	20,553	174	27,190	
AVERAGE NO. FISH/ANGLER	3.9	2.9	5.6	4.3	2.5	Av. 4.2	
AVERAGE NO. FISH/HOUR	1.6	1.3	3.1	1.5	0.8	Av. 1.5	

A REPORT OF THE 1955 DEER SEASON BASED
ON DATA FROM CHECKING STATIONS

by

Paul Kline*
Game Biologist

Iowa's third consecutive deer season was held December 3-5, 1955. For the first time hunting was allowed throughout the entire state. During the previous two seasons only certain counties in the state had been opened for deer hunting. In 1953, $41\frac{1}{2}$ counties were open; while during 1954, hunting was allowed in $51\frac{1}{2}$ counties. Regulations remained unchanged except for inclusion of a season limit of one deer.

In order to facilitate collections of age, sex, and weight data, and secure orally certain information from hunters, four voluntary checking stations were established in locations where hunter concentrations were expected. These stations were located at Denver, Cherokee, Lansing and Indianola. After it was determined that little information was being secured from the Denver station, it was moved to Backbone State Park. All information obtained from this station is included hereinafter as Denver-Backbone.

The stations were manned by members of the biology, federal aid, and game sections. In addition to the four checking stations, at least one officer, Charles Olofson, collected considerable data from Mahaska County. Assistance of all personnel who participated in gathering the following information is greatly appreciated.

Results

Age classes - Comparison of age classes in the hunters' kill for three seasons can be seen in Table 1. The percentage of fawns (34.7%) decreased from the 1954 kill (41.7%), but did not descend to the level of 1953, when only 27.4% of all deer were fawns. Also, more deer $3\frac{1}{2}$ years and older were shot in 1955 than in 1954, but fewer than 1953. These discrepancies may be due, in part at least, to hunting in much of the state where the season had been closed during two previous years. As reported in 1953 and 1954, the $1\frac{1}{2}$ year age class was not as large as the $2\frac{1}{2}$ year class.

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Table 1. Age Classes of Deer Examined at Checking Stations during the 1953, 1954, and 1955 Seasons.

Age Class	1953		1954		1955	
	Number	Per Cent of Total	Number	Per Cent of Total	Number	Per Cent of Total
Fawn	135	27.4	125	41.7	59	34.7
1½	109	22.1	58	19.7	37	21.7
2½	120	24.3	62	21.0	38	22.4
3½	65	13.4	35	11.8	24	14.1
4½	43	8.7	10	3.4	7	4.1
5½	11	2.2	4	1.4	1	0.6
6½	4	0.8	0	0.0	2	1.2
7½	4	0.8	1	0.3	2	1.2
8½	1	0.2	0	0.0	0	0.0
Totals	493		300		170	

Sex ratios - As can be seen in Table 2, more bucks than does were shot. The number of female fawns (28) is only slightly fewer than the number of male fawns (31). These data give a sex ratio of 47.5% female fawns and 52.5% males. In 1953, 52% of the fawns examined were males; while in 1954, 63% were males. An increase in the percentage of female fawns as occurred during the past year may be beneficial to the deer herd as it should permit it to rebound more strongly from hunting pressure.

Ten more bucks than does 2½ years or older were checked. However, these were partly offset by fewer 1½ year old bucks (16) than does (21). The combination of all deer examined gives 52.4% bucks and 47.6% does. These percentages compare closely to those obtained during the 1953 season when 54% bucks were shot; but they do not compare with 58% bucks shot in 1954.

Table 2. Sex Composition of Deer Based on Age Classes.

Age Class	Males		Females	
	Number Examined	Per Cent of Total Deer	Number Examined	Per Cent of Total Deer
Fawn	31	18.2	28	16.5
1½	16	9.4	21	12.3
2½ & Older	42	24.7	32	18.8
Total	89	52.4	81	47.6

Body weights - Computed average live weights of the various age and sex classes can be an indication of herd condition. If enough information is secured it may be possible to compare herd condition in one location with that of another. Unfortunately, not enough data was collected to facilitate any such comparisons.

As Table 3 shows, the average of all deer weighed was 140 pounds. This is an increase of 8.4 pounds per animal over 1954, and 9.6 pounds over 1953. Fawns weighed somewhat less than last year. Female fawns averaged 87.6 pounds, while males averaged 100 pounds. In 1954, females weighed 92.5 pounds and males 113.2 pounds. Weights were above those of 1953 when female fawns averaged 71.7 pounds, and males tipped the scales at 84.7 pounds.

Average bucks of all age classes weighed 155.4 pounds as compared to 136.9 pounds in 1954 and 148.2 pounds in 1953. Average weight of all does (122.0 pounds) fell more nearly in line with 1954 figure (124.5 pounds), but was higher than that of 1953 (108.7 pounds).

Table 3. Computed* Live Weights of Deer Based on Sex and Age Classes.

Age Class	Males	Females	Average
Fawns	22#- 100.0	24 - 87.6	46 - 93.7
1½	13 - 157.7	14 -133.2	27 -145.0
2½	13 - 176.3	15 -147.1	28 -160.7
3½	10 - 216.3	6 -162.1	16 -196.0
4½	4 - 221.0	2 -140.5	6 -194.1
5½	1 - 252.0	0 -000.0	1 -252.0
6½	1 - 164.0	1 -135.0	2 -149.5
7½	1 - 201.0	0 -000.0	1 -201.0
Average	65 - 155.4	62 -122.0	127 -140.0

* Live weights in pounds was computed by multiplying hog-dressed weights by 1.272.

Figures preceeding dashes in all cases represent the number of deer used in determination of average.

Forty-six pounds was the calculated live weight of the smallest deer, a female fawn. The largest, two, 252 pound bucks, were 3½ and 5½ years old.

Hunter effort - Time to bag their deer as reported by successful hunters was found to be 5.9 hours, compared to 6.4 hours in 1954. Lansing hunters, as revealed by Table 4, needed more time, 7.2 hours, than any other group. Also, Lansing hunters hunted more days before making a kill than the average (1.47 days). Other data obtained from questioned hunters revealed that the average hunter saw 5.3 deer and shot at 1.5 deer while making a kill. There appeared to be little selectivity by hunters as 148 (92%) of 161 reported shooting at the first deer they saw in range.

Table 4. Hunter Effort as Reported by Successful Hunters at Five Locations.

66				
Location	Average Number Days Hunted	Average Number Hours Hunted	Average Number Deer Seen Before Kill	Average Number Deer Shot At
Cherokee	56* - 1.43	54 - 5.1	54 - 8.0	55 - 1.7
Denver-Backbone	19 - 1.31	17 - 5.0	18 - 3.8	19 - 1.5
Lansing	64 - 1.58	62 - 7.2	63 - 4.0	64 - 1.4
Indianola	21 - 1.24	21 - 5.0	21 - 4.0	20 - 1.4
Mahaska County	8 -- 2.00	_____	6 - 3.5	6 - 1.5
Average	168 - 1.47	154 - 5.9	162 - 5.3	164 - 1.5

* Numbers preceeding dashes in all cases represents number of hunters interviewed to determine average.

One hundred and eleven (60.9%) of 182 interviewed hunters reportedly killed their deer in home counties. Seventy-one or 39.1% killed a deer outside their home county. In 1954 less than 1/3 successful nimrods killed deer in their home county; and in 1953 the figure was about $\frac{1}{2}$. The fact that hunting was permitted this year in all counties may account for the difference. Only Lansing checking station reported mostly non-resident hunters (see Table 5)..

Table 5. Numbers of Reporting Hunters Who Killed Deer in Their Home Counties.

Location	Number Hunters Who Made Kill in Home County	Number Hunters Who Did Not Kill in Home County
Cherokee	51	12
Denver-Backbone	10	9
Lansing	22	42
Indianola	14	8
Mahaska County	10	0
Total	111 or 60.9%	71 or 39.1%

As in 1954, most deer were taken during opening day. Table 6 shows 60.3% were killed opening day, 23% the second, and 16.7% on the final day. In 1954, 61% of the kill fell on opening day; and 25% and 14% on the second and third days respectively.

Table 6. Number of Deer Killed Per Day as Reported at Each Checking Station Location.

Location	Number Killed First Day	Number Killed Second Day	Number Killed Third Day
Cherokee	37	13	12
Denver-Backbone	14	4	1
Lansing	35	19	10
Indianola	16	4	2
Mahaska County	<u>3</u>	<u>0</u>	<u>4</u>
Total	105 or 60.3%	40 or 23.0%	29 or 16.7%

More farmers hunted deer in 1955 than in previous years. Forty-two per cent of all hunters were farmers as compared to 38% in 1954 and 40% in 1953.

Most gunners (83.0%) preferred 12-gauge shotguns. Sixteen-gauge was used by 12.2% and 20-gauge by 1.8% of all hunters. One-hundred fifty-five hunters reportedly averaged 60 yards per successful shot. However, 17 of these reported ranges over 100 yards. For shotgun slugs, these seem to be excessive ranges. By eliminating all reports over 100 yards, an average of 50 yards per successful shot was reached.

SUMMARY

1. Iowa's third successive deer season was held December 3-5, 1955. Hunting was allowed in all counties. One deer was established as the season bag limit.

2. Fawns comprised 34.7% of the total kill. Age classes $1\frac{1}{2}$, $2\frac{1}{2}$, and $3\frac{1}{2}$ comprised 21.7%, 22.4%, and 14.1% respectively of the kill.

3. Bucks comprised 52.4% of all deer checked. Male fawns made up 52.5% of all fawns. Compared to the 63% male fawns found in 1954 this is a definite decrease.

