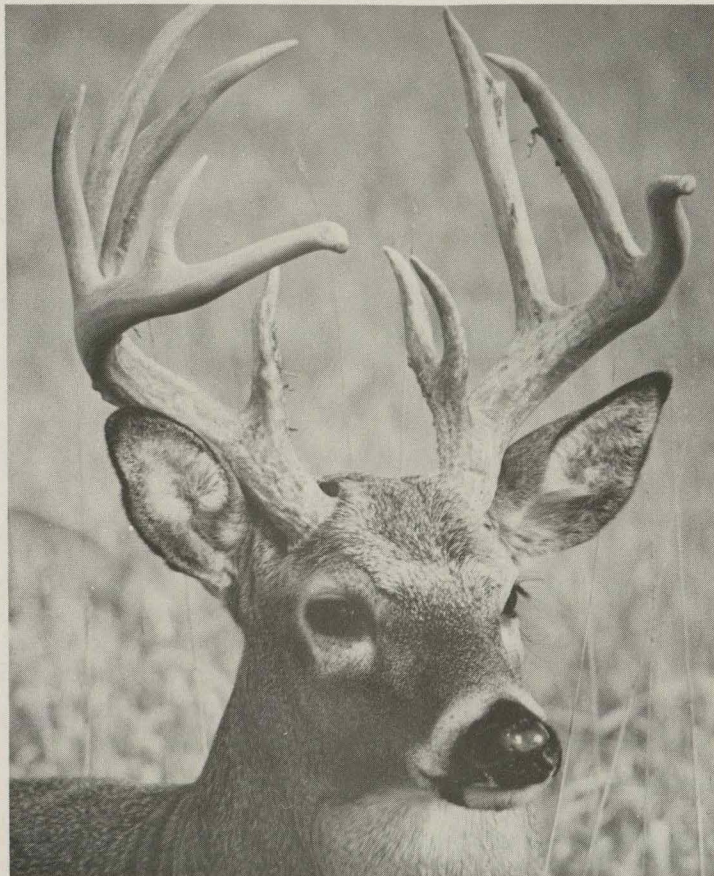


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Deer in Iowa - 1979

Annual Progress Report
Wildlife Research and Surveys Project
Federal Aid Project No. W-115-R

Phase D. Study No. 13
Job No. 1: Deer Harvest Survey

Phase D. Study No. 15
Job No. 1: Winter Population Estimate
Job No. 2: Miscellaneous Mortality Survey
Job No. 3: Sex and Age Ratio Survey

by

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ABSTRACT

The primary deer management tool in Iowa is the formulation of a good deer harvest strategy. The annual population surveys and harvest results from the previous year are important components in the preparation of hunting regulations that meet the deer management goals of this state. There were 55,718 paid shotgun licenses issued, a 7% increase from 1978. Also, 10,504 free landowner-tenant licenses were issued, a 33% decrease from last year, and 13,378 bow licenses were sold, 4% more than in 1978. An estimated 16,149 (± 503) deer were harvested by shotgun hunters with 1st season hunters taking 7,918 compared to 8,231 in the 2nd. In addition, 3,305 (± 356) deer were harvested by archers. The total harvest of 19,454 deer was the 2nd highest in Iowa history and represents an 8% increase from 1978. About 23% of the total shotgun harvest was composed of does compared to 32% does in the bow harvest. Shotgun hunters spent around 1.2 million hours in the field while bow hunters clocked another 3/4 million. About 86% of the shotgun hunters reported they hunted on private land and only 12% had any trouble obtaining permission. Central deer incisors submitted by hunters indicated some increases in the mean expectation of life for bucks and does when compared to the past 2 years. There were 3,005 deer lost in traffic accidents which is an 8% increase from 1978. The sex ratio of the traffic kill was nearly equal. The major peak in the traffic kill was during the breeding season in October, November, and December and 56% of the loss during this period was males. Winter population estimates increased 8% from the previous year with 66 counties reporting increases.

ACKNOWLEDGEMENTS

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INTRODUCTION

Goals of the Iowa deer management program are to: (1) maintain a stable to slightly increasing herd on a regional basis, (2) provide the maximum amount of quality recreation possible without endangering the resource, (3) monitor population trends and recommend hunting regulations that will provide proper harvest. To help determine effectiveness of the hunting season, harvest results are tabulated from information provided by hunters on post-season report cards. Hunter report cards provide estimates of harvest, hunter success, hunter effort, sex ratio of deer harvested, and crippling rate. Mean expectation of life is calculated from the age composition of a sample of harvested deer. Population trends are determined from traffic kill and conservation officer winter population estimates. Results of these surveys are used as a basis for annual hunting season recommendations. Manipulation of the harvest is the primary tool for managing deer populations since hunting is the largest mortality factor for deer in Iowa. Results of the 1979 hunting season and annual population trend surveys are presented in this bulletin.

HUNTING SEASON REGULATIONS

Two separate shotgun seasons were conducted (1-4 December and 8-14 December) in 10 hunting zones (Fig. 1). Hunters were allowed to apply for a limited number of any-sex licenses in only 1 hunting zone and season combination. Twice as many any-sex licenses were issued for the 2nd season in zones with any-sex quotas for both seasons. This higher any-sex license issue equalized hunter numbers, harvest and hunting success between seasons. Several hunting zones (1, 7, and 9) had a bucks-only 1st season and the entire any-sex quota issued the 2nd. This bucks-only season eliminated high bucks-only to any-sex license ratios that would develop from large hunter application rates for a small number of any-sex licenses. Any-sex licenses were issued after a randomized computer drawing from all applications for each zone and season combination. All unsuccessful applicants in the any-sex license drawing received a bucks-only license valid for the zone and season they indicated on their application. These bucks-only hunters were also issued a certificate that would give them preference in the 1980 random drawing for any-sex licenses if the certificate is returned with their 1980 application. Landowner-tenants were issued free shotgun licenses at the same bucks-only to any-sex ratio as determined for paid shotgun hunters in each zone and season combination. Landowner-tenants were allowed 1 free license per farm unit and could hunt only on their own property. The license fee for paid shotgun hunters was \$15. Other regulations included shooting hours from sunrise to sunset and a 1 deer bag and possession limit.

A 56-day bow and arrow season was held from 6 October to 30 November. Hunters could buy an any-sex license at county recorder offices for \$15. Hours of hunting for archers were 1/2 hour before sunrise to 1/2 hour after sunset with a 1 deer bag and possession limit.

HUNTING SEASON RESULTS

Hunter Report Card Survey

A hunter report card was mailed to 33% of the licensed hunters (25% of the paid shotgun and 72% of the landowner-tenants) immediately following the season they hunted. Information requested by the report card included hunter success, sex of deer harvested, hunting effort, crippling rate, and area hunted. If a reply to the 1st mailing was not received within 1 month, a follow-up card was sent. Of 21,622 hunters surveyed, 76% returned report cards (75% of the paid shotgun and 78% of the landowner-tenants). About 51% of the survey sample returned the 1st mailing. A sample of 1,500 archers was surveyed and 80% returned report cards. Harvest results of nonrespondents were determined by assigning them the same success rates as those responding to the follow-up report cards. Success rates were calculated only for those that reported they hunted.

License Issue and Hunting Pressure

There were 55,718 paid shotgun licenses issued, a 7% increase from 1978 (Table 1). Also, 10,504 free landowner-tenant licenses were issued compared to 15,699 in the previous year (33% decrease). The increase in paid shotgun licenses and decrease in free landowner licenses were probably due to landowners applying for only 1 license type (paid shotgun or free landowner-tenant) in compliance with deer licensing laws. This compliance was initiated by an intensive enforcement effort in 1978 and 1979 to notify landowners of the law and to collect licenses that were illegally obtained. The shotgun license issue was evenly split between the 2 hunting seasons (Table 2). The highest bucks-only to any-sex license ratio was 12/1 in zone 10, 1st season, while the lowest ratio was 1/1 in zones 3 and 6 during the 2nd (Table 2).

A total of 13,378 bow and arrow licenses were sold. This represents a 4% increase from 1978 and is the highest number of bow licenses ever sold.

Light snow and normal winter temperatures during the 1st shotgun season created excellent hunting conditions. The number of hunters that reported they did not hunt was lower during the 1st season than the 2nd (Table 3). Good weather during the 2nd season combined with excellent conditions during the 1st sent a higher percentage of hunters to the field in 1979 than in 1977 or 1978 when winter storms reduced hunter pressure (Table 3).

Harvest and Hunting Success

An estimated 16,149(± 503) deer were harvested by shotgun hunters with 7,918 taken in the 1st season and 8,231 in the 2nd. Of 16,149 deer harvested, 14,178 were taken by paid shotgun hunters and 1,971 by landowner-tenants (Table 1). In addition, 3,305(± 356) deer were harvested by archers for a

total harvest of 19,454. This represents an 8% increase from 1978 and is the 2nd highest harvest in Iowa history. Favorable weather during both seasons and good fall deer populations produced high harvest and success rates. Hunting zone 6 recorded the highest regional harvest with 2,724 deer while zones 3 and 4 had the highest overall success rates (Table 4).

Shotgun hunter success rates were generally better than in 1978 and were comparable to the record rates of 1975 (Table 5). Increases in landowner-tenant success rates are probably due to the loss of less active hunters because of compliance with license laws. Hunter success rates during 1st season were higher in all hunter categories than during the 2nd (Table 5).

Bow harvest and success rates have continued to increase because of higher archer numbers, good deer populations, and increased use of compound bows (Table 6). A record high success rate of 26% was achieved in 1979 by active archers.

Distribution of harvest during the shotgun seasons was estimated from a question on deer tooth envelopes. Most of the harvest took place on opening weekends with 68% taken during the 1st and 55% during the 2nd (Table 7). The remainder of the harvest was evenly distributed among weekdays in both seasons.

Sex Ratio of the Harvest

Paid any-sex shotgun hunters reported that during the 1st season about 62% of their harvest was does with 65% in the 2nd. Landowner-tenant any-sex hunters reported 58% and 62% of their harvest was does during the 2 seasons. An estimated 3,764 does were harvested by shotgun hunters compared to 3,441 in 1978. The increased harvest of does was probably due to increases in any-sex license quotas and higher any-sex hunter success rates. Does composed 64% of the any-sex harvest and 23% of the total shotgun harvest. Bow hunters harvested an additional 1,222 does (32% of their harvest) producing a total doe harvest of 4,986 (Table 8). The 1979 doe harvest is the highest since 1975 when 6,037 does were harvested.

Hunter Effort

An estimated 1.2 million hours during 183,000 days were spent by shotgun hunters pursuing deer. An average of 2.7 days were spent in the field per 1st season shotgun hunter, compared to 3.5 days in the 2nd. Hunter effort increased for paid shotgun hunters in 1979 probably due to favorable weather conditions (Table 9). The landowner-tenant hunter effort however, remained about the same as in previous years. Hunters took advantage of the longer 2nd season as shown by increased number of hours and days spent in the field (Table 9). An average of 101 hours of

hunting were required for paid bucks-only shotgun hunters to harvest a deer compared to 92 hours in 1978. Any-sex hunters required only 38 hours per deer harvested compared to 35 hours in 1978. Several explanations for the increased effort per deer harvested may be the lack of snow during the 1979 season, more inexperienced hunters in the field due to higher license sales and mild weather, or differences in deer population density.

Bow hunters spent an estimated 774,000 hours during 206,000 days hunting deer with the average archer hunting 16 days. Bow hunters required an average of 225 hours of hunting to bag a deer which is the same as in 1978.

Crippling Rate

Crippling rate for shotgun hunters in 1979 increased slightly to 14%. This increase may be due to the increased number of any-sex licenses issued since any-sex hunters cripple deer at a slightly higher rate (15%) than bucks-only hunters (13%). Also, paid shotgun hunters, who made up a larger proportion of the total number of hunters, have a higher reported crippling rate (15%) than landowners (8%). Crippled deer may recover or be harvested by other hunters and therefore, only a portion of them can be considered a loss in addition to the reported harvest. Archers reported a 15% crippling rate which is slightly higher than the 14% reported in 1978.

Public and Private Land Use

About 86% of the shotgun hunters indicated they hunted on private land. Another 13% hunted on public land and 1% hunted on both private and public land. Only 12% of those hunting on private land reported they had trouble obtaining permission. This indicates that deer hunters are not having any significant problems in finding a place to hunt on private land and that a good percentage is utilizing public hunting areas.

SEX AND AGE COMPOSITION

Age Composition

About 12,000 any-sex shotgun hunters were sent a deer tooth envelope with their license. The envelope asked that successful hunters insert central incisors from deer they harvested and to provide information about the sex of deer and date of kill. A total of 1319 useable deer incisors were returned for use in aging by the tooth sectioning technique (Low and Cowan 1963). About 40% of the any-sex hunters returning tooth envelopes harvested fawns. Mean expectation of life (M.E.L.) was calculated for bucks and does of each age group for comparison with previous years (Table 10). M.E.L. for both bucks and does was comparable

to 1976 but slightly higher than 1977 and 1978 levels. During the past 5 years, trends in M.E.L. for bucks and does has been relatively stable with small annual fluctuations. M.E.L. for bucks is much lower than does, indicating heavier mortality rates probably due to increased hunter pressure and bucks-only restrictions.

M.E.L. for does varied by hunting zone because of different mortality rates or some other cause (Table 11). It was highest for does in hunting zones 2, 6, and 9 and lowest in zones 3, 4, and 10. M.E.L. for bucks on a regional basis was excluded because of small sample size. The oldest deer harvested in 1979 was a 14½-year-old doe taken by a shotgun hunter. The oldest buck harvested was 6½ years old.

Sex Ratio

Sex ratio of the any-sex harvest could be determined from information on tooth envelopes. About 52% of the fawns harvested by any-sex shotgun hunters were does. Adult bucks made up about 15% of the total any-sex harvest and about 25% of the adults harvested. The tooth envelope survey indicated that 66% of the total any-sex harvest was does corresponding closely to results of the hunter postcard survey.

MISCELLANEOUS MORTALITY

A total of 3,393 deer were reported lost to various nonhunting mortality factors. Traffic accidents were the major factor accounting for 3,005 deer, compared to 2,872 in 1978. Of the remaining 388 deer, there were 188 lost to known illegal kill, 54 to dog predation, and 156 to accidents such as mowing, trains, and fences. When deer traffic loss is computed on the basis of deer killed per billion vehicle miles traveled and compared to previous years, a useable deer population trend indicator is available. In 1979, an estimated 11.6 billion miles were driven on rural interstate, primary, and secondary road systems (Iowa Department of Transportation-personal communications). This would extrapolate to 259 deer killed per billion miles traveled. This is a new record high number of deer killed per billion vehicle miles and represents an 8% increase from 1978 (Table 12).

Changes in sex ratio of the traffic kill may be one indicator of sex ratio changes in the population due to differential mortality from hunting or some other cause. There may however, be some biases due to unequal vulnerability and differences in behavior. About 50% of the traffic kill was does compared to 47% in 1978 (Table 12).

Traffic kill can be broken down into deer survey units (Gladfelter 1977), which correspond closely to hunting zones, to provide an indication of changes on a regional basis (Table 13). These data have been corrected for vehicle mileage by adjusting traffic kill to deer killed per billion vehicle miles traveled. Fluctuating traffic kill trends were recorded in most regions during the past 6 years (Table 13). Increases in deer killed per billion vehicle miles occurred in most deer survey units ranging from 2% in unit 3 to 33% in unit 7. Decreases occurred in unit 1 (-17%), probably because of personnel changes and lost records; in unit 6 (-1%), because

of increased any-sex harvest to reduce the herd; and in unit 9 (-18%), possibly because of population declines in one county.

The major peak in traffic mortality occurred during the breeding season in October, November, and December (Fig. 2). About 56% of the kill during this period was bucks, indicating that they may be more vulnerable because of breeding activity. A smaller peak in mortality occurred in April and May during the period of family group breakup and fawning.

WINTER POPULATION ESTIMATE

Conservation officers annually estimate the number of wintering deer in their assigned territory. The 1979-80 winter deer population was estimated at around 30,500, an 8% increase compared to 1978-79. This increase was reported during a winter which was characterized by lack of snowfall, relatively mild weather, and reduced herding of deer. Winter population estimates increased from 1978-79 levels in 8 of 10 deer survey units (Table 14). Only units 3 (-5%) and 10 (-5%) indicated declines while the others reported increases ranging from 2% to 23%. Winter deer herd size appears to be increasing in most survey units during the past 3 years (Table 14). When compared to the previous year, winter estimates increased in 66 counties, decreased in 22 and 11 remained unchanged.

SUMMARY

Deer harvest and success rates were very good because of an excellent fall population of deer and favorable hunting conditions during the shotgun season. Population surveys indicate a relatively stable statewide deer herd with some areas showing increasing population trends.

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TABLES AND FIGURES

Table 1. Comparison of statewide results from 27 years of shotgun deer seasons in Iowa.

Year	Season length in days	Licenses issued		No. deer harvested		Total gun harvest	Percent success			
		Shotgun	Landowner ¹	Shotgun	Landowner		Paid shotgun		Landowner ¹	
							Any-sex	Bucks-only	Any-sex	Bucks-only
1953	5	3,772	-----	2,401	1,606	4,007	61	---	---	---
1954	3	3,788	-----	1,827	586	2,413	64	---	---	---
1955	3	5,586	-----	2,438	568	3,006	44	---	---	---
1956	2	5,440	-----	2,000	561	2,561	39	---	---	---
1957	2	5,997	-----	2,187	480	2,667	37	---	---	---
1958	2	6,000	-----	2,141	588	2,729	38	---	---	---
1959	2	5,999	-----	1,935	541	2,476	33	---	---	---
1960	3	7,000	-----	3,188	804	3,992	46	---	---	---
1961	3	8,000	-----	4,033	964	4,997	52	---	---	---
1962	3	10,001	-----	4,281	1,018	5,299	44	---	---	---
1963	2,3	12,001	-----	5,595	1,018	6,613	48	---	---	---
1964	2,4	15,993	-----	7,274	1,750	9,024	47	---	---	---
1965	2,4	17,491	-----	6,588	1,322	7,910	39	---	---	---
1966	2,4	20,811	-----	9,070	1,672	10,742	45	---	---	---
1967	2,3	20,812	21,121	7,628	2,764	10,392	39	---	19	---
1968	2,3	20,485	24,796	9,052	3,890	12,941	48	---	21	---
1969	2,3	18,000	23,476	6,952	2,779	10,731	41	---	21	---
1970	2,3	18,000	21,697	8,398	4,345	12,743	49	---	26	---
1971	2	18,000	10,522	7,779	2,680	10,459	45	---	31	---
1972	2,4	19,000	11,205	7,741	2,738	10,485	44 ²	30	34 ²	20
1973	5	27,530	9,686	10,017	2,191	12,208	58	31	40	25
1974	5	33,772	16,329	11,720	4,097	15,817	64	29	48	27
1975	4,7	56,003	17,821	15,300	3,650	18,950	60	23	43	22
1976	4,7	60,197	17,818	11,725	2,525	14,250	48	17	37	17
1977	4,7	58,715	16,289	10,737	2,051	12,788	47	16	34	16
1978	4,7	51,934	15,699	12,815	2,353	15,168	55	21	39	20
1979	4,7	55,718	10,504	14,178	1,971	16,149	56	21	45	24

¹ These data have been collected since 1967 when landowner-tenants were 1st required to obtain a permit.

² Percent success was calculated, for comparison purposes, for any-sex hunting zones 1, 2, and 4 only.

Table 2. License issue by type of hunter, zone, season and ratio of bucks-only to any-sex licenses sold in 1979.

Hunting zone	Season 1				
	Bucks-only	Paid shotgun		Landowner-tenant	
		Any-sex	B.O./A.S. ratio	Bucks-only	Any-sex
1	1611	0	--	249	0
2	1279	125	10/1	174	18
3	1588	500	3/1	182	59
4	3628	375	9/1	627	66
5	4150	575	7/1	830	117
6	2840	750	4/1	562	152
7	3452	0	--	663	0
8	2173	200	11/1	364	34
9	2961	0	--	541	0
10	1570	125	12/1	234	19
Total	25,252	2,650		4,426	465

Hunting zone	Season 2				
	Bucks-only	Paid shotgun		Landowner-tenant	
		Any-sex	B.O./A.S. ratio	Bucks-only	Any-sex
1	1437	475	3/1	225	77
2	877	250	3/1	144	42
3	666	1000	1/1	100	160
4	2034	750	3/1	459	174
5	2610	1150	2/1	699	316
6	2010	1500	1/1	465	358
7	5043	800	6/1	863	141
8	1674	400	4/1	342	84
9	3310	750	4/1	633	145
10	830	250	3/1	142	44
Total	20,491	7,325		4,072	1,541

Table 3. Percent of hunters that did not hunt, 1975-1979.

Type of hunter	Bucks-only					Any-sex				
	1975	1976	1977	1978	1979	1975	1976	1977	1978	1979
<u>Season 1</u>										
Paid shotgun	4	9	11	10	5	3	6	7	7	5
Landowner-tenant	21	29	32	36	32	15	24	23	32	24
<u>Season 2</u>										
Paid shotgun	6	10	16	16	8	3	8	10	7	6
Landowner-tenant	21	32	38	41	37	13	26	35	33	32

Table 4. Harvest and success rates for active shotgun hunters by hunting zone, 1979.

Hunting zone	Season 1		Season 2		Total shotgun harvest
	Bucks-only harvest (% success)	Any-sex harvest (% success)	Bucks-only harvest (% success)	Any-sex harvest (% success)	
1	430(26)	none	330(24)	329(65)	1089
2	298(22)	79(59)	149(17)	143(53)	669
3	521(32)	328(64)	167(25)	542(51)	1558
4	1106(29)	281(69)	448(20)	435(53)	2270
5	869(19)	335(54)	595(21)	538(43)	2337
6	795(26)	556(66)	583(27)	790(48)	2724
7	839(23)	none	687(14)	445(51)	1971
8	445(19)	107(48)	355(20)	220(50)	1127
9	603(19)	none	623(18)	501(61)	1727
10	235(14)	91(68)	193(22)	158(59)	677
Total	6,141(23)	1,777(62)	4,130(19)	4,101(52)	16,149

Table 5. Success rates for active shotgun hunters, 1975-1979.

Type of hunter	Bucks-only					Any-sex				
	1975	1976	1977	1978	1979	1975	1976	1977	1978	1979
<u>Season 1</u>										
Paid shotgun	31	18	17	22	22	63	51	52	54	64
Landowner-tenant	26	19	18	22	26	47	42	39	39	49
<u>Season 2</u>										
Paid shotgun	18	16	16	19	19	57	47	44	55	53
Landowner-tenant	20	16	15	17	23	40	34	32	39	44

Table 6. Comparison of statewide results from 27 years of archery deer seasons in Iowa.

Year	Season length in days	Licenses issued	Number of deer harvested	Percent success
1953	5	10	1	10
1954	12	92	10	11
1955	21	414	58	14
1956	31	1,284	117	10
1957	31	1,227	138	11
1958	30	1,380	162	12
1959	31	1,627	255	16
1960	44	1,772	277	16
1961	48	2,190	367	17
1962	51	2,404	404	17
1963	51	2,858	538	19
1964	51	3,687	670	19
1965	51	4,342	710	17
1966	51	4,576	579	13
1967	62	4,413	791	19
1968	62	5,136	830	17
1969	62	5,465	851	16
1970	62	5,930	1,037	18
1971	51	6,789	1,232	19
1972	51	6,916	1,328	20
1973	53	10,506	1,822	18
1974	51	12,040	2,173	19 ¹
1975	52	12,296	2,219	19 ¹
1976	56	12,522	2,350	20
1977	56	12,994	2,400	20
1978	56	12,809	2,957	25
1979	56	13,378	3,305	26

¹ Average % success from 1970-1973 was used to estimate success in 1974 and 1975.

Table 7. Percentage distribution of the 1979 deer harvest by day of season.

Day	Season 1 harvest	Cumulative %	Season 2 harvest	Cumulative %
Saturday	36	36	27	27
Sunday	32	68	28	55
Monday	16	84	10	65
Tuesday	16	100	6	71
Wednesday			9	80
Thursday			10	90
Friday			10	100

Table 8. Comparison of antlered, antlerless, and doe harvest for 1953-79.

Year	Total harvest	Antlered harvest	Antlerless harvest ¹	Doe harvest
1953	4,008	1,580	2,428	1,858
1954	2,423	781	1,642	1,009
1955	3,064	1,046	2,018	1,460
1956	2,678	964	1,714	1,234
1957	2,805	884	1,921	1,316
1958	2,891	828	2,063	1,360
1959	2,731	959	1,772	1,176
1960	4,269	1,348	2,921	1,881
1961	5,364	1,599	3,765	2,512
1962	5,703	1,709	3,994	2,814
1963	7,151	2,117	5,034	3,366
1964	9,694	2,486	7,208	4,846
1965	8,620	2,668	5,952	3,886
1966	11,321	3,101	8,220	5,392
1967	11,183	3,110	8,073	5,361
1968	13,771	3,583	10,188	6,808
1969	11,582	3,034	8,548	5,456
1970	13,780	3,612	10,168	6,951
1971	11,691	3,091	8,600	5,735
1972	11,813	3,697	8,116	5,294
1973	14,030	6,796	7,234	4,875
1974	17,990	9,071	8,919	6,607
1975	21,169	13,141	8,028	6,037
1976	16,600	10,255	6,345	4,779
1977	15,188	10,157	5,031	3,553
1978	18,125	11,567	6,558	4,565
1979	19,454	12,378	7,026	4,986

¹ Antlerless harvest includes male fawns.

Table 9. Shotgun hunter effort, 1975-1979.

Type of hunter	Hours per hunter					Days per hunter				
	1975	1976	1977	1978	1979	1975	1976	1977	1978	1979
Season 1										
Paid shotgun	17	18	17	17	19	2.6	3.5	3.2	2.7	2.8
Landowner-tenant	11	12	11	11	10	2.2	3.2	2.8	2.3	2.2
Season 2										
Paid shotgun	24	22	21	21	23	3.6	4.2	3.8	3.4	3.6
Landowner-tenant	14	13	12	12	12	2.8	3.5	3.1	2.6	2.6

Table 10. The statewide mean expectation of life for deer (in years), 1976-1979.

Age class	Doe				Buck			
	1976	1977	1978	1979	1976	1977	1978	1979
Fawn	2.14	1.97	2.02	2.11	1.27	1.12	1.14	1.25
1½	1.79	1.68	1.81	1.85	1.17	1.03	0.99	1.25
2½	1.80	1.68	1.72	1.75	1.34	1.18	0.90	1.27
3½	1.62	1.53	1.43	1.54	1.13	1.36	1.14	0.97
4½	1.17	1.11	1.10	1.18	0.97	0.96	1.00	0.83
5½+	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50

Table 11. Mean expectation of life for does (in years), 1979.

Hunting zone	Sample size	Age class					
		Fawn	1½	2½	3½	4½	5½+
1	60	2.10	1.84	1.54	1.37	1.12	0.50
2	35	2.67	2.12	1.97	1.83	1.28	0.50
3	119	1.87	1.73	1.87	1.43	1.06	0.50
4	119	1.87	1.67	1.55	1.37	1.00	0.50
5	89	2.16	1.78	1.68	1.64	1.21	0.50
6	190	2.23	1.97	1.92	1.55	1.19	0.50
7	69	2.09	1.84	1.47	1.44	1.17	0.50
8	51	2.15	1.71	1.34	1.41	1.17	0.50
9	86	2.31	2.14	2.19	1.76	1.39	0.50
10	50	1.92	1.65	1.61	1.50	1.17	0.50

Table 12. Deer killed per billion vehicle miles traveled and percent does in the traffic kill, 1972-1979.

Year	Deer killed per billion miles driven	% change from previous year	% does in traffic kill
1972	233	--	48
1973	248	+6.7	50
1974	250	+0.5	50
1975	227	-9.1	54
1976	225	-0.8	54
1977	252	+11.9	56
1978	241	-4.1	47
1979	259	+7.5	50

Table 13. Number of deer killed per billion vehicle miles traveled, 1974-1979.

Deer survey unit	Deer killed per billion miles traveled						% change 1978 to 1979
	1974	1975	1976	1977	1978	1979	
1	224	192	247	223	258	214	-17.1
2	196	160	156	172	178	184	+ 3.4
3	289	222	224	236	220	224	+ 1.8
4	187	206	161	209	172	201	+16.9
5	275	227	264	294	248	293	+18.1
6	599	470	581	606	607	600	- 1.2
7	174	162	160	211	182	242	+33.0
8	226	246	219	263	259	283	+ 9.3
9	531	586	518	520	682	556	-18.5
10	272	256 ¹	220	252	243	249	+ 2.5

¹ Does not include Cerro Gordo County.

Table 14. Results of the winter population estimates by deer survey unit, 1973-74 to 1979-80.

Deer survey unit	Winter population estimate							% change 1978-79 to 1979-80
	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	
1	1640	1851	1811	1954	1958	2229	2409	+ 8.1
2	1116	1234	1144	1117	1449	1276	1317	+ 3.2
3	3376	3618	3296	3201	3722	3831	3646	- 4.8
4	4148	4427	4052	3927	4018	3958	4292	+ 8.4
5	4652	5357	5510	4520	4539	4070	4873	+19.7
6	2912	3365	3695	3225	3168	3275	3583	+ 9.4
7	2414	2638	2266	2393	2621	2884	3111	+ 7.9
8	1487	1660	1593	1653	1820	2301	2341	+ 1.7
9	2500	2725	2185	1840	2195	2883	3555	+23.3
10	1656	1688	1307	1324	1399	1542	1471	- 4.6
Total	25,901	28,563	26,859	25,154	26,889	28,249	30,598	+ 8.3
% Annual change	---	+10.3	-6.0	-6.3	+6.8	+5.1	+8.3	

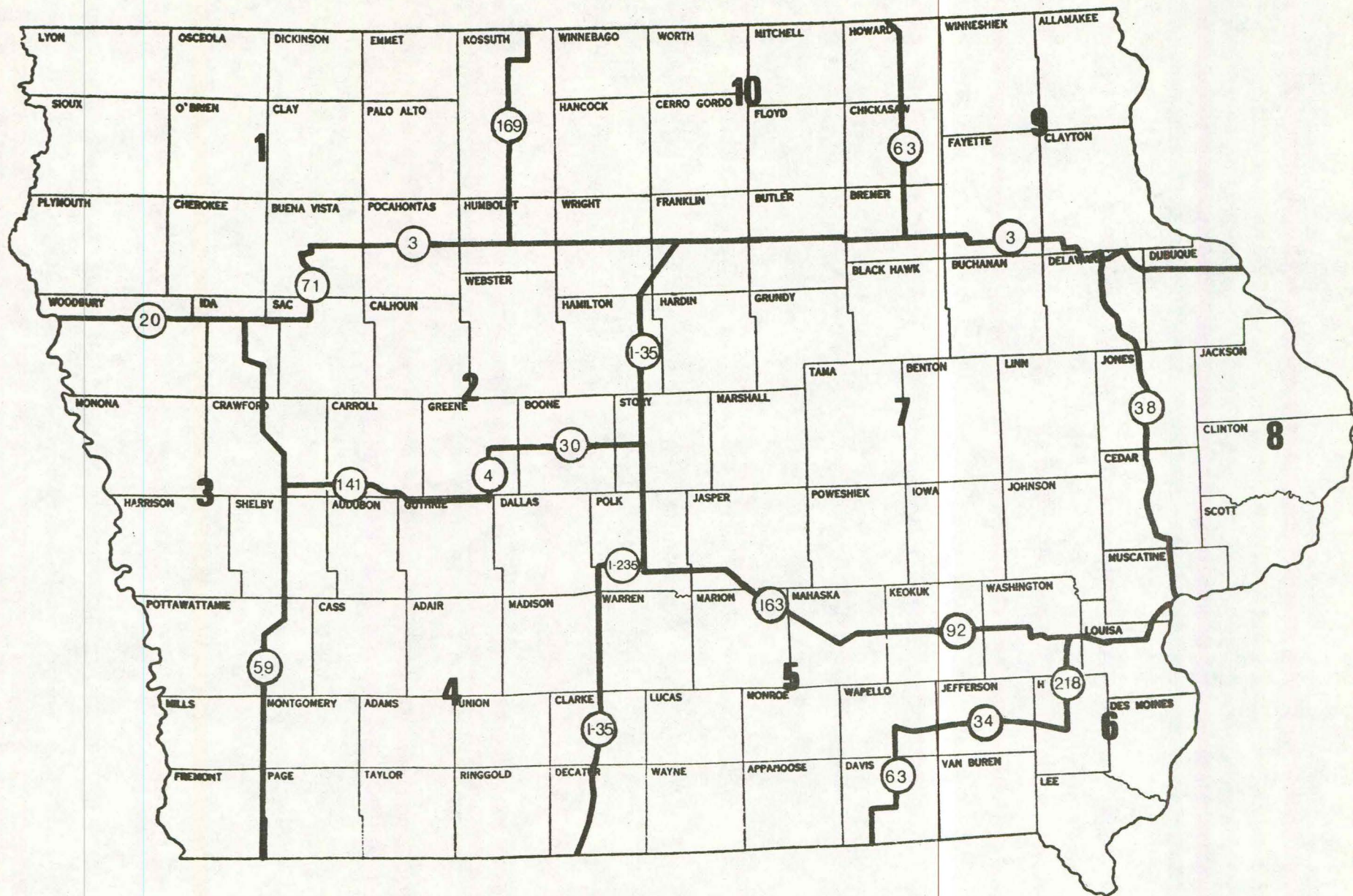


Figure 1. Hunting zone boundaries for 1979 season.

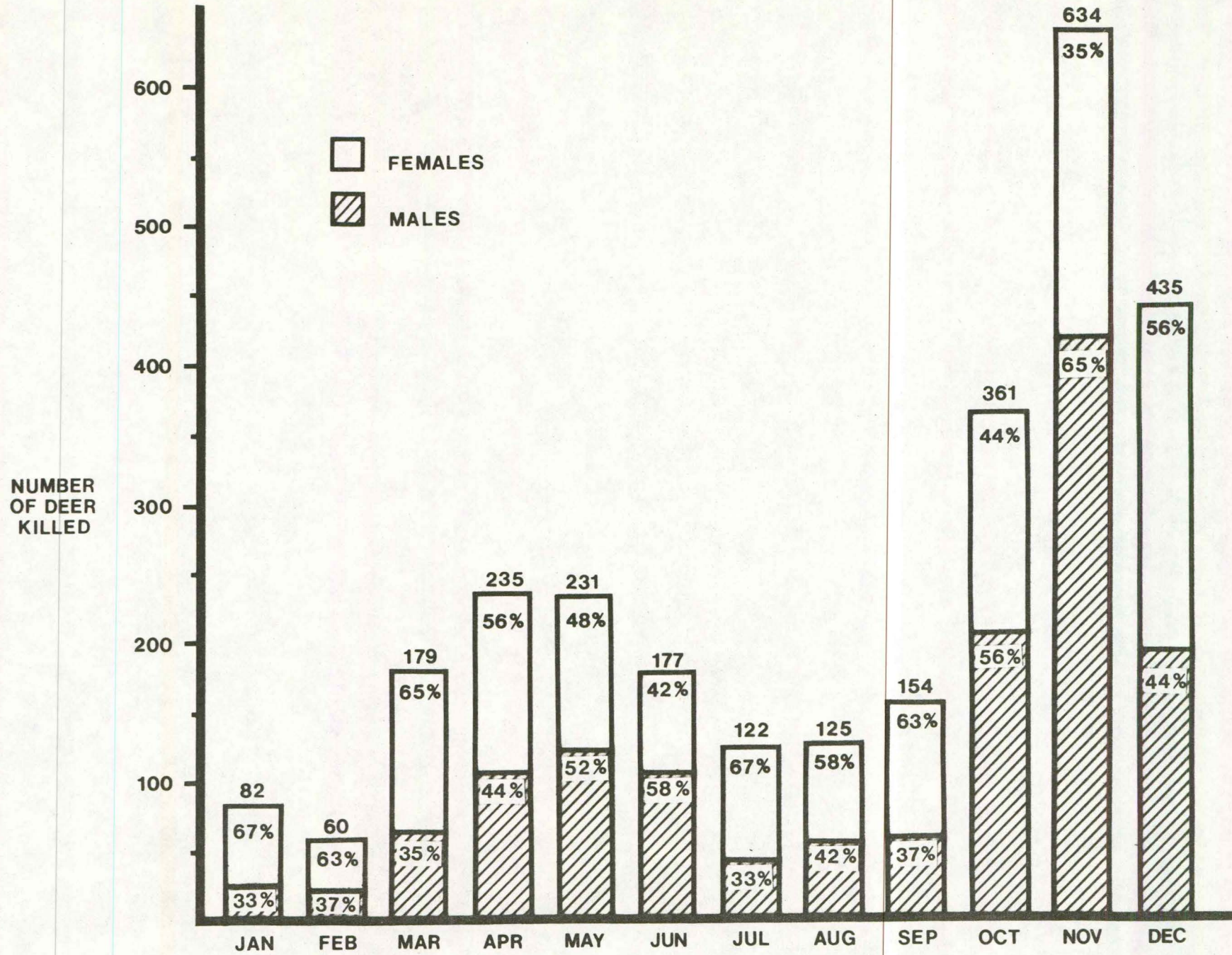


Figure 2. The 1979 traffic mortality by month and sex ratio.

APPENDIX

County	1979-80		County	1979-80	
	Winter population estimate	1979 Traffic mortality		Winter population estimate	1979 Traffic mortality
Adair	230	14	Jasper	333	46
Adams	255	15	Jefferson	520	33
Allamakee	945	43	Johnson	390	141
Appanoose	435	16	Jones	740	33
Audubon	215	9	Keokuk	165	7
Benton	72	29	Kossuth	269	22
Black Hawk	137	37	Lee	825	96
Boone	115	29	Linn	330	53
Bremer	125	23	Louisa	400	27
Buchanan	80	34	Lucas	700	24
Buena Vista	160	19	Lyon	130	31
Butler	150	42	Madison	550	25
Calhoun	61	13	Mahaska	185	13
Carroll	57	4	Marion	273	8
Cass	262	27	Marshall	315	48
Cedar	185	18	Mills	240	26
Cerro Gordo	42	28	Mitchell	165	8
Cherokee	283	10	Monona	690	18
Chickasaw	130	18	Monroe	370	12
Clarke	435	23	Montgomery	180	44
Clay	312	29	Muscatine	185	41
Clayton	1520	86	O'Brien	225	29
Clinton	306	63	Osceola	150	14
Crawford	280	16	Page	260	39
Dallas	325	47	Palo Alto	135	5
Davis	480	31	Plymouth	217	4
Decatur	725	50	Pocahontas	100	10
Delaware	140	26	Polk	430	57
Des Moines	1116	60	Pottawattamie	1101	97
Dickinson	185	21	Poweshiek	85	10
Dubuque	210	19	Ringgold	500	0
Emmet	214	21	Sac	164	6
Fayette	240	39	Scott	295	33
Floyd	135	22	Shelby	150	11
Franklin	138	39	Sioux	129	24
Fremont	305	38	Story	92	40
Greene	110	15	Tama	95	21
Grundy	17	2	Taylor	265	19
Guthrie	620	23	Union	200	0
Hamilton	170	35	Van Buren	890	44
Hancock	127	15	Wapello	380	44
Hardin	250	51	Warren	275	22
Harrison	700	39	Washington	285	61
Henry	352	42	Wayne	280	17
Howard	200	13	Webster	235	48
Humboldt	160	14	Winnebago	116	20
Ida	65	4	Winneshiek	850	37
Iowa	140	63	Woodbury	180	17
Jackson	420	99	Worth	143	27
			Wright	80	20

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