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DEER IN IOWA 1983



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Deer in Iowa -1983

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: Winter aerial survey
Job No. 4: Sex and Age Ratio Survey

by

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ABSTRACT

The 1983 estimated harvest of 35,619 deer was a new record high for Iowa. Shotgun hunters accounted for 30,375 deer while archers bagged 5,244. Higher any-sex license quotas, increased license issue, a high deer population and excellent weather were responsible for the increased harvest. There were 75,918 paid shotgun, 15,067 free landowner-tenant, and 19,945 archery licenses issued. Paid shotgun any-sex hunters averaged 66% success for both seasons compared to 50% for landowner-tenants. Paid shotgun bucks-only hunters averaged 31% success while landowner-tenants reported 29%. Success rates between the two seasons were nearly equal. Bowhunters reported a success rate of 28% which is slightly higher than the past few years. The season provided over 1/2 million days of hunting recreation. Mean expectation of life for does, calculated from a sample of deer teeth sent in by any-sex hunters, was generally comparable to previous years. A sample of any-sex hunters reported that 45% of their harvest was composed of adult does, 39% fawns, and 16% adult bucks. There were 5,335 deer reported killed in deer-vehicle accidents which represents a 9% increase from 1982. Winter population estimates made by conservation officers indicated a 26% increase over the previous year. Seventy-two counties were completed during the aerial deer survey and a 10% increase from 1982 was observed on comparable routes.

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HUNTING SEASON REGULATIONS

The first shotgun season was held from 3-6 December with a second season from 10-16 December. Shotgun hunters were allowed to apply for only 1 of the 2 seasons in 1 of 10 hunting zones (Fig. 1). Twice as many any-sex licenses were issued for the second season compared to the first season in 7 of the 10 hunting zones. In the other 3 hunting zones, the entire any-sex quota was issued for the second season. This was necessary to help equalize hunter numbers, harvest and success rates between the 2 seasons. Any-sex licenses were issued by randomized computer drawing with preference given to valid applications containing certificates issued to buck-only license recipients in 1982. About 42% of the hunters receiving certificates in 1982 returned them with their 1983 applications. If the any-sex quota for any zone and season combination could not be filled from applications with certificates, they were filled by random drawing from noncertificate holders. All unsuccessful applicants in the any-sex license drawing received a buck-only license valid statewide. Buck-only license recipients were also issued a certificate giving them preference in the 1984 drawing for any-sex licenses. Landowner-tenants were issued free shotgun licenses at the same buck-only to any-sex license ratio as determined by the application rates of paid shotgun hunters in each zone and season combination. All other shotgun regulations remained the same as in previous years.

The 56-day bow season was held from 8 October to 2 December. Bow licenses were available from county recorders and from the Iowa Conservation Commission license section. All other bow and arrow regulations remained the same as in previous years.

HUNTING SEASON RESULTS

Hunter Report Card Survey

A post-season hunter report card was sent to 29% of the licensed hunters (24% of the paid shotgun hunters and 56% of the landowner-tenants) to obtain information on harvest, success rate, sex ratio, hunting effort, crippling rate, and area hunted. A reminder questionnaire was sent to hunters not responding to the first mailing within 1 month. Harvest results of nonrespondents were estimated by assigning them the same success rates as those returning the reminder mailing. Success rates were calculated on the basis of active hunters only. Post-season report cards were also sent to 1,916 archers of which 74% returned complete information.

License Issue

There were 75,918 paid shotgun licenses issued in 1983 (Table 1), an increase of 2% from 1982. This is a new record high paid shotgun license issue and continues the upward trend in license sales since 1978. In addition, 15,067 free landowner-tenant shotgun licenses were issued, a 2% decrease from 1982. This is the first decrease in free landowner-tenant license issue since 1979. Overall, the 90,985 shotgun license issue is slightly higher than 1982. Increased license issue is probably due to favorable publicity about high deer population levels and increased interest in the sport of deer hunting.

About 58% of all shotgun licenses were issued for the first hunting season. This is a reduction from the 63% for 1982 and is mostly due to the buck-only first season conducted in hunting zones 1, 2 and 10 in 1983. Many hunters responded to the buck-only first season by applying for the second season in which any-sex licenses were available. Some hunters were not aware of the buck-only first season in these zones indicating that the application rates might have been even closer to an even distribution.

The highest buck-only to any-sex license ratio (13/1) occurred in hunting zone 7 (Fig. 1) during the first season. The lowest ratios occurred during the second season when many zones recorded a 1/1 ratio because of high any-sex license quotas and low hunter application rates (Table 2).

In addition to shotgun licenses, there were 19,945 bow and arrow licenses issued (Table 3), an increase of 6% from 1982. This is a new record high bow license issue and continues the upward trend in demand for this sport in Iowa. About 65% of the bowhunters stated that they would purchase a buck-only shotgun license if they were unsuccessful during the bow season, and these licenses were available up to 15 days prior to the opening of the first shotgun season.

Harvest

The record high harvest of 1982 was smashed in 1983 with an estimated total harvest of 35,619 deer. This is an increase of 35% from the 1982 harvest of 26,461 deer. Higher any-sex license quotas, increased license issue, a high deer population and excellent weather during the first hunting season were responsible for the increased harvest. An estimated 30,375 (± 823) deer were harvested by shotgun hunters with 17,336 (± 733) taken the first season and 13,039 (± 375) taken the second. Allocation of the harvest was extremely good with 58% of the hunters hunting first season and taking 57% of the total shotgun harvest. Twice as many any-sex licenses in the second season helped overcome the lower success rates in that season. Shotgun harvest and success rates varied by zone and season (Table 4).

Archers harvested an additional 5,244 (± 499) deer which was a new record high harvest. Increased hunter numbers, higher success rates and high deer numbers were responsible for this new record.

Distribution of the harvests by day of the season was estimated from deer tooth envelopes returned by successful hunters. Most of the deer harvested were taken on weekends (Table 5). Excellent weather was responsible for 71% of the 1st season harvest occurring on the weekend compared to 57% in 1982. The first weekend opener was about the same for both years with half the deer taken during weekend days and the remainder on weekdays.

Hunter Success

Success rates in 1983 were the highest since the initiation of modern deer hunting seasons in Iowa in 1953 in every hunter category. Buck-only and any-sex hunters in 1983 had higher success rates during the first season than in the second (Table 6). Excellent weather and high deer densities were responsible for these high success rates.

Paid shotgun any-sex hunters averaged 66% success for both seasons compared to 50% for landowner-tenants (Table 1). Paid shotgun buck-only hunters averaged 31% while landowner-tenants reported a 29% success rate. The highest shotgun success rates were reported in northern Iowa (hunting zones 1, 2 and 10) (Table 4) probably because of the high vulnerability of deer in limited timber habitat. Bow hunter success was 28% which is higher than the 26% reported in 1982 (Table 3).

Another measure of hunter success is the number of hours of hunting required to harvest a deer. Paid buck-only shotgun hunters averaged only 64 hours of hunting to bag a deer compared to 102 hours in 1982 and 92 in 1981. Paid any-sex shotgun hunters averaged 30 hours of hunting to bag a deer compared to 37 hours in 1982 and 39 in 1981. These are the lowest figures since modified buck-only seasons originated in 1973.

Archers required 213 hours of hunting to bag a deer which is slightly better than the 215 hours required in 1982. The early corn harvest may have concentrated deer into timbered habitat where they were more vulnerable to bow hunters.

Sex Ratio of the Harvest

An estimated 8,078 does were harvested by shotgun hunters compared to 6,301 in 1982. This 28% increase in doe harvest was primarily due to higher any-sex license quotas and higher success rates. An additional 1,641 does were harvested by archers for a total of 9,719 during all seasons (Table 7). Does accounted for 66% of the shotgun any-sex harvest while 31% of the successful archers reported harvesting a doe. Does accounted for about 27% of the total harvest.

Hunter Effort

The percentage of shotgun hunters that did not hunt in 1983 was comparable to 1982 levels (Table 8). Did not hunt rates were higher for the second season compared to the first in 1983 in all hunter categories. Weather is usually the primary factor for these differences. Free landowner-tenant hunters continued their high rate of not hunting with only about 1/2 of those with buck-only licenses in the field during the second season.

Those hunters that entered the field in 1983 hunted about as long as they did in 1982 except during second season when slight reductions were recorded (Table 9). The higher number of days and hours hunted by second season hunters indicates that they did take advantage of the extra days available during that season. The deer season provided over 1/2 million days of hunting recreation with shotgun hunters in the field for 234,000 days and archers about 300,000 days. Hunters obtain about 2.6 million hours of recreation from the season.

Crippling Rate

In 1983, about 9% of the shotgun hunters reported crippling a deer. Crippling rates were slightly higher during the first season (9%) compared to the second (8%). Paid shotgun hunters reported a higher crippling rate (9%) than

landowner-tenants (6%). About 17% of the archers reported they crippled a deer during the season. Crippled deer may recover from their wounds or are harvested by other hunters and therefore, only a portion of them can be considered a loss in addition to the tagged harvest.

Hunter Travel

Paid shotgun hunters averaged about 60 miles traveling to and from their hunting areas. Some hunters traveled as far as 600 miles (round trip) to hunt deer. Hunting zone 9 had the highest average travel with 80 miles followed closely by zones 5 (74) and 6 (72). The agricultural zones (1, 2, 7, 8 and 10) were the lowest with about 34-44 miles per round trip.

As expected, landowner-tenants traveled only short distances to hunt deer. The average round trip for landowner-tenants was 4-5 miles. A few did travel up to 300 miles to hunt deer on their own property.

SEX AND AGE COMPOSITION

Age Composition

About 21,000 any-sex shotgun hunters were sent deer tooth envelopes along with their license. A total of 3,090 teeth were returned for aging by using the tooth sectioning technique (Low and Cowan 1963). The reported harvest of these any-sex hunters consisted of 39% fawns.

Mean expectation of life (MEL) was calculated only for does to reduce the cost of the survey. MEL for does was generally comparable to previous years (Table 10).

MEL for does varied by hunting zone presumably because of different mortality rates (Table 11). MEL was highest for hunting zones 6, 4, and 5 and lowest in 2, 10 and 3.

The age of the oldest doe submitted in the tooth sample was 15 1/2 years. About 10% of the does sampled were 5 1/2 years old or older.

Sex Ratio

Does comprised 55% of the fawn harvest and 67% of the total harvest reported by any-sex hunters returning tooth envelopes. These hunters also reported that 16% of their harvest was adult bucks while 45% was adult does. Sex ratio of the any-sex harvest may be biased because of hunter selectivity, but changes in annual sex ratio trends may be indicated by this survey.

MISCELLANEOUS MORTALITY

Conservation officers reported that 5,840 deer were lost to various mortality factors exclusive of legal harvest. Traffic accidents were the primary cause of mortality with 5,335 deer lost compared to 4,805 in 1982. Known illegal loss was placed at 238 with 30 deer lost to dog predation and 236 to other accidents such as mowing, entanglement in fences, trains, etc.

The number of deer killed in traffic accidents provides a reasonable population trend indicator when related to number of vehicle miles driven on Iowa's highways. An estimated 11.9 billion vehicle miles were logged on rural roads and highways (Iowa DOT estimates). A new record high of 448 deer killed/billion vehicle miles traveled was recorded, an increase of 9% from 1982 (Table 12).

Sex ratio trends in the traffic kill may be an indicator of sex ratio trends in the population, if vulnerability and behavior are considered constant between years. In 1983, 57% of the traffic kill was does compared to 52% in 1982 (Table 12).

Deer killed per billion vehicle miles traveled can be calculated to provide regional population trends for deer survey units which correspond closely to hunting zones (Gladfelter 1977). Trends have fluctuated, but are generally upward in most survey units during 1977-83 (Table 13). The largest increases compared to 1982 (24-30%) were in northeastern (unit 9) and northcentral (unit 10) Iowa. Slight decreases of from 3-15% were recorded for western, southwestern and southcentral Iowa (units 3, 4 and 5). The remainder of the survey units produced increases ranging from 8-16%.

The major peak in traffic mortality occurred from October through December (Fig. 2). This high mortality period corresponds to the peak in rutting activity. November is the only month that the number of bucks killed by vehicles exceeded number of does (Fig. 2). This is probably due to increased movement of bucks at this time because of a peak in rutting activity. The lowest deer kill occurred in July and August when does were caring for young and bucks were relatively inactive.

WINTER POPULATION ESTIMATE

Conservation officers annually estimate the number of wintering deer in their assigned territories. The 1983-84 winter population estimate was 57,500 deer, a 26% increase from the previous year. Winter estimates increased in 86 counties, decreased in 9 and remained unchanged in 4 compared to the previous winter. Severe early winter conditions forced deer into large herds which should have increased their visibility during this winter. Population estimates increased in all 10 deer survey units (Table 14) compared to 1982-83. The largest increases were in survey units 2 (northcentral), 3 (western) and 1 (northwestern). Estimated size of the wintering deer population has been steadily increasing in most regions of the state during the past 7 years.

AERIAL SURVEY

In 1982, wildlife biologists were asked to select survey areas that could be used for conducting aerial deer counts (Gladfelter 1983). The first aerial surveys were conducted during the 1982-83 winter with flights over about 10% of the timber in each of the counties surveyed. The aerial surveys were continued during the 1983-84 winter. Lack of snowfall after 1 January in some regions, hampered efforts to survey the entire state. Several new survey areas were established in 1983 while others were dropped because of unsuitable conditions for conducting the survey. Therefore, comparisons between the first 2 years of the survey are difficult.

During the 1983-84 winter, aerial surveys were completed in 72 counties compared to 65 the previous year. A total of 3,853 deer were counted in 1983-84 compared to 3,997 seen in 1982-83. However, when comparisons are made between individual survey areas that were flown both years, a 10% increase was recorded statewide for 1983-84 compared to the previous year. Regions of the state showing increases in comparable survey routes in 1983-84 were northcentral, eastcentral and southcentral Iowa. Regions indicating reductions in comparable survey routes were northwestern and central Iowa. Comparable surveys were not available for western or southeastern Iowa.

Future deer population trends may be indicated by this survey technique. However, weather, especially snowfall, is a key determining factor in the regions of the state that can be surveyed each year.

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TABLES AND FIGURES

Table 1. Comparison of statewide results of shotgun deer seasons in Iowa, 1953-83.

Year	Season length in days	Licenses issued		No. deer harvested		Total gun harvest	% success			
		Shotgun	Landowner ¹	Shotgun	Landowner		Paid		Landowner ¹	
							Any-sex	Bucks-only	Any-sex	Bucks-only
1953	5	3,772	-----	2,401	1,606	4,007	61	---	---	---
1954	3	3,778	-----	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
1980	4,7	64,462	12,858	16,511	2,346	18,857	56	21	42	22
1981	4,7	69,529	14,068	19,224	2,354	21,578	55	24	40	21
1982	4,7	74,331	15,431	19,269	2,472	21,741	59	20	41	21
1983	4,7	75,918	15,067	27,078	3,297	30,375	66	31	50	29

¹ These data have been collected since 1967 when landowner-tenants were first 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 1983.

Hunting zone	Season 1				
	Paid shotgun			Landowner-tenant	
	Bucks-only	Any-sex	B.O./A.S. ratio	Bucks-only	Any-sex
1	3300	none	-	551	none
2	2115	none	-	285	none
3	2335	525	4/1	321	72
4	4650	825	6/1	902	161
5	4999	850	6/1	1165	198
6	3566	1125	3/1	748	237
7	6430	500	13/1	1105	86
8	3166	375	8/1	571	68
9	5465	700	8/1	984	126
10	2224	none	-	412	none
No zone	1905	-	-	-	-
Total	40,155	4900	-	1,044	948

Hunting zone	Season 2				
	Paid shotgun			Landowner-tenant	
	Bucks-only	Any-sex	B.O./A.S. ratio	Bucks-only	Any-sex
1	1184	900	1/1	242	184
2	749	825	1/1	129	141
3	782	1050	1/1	140	192
4	2289	1650	1/1	582	418
5	2492	1700	1/1	743	507
6	1117	2250	1/1	299	603
7	4325	1000	4/1	1011	234
8	1532	750	2/1	381	189
9	2050	1400	1/1	442	303
10	1003	675	1/1	200	135
No zone	1140	-	-	-	-
Total	18,663	12,200	-	4,169	2,906

Table 3. Comparison of statewide results of archery deer seasons in Iowa, 1953-83.

Year	Season length in days	Licenses issued	No. of deer harvested	% 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
1980	56	15,398	3,803	26 ²
1981	56	17,258	4,368	26
1982	56	18,824	4,720	26
1983	56	19,945	5,244	28

¹ Average % success from 1970-73 was used to estimate success in 1974 and 1975.

² % success from 1979 was used for 1980 success rate.

Table 4. Harvest and success rates for active shotgun hunters by hunting zone, season and license type, 1983.

Hunting zone	Season 1		Season 2		Total harvest
	Bucks-only harvest (% success)	Any-sex harvest (% success)	Bucks-only harvest (% success)	Any-sex harvest (% success)	
1	1,599(43)	none	326(23)	684(72)	2,609
2	786(33)	none	212(24)	593(67)	1,591
3	954(37)	383(69)	364(34)	747(67)	2,448
4	2,007(40)	726(78)	804(33)	1,206(64)	4,743
5	1,802(32)	641(65)	796(28)	1,024(53)	4,263
6	1,161(29)	846(67)	387(31)	1,429(56)	3,823
7	1,738(26)	400(73)	730(18)	694(61)	3,562
8	664(20)	233(56)	259(16)	419(49)	1,575
9	1,788(34)	603(76)	526(25)	1,042(68)	3,959
10	1,005(38)	none	256(22)	541(71)	1,802
Total	13,504(34)	3,832(70)	4,660(25)	8,379(62)	30,375

Table 5. Percentage distribution of the 1983 shotgun deer harvest by day of season.

Day	Season 1	Cumulative	Season 2	Cumulative
	harvest	%	harvest	%
Saturday	38	38	35	35
Sunday	33	71	23	58
Monday	14	85	12	70
Tuesday	15	100	8	78
Wednesday			7	85
Thursday			6	91
Friday			8	99

Table 6. Success rates for active shotgun hunters, 1979-83.

Type of hunter	Bucks-only					Any-sex				
	1979	1980	1981	1982	1983	1979	1980	1981	1982	1983
<u>Season 1</u>										
Paid shotgun	22	23	26	20	34	64	59	63	59	72
Landowner- tenant	26	24	23	22	31	49	46	49	46	56
<u>Season 2</u>										
Paid shotgun	19	18	19	21	25	53	54	51	58	64
Landowner- tenant	23	18	18	18	26	44	41	37	39	48

Table 7. Comparison of antlered, antlerless, and doe harvest for 1953-83.

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
1980	22,660	14,657	8,003	5,723
1981	25,946	16,927	9,019	6,544
1982	26,461	15,943	10,518	7,849
1983	35,619	22,753	12,866	9,719

¹ Antlerless harvest includes male fawns.

Table 8. Percent of shotgun hunters that did not hunt, 1979-83.

Type of hunter	Bucks-only					Any-sex				
	1979	1980	1981	1982	1983	1979	1980	1981	1982	1983
<u>Season 1</u>										
Paid shotgun	5	5	8	10	10	5	4	3	4	4
Landowner-tenant	32	28	36	42	39	24	19	15	18	18
<u>Season 2</u>										
Paid shotgun	8	7	10	10	14	6	4	5	5	5
Landowner-tenant	37	35	44	48	48	32	25	28	30	31

Table 9. Shotgun hunter effort, 1979-83.

Type of hunter	Hours/hunter					Days/hunter				
	1979	1980	1981	1982	1983	1979	1980	1981	1982	1983
<u>Season 1</u>										
Paid shotgun	19	19	20	19	19	2.8	2.8	2.9	2.9	2.8
Landowner-tenant	10	11	12	11	11	2.2	2.3	2.4	2.3	2.3
<u>Season 2</u>										
Paid shotgun	23	23	24	24	22	3.6	3.6	3.7	3.8	3.5
Landowner-tenant	12	13	13	12	11	2.6	2.7	2.8	2.8	2.6

Table 10. The statewide mean expectation of life for does (in years), 1977-83.

Age class	Year						
	1977	1978	1979	1980	1981	1982	1983
Fawn	1.97	2.02	2.11	2.12	2.12	2.15	2.11
1 1/2	1.68	1.81	1.85	1.83	1.89	1.85	1.87
2 1/2	1.68	1.72	1.75	1.72	1.80	1.67	1.81
3 1/2	1.53	1.43	1.54	1.52	1.52	1.56	1.53
4 1/2	1.11	1.10	1.18	1.13	1.15	1.12	1.17
5 1/2+	0.50	0.50	0.50	0.50	0.50	0.50	0.50

Table 11. Mean expectation of life for (MEL) does (in years), 1983.

Hunting zone	Sample size	MEL					
		Fawn	1 1/2	2 1/2	3 1/2	4 1/2	5 1/2+
1	156	2.19	1.88	1.75	1.43	1.08	0.50
2	113	1.78	1.51	1.16	1.11	1.07	0.50
3	145	1.87	1.64	1.71	1.43	1.15	0.50
4	299	2.16	1.96	1.93	1.66	1.16	0.50
5	219	2.16	1.94	1.78	1.50	1.17	0.50
6	313	2.01	2.03	2.13	1.81	1.21	0.50
7	234	2.19	1.75	1.70	1.38	1.20	0.50
8	153	2.08	1.75	1.66	1.39	1.05	0.50
9	310	2.12	1.81	1.73	1.39	1.11	0.50
10	125	1.80	1.49	1.58	1.71	1.14	0.50

Table 12. Deer killed per billion vehicle miles traveled and percent does in the traffic kill, 1972-83.

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
1980	335	+29.2	53
1981	365	+ 9.1	54
1982	412	+12.9	52
1983	448	+ 8.7	57

Table 13. Number of deer killed per billion vehicle miles traveled, 1977-83.

Deer survey unit	Deer killed/billion miles traveled							% change 1982 to 1983
	1977	1978	1979	1980	1981	1982	1983	
1	223	258	214	414	504	456	496	+ 9
2	172	178	184	250	308	330	356	+ 8
3	236	220	224	236	225	357	341	- 4
4	209	172	201	218	316	403	343	-15
5	294	248	293	363	398	381	370	- 3
6	606	607	600	736	658	722	827	+14
7	211	182	242	279	304	333	380	+14
8	263	259	283	378	370	435	506	+16
9	520	682	556	737	623	1005	1305	+30
10	252	243	249	409	435	404	501	+24

Table 14. Results of the winter population estimates by deer survey unit, 1977-78 to 1983-84.

Deer survey unit	Winter population estimate						% change 1982-83 to 1983-84	
	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1983-84
1	1958	2229	2409	2820	3378	4049	5286	+31
2	1449	1276	1317	1783	2277	3204	4553	+42
3	3722	3831	3646	3917	4413	4857	6397	+32
4	4018	3958	4292	4615	7180	7372	9570	+30
5	4539	4070	4873	4980	5365	6165	7514	+22
6	3168	3275	3583	3622	3583	3741	4157	+11
7	2621	2884	3111	3296	3874	4278	5161	+21
8	1820	2301	2341	2595	2990	3453	4119	+19
9	2195	2883	3555	3455	3780	4750	6185	+30
10	1399	1542	1471	2057	3417	3888	4554	+17
Total	26,889	28,249	30,598	33,140	40,257	45,757	57,496	
% annual change	+7	+5	+8	+8	+21	+14	+26	

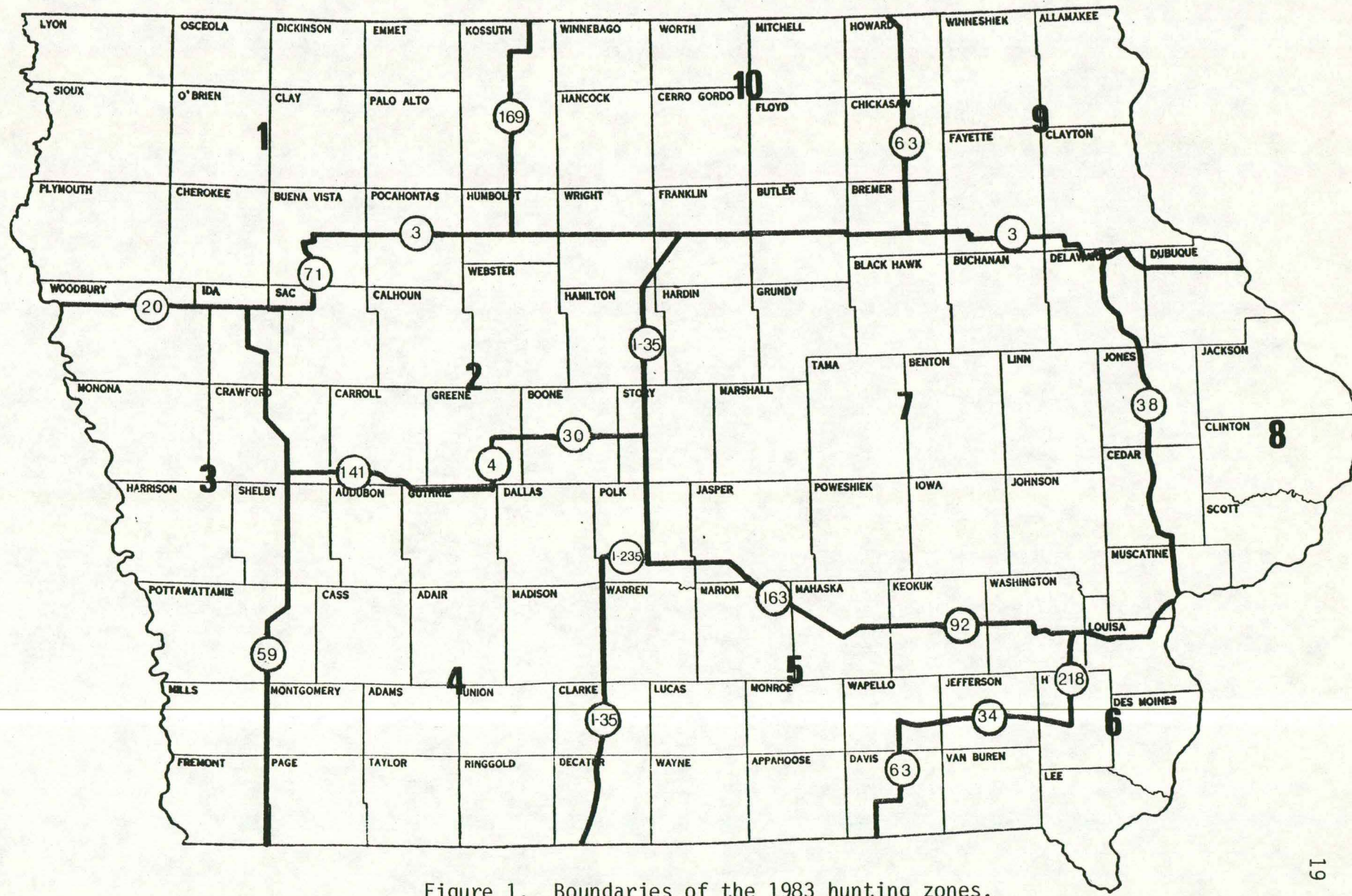


Figure 1. Boundaries of the 1983 hunting zones.

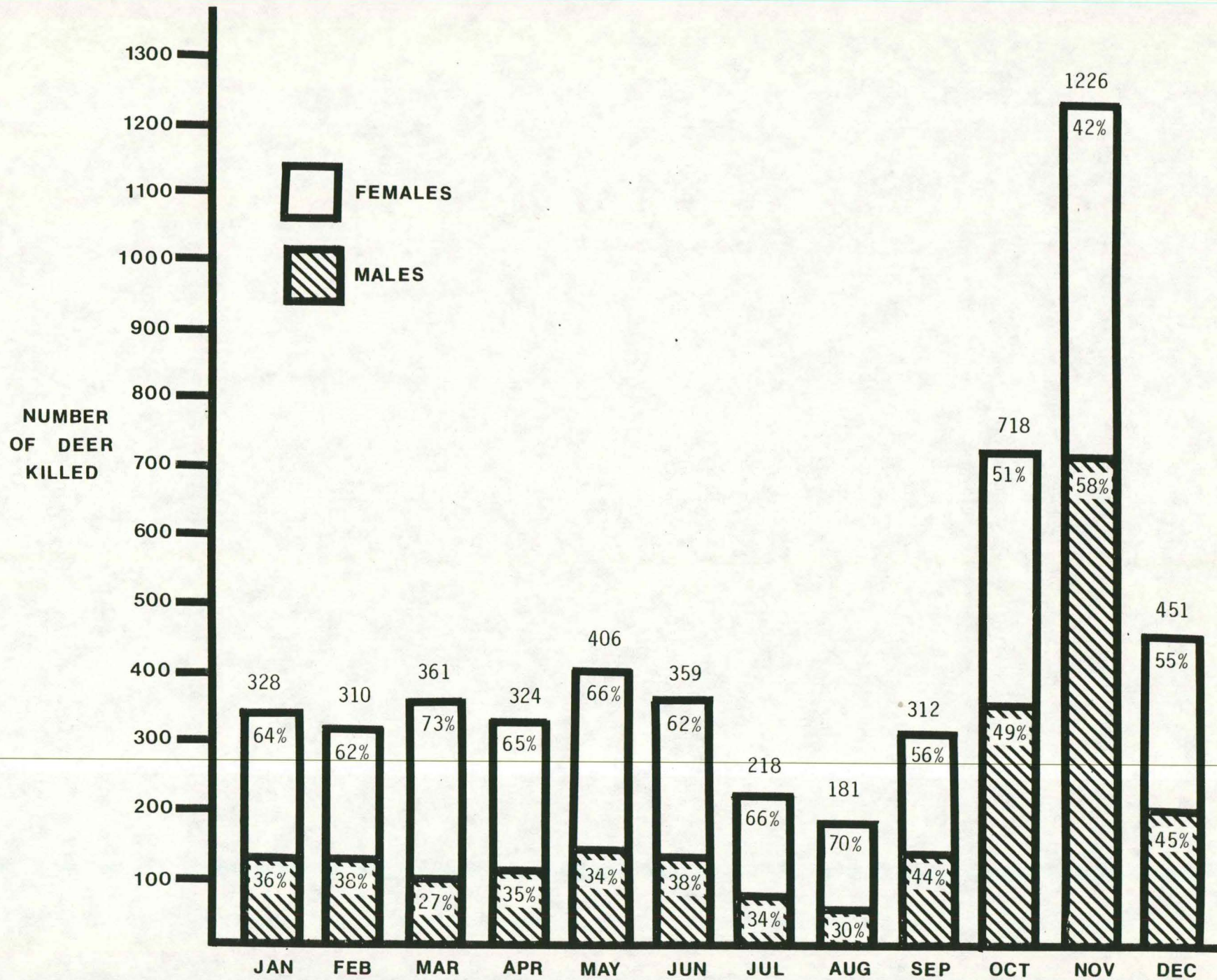


Figure 2. The 1983 traffic mortality by month and sex ratio.

APPENDIX

County	Winter 1983-84 population estimate	1983 Traffic mortality	County	Winter 1983-84 population estimate	1983 Traffic mortality
Adair	365	32	Jasper	355	28
Adams	335	53	Jefferson	654	29
Allamakee	2500	102	Johnson	495	217
Appanoose	400	21	Jones	870	49
Audubon	630	14	Keokuk	230	45
Benton	112	30	Kossuth	487	87
Black Hawk	285	38	Lee	825	123
Boone	197	48	Linn	515	132
Bremer	200	39	Louisa	340	47
Buchanan	100	42	Lucas	1000	30
Buena Vista	339	40	Lyon	575	40
Butler	483	56	Madison	1100	22
Calhoun	120	28	Mahaska	368	30
Carroll	176	14	Marion	565	19
Cass	465	35	Marshall	610	80
Cedar	225	49	Mills	847	34
Cerro Gordo	125	75	Mitchell	270	52
Cherokee	596	45	Monona	840	25
Chickasaw	180	38	Monroe	265	12
Clarke	1200	19	Montgomery	575	39
Clay	495	66	Muscatine	240	66
Clayton	1950	116	O'Brien	397	33
Clinton	459	78	Osceola	475	6
Crawford	505	47	Page	720	47
Dallas	750	66	Palo Alto	330	39
Davis	545	49	Plymouth	223	27
Decatur	1500	32	Pocahontas	468	16
Delaware	155	87	Polk	755	120
Des Moines	1435	84	Pottawattamie	1700	112
Dickinson	610	55	Poweshiek	320	18
Dubuque	650	56	Ringgold	1325	24
Emmet	329	43	Sac	830	33
Fayette	535	77	Scott	800	161
Floyd	300	40	Shelby	350	27
Franklin	376	77	Sioux	430	37
Fremont	800	50	Story	117	62
Greene	273	15	Tama	172	47
Grundy	45	11	Taylor	345	38
Guthrie	1195	23	Union	1010	54
Hamilton	440	38	Van Buren	1010	75
Hancock	405	30	Wapello	390	57
Hardin	550	62	Warren	570	77
Harrison	925	61	Washington	457	63
Henry	547	54	Wayne	425	16
Howard	400	42	Webster	595	57
Humboldt	490	38	Winnebago	980	32
Ida	496	22	Winneshiek	1200	217
Iowa	275	125	Woodbury	430	54
Jackson	875	120	Worth	835	32
			Wright	468	66

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