

JOB COMPLETION REPORT
SURVEYS AND INVESTIGATIONS PROJECTS

As Required By
FEDERAL AID IN WILDLIFE RESTORATION ACT

ILLINOIS

Federal Aid Project No. W-49-R(26)

Study I: Population Trends and Characteristics

Job No. 10: Opossum and striped skunk investigations

By

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ILLINOIS DEPARTMENT OF CONSERVATION

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STATE OF ILLINOIS

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STUDY I

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STUDY NO. I: Population Trends and Characteristics

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ABSTRACT: A total of 64 unskinned opossums (Didelphis marsupialis) was examined at fur houses in Illinois during the 1978-79 season. Males comprised 62.8 percent of all hunter-killed animals compared to 64.7 percent of those caught by trappers. Hunters harvested 67.2 percent of all opossums sold while trappers and road-kills accounted for 26.6 and 6.2 percent respectively. Males made up 66.7 percent of a selected sample of road-killed opossums examined from May through November 1978. Monthly records of opossum and striped skunk (Mephitis mephitis) road-kills were maintained for 532,697 mi driven by project personnel in 1978. A population index value based on the number of road-kills observed per 1,000 mi sampled was calculated on a monthly and/or seasonal basis for these two species. The fall (September - November) index for opossums decreased by 29 percent from 1976 to 1977 and by 53 percent from 1977 to 1978. The breeding period (February - March) road-kill index for striped skunks declined 7 percent between 1977 and 1978 while the growth-fattening/post-reproductive period (September - November) index remained stable from 1976 to 1977 and increased 43 percent between 1977 and 1978. Road-kill index data indicate the statewide opossum population probably decreased from 1977 to 1978 while the skunk population increased.

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OBJECTIVE: To determine the population trends and characteristics for the opossum and striped skunk in Illinois and relate these parameters to harvest, habitat, and other factors which may influence population levels.

PROCEDURES: Unskinned opossums were examined at fur houses in Illinois during the legal hunting and trapping seasons. Sex was determined using the methods described by Petrides (1949). Method of harvest was ascertained by external examination of whole animals. In addition, the sex of road-killed opossums except pouch young was recorded whenever possible.

Project personnel maintained monthly records of the number of road-killed opossums and striped skunks observed and miles traveled. Four button tally counters were mounted in vehicles to simplify record keeping. Data were collected according to the instructions contained in an official memorandum sent to all survey participants (Fig. 1). The road-kill data were submitted monthly to the project leader on special report cards (Fig. 2).

A monthly road-kill index (RKI) for each species was calculated from the data collected using the formula:

RKI for species "X" during month "Y" =

$$\frac{\text{Total species "X" road-kills observed during month "Y"}}{\text{Total miles sampled during month "Y"}} \times 1,000$$

To make the index more comparable from year to year, all road-kill indexes calculated after the first 12 months were adjusted for the variation in total rural vehicle miles traveled in Illinois. Monthly estimates of rural vehicle miles traveled were obtained from the Illinois Department of Transportation. The mileage estimates for the initial 12 months of data collection (Feb. 1975-Jan. 1976 for striped skunk, Aug. 1976-July 1977 for opossum) were considered as the 100 percent values or base mileage. The base mileage for a particular month was used to calculate an adjustment factor (AF) for that same month in subsequent years using the formula:

$$\text{AF for month "Y", year "Z"} = \frac{\text{Base mileage for month "Y", year 1}}{\text{Mileage est. for month "Y", year "Z"}}$$

Next, the monthly adjusted road-kill indexes were tabulated as follows:

Adjusted RKI for species "X" during month "Y" =

(RKI for species "X" during month "Y") X (AF for month "Y")

All road-kill indexes calculated for time periods other than calendar months were derived via the same procedure.

FINDINGS AND ANALYSIS:

A total of 64 unskinned opossums was examined at fur houses during the 1978-79 season (Table 1). All specimens were obtained from two wildlife management units - the Grand Prairie and Southern Plain (Fig. 3). Males comprised 62.5 percent of all specimens checked. The proportion of males in the 1978-79 sample is somewhat greater than in the 1977-78 sample. The difference, however, is not significant and was largely due to the reduced sample size for the more recent season.

Hunters harvested 67.2 percent of the opossums examined, trappers took 26.6 percent and opossums killed by vehicles accounted for the remaining 6.2 percent (Table 1). This distribution of harvest is similar to the previous year. Hunters typically account for the majority of opossums taken each season. This is probably due to the fact that approximately four times as many individuals hunt opossums as trap them (Hubert 1978).

Sex was determined for 36 road-killed opossums checked from May through November 1978 (Table 2). Males made up 66.7 percent of the sample. This value is somewhat higher than that obtained from fur house studies and those reported by other researchers in the Midwest (Bennit and Nagel 1937, Reynolds 1945, Holmes and Sanderson 1965). Perhaps the movement and activity patterns of males make them more vulnerable to vehicle-related mortality than to conventional harvest and capture techniques.

A total of 532,697 miles was sampled for opossum and striped skunk road-kills from January through December 1978 (Table 3). Each month an average of 22 observers sampled 44,391 miles for road-killed wildlife. During 1978, 617 miles were sampled for each road-killed opossum observed compared to 297 miles per road-killed skunk recorded.

The monthly adjusted road-kill index for opossums varied throughout 1978, but was generally lower than during the previous 17 months sampled (Fig. 4). The highest value recorded in 1978 was 2.70 in April; the lowest value of 0.32 in January. Based on the data available, it appears that there are two periods during which the opossum suffers high mortality on roads (Fig. 4). These peaks occur from March through May and again from September through November. Biologically, the two periods coincide with reproductive activities and dispersal.

Hubert (1978) reported that road-kill indexes calculated for seasonal periods are probably more comparable from year to year than monthly indexes. Therefore, the annual trends in the spring (March - May) and fall (September - November) adjusted road-kill indexes for opossums from 1976 through 1978 were examined. The fall index was 5.35 in 1976, 3.82 in 1977, and 1.81 in 1978. These values reflect annual decreases in the index of 29 and 53 percent, respectively. Spring

index values were 4.35 in 1977 and 2.46 in 1978. These data represent a decline of 43 percent between years. Overall, the 1978 road-kill index for opossums during peak highway mortality periods was 48 percent lower than the previous year. Annual fluctuations of 2 to 67 percent in the number of road-killed opossums observed along I-80 in Nebraska were reported by Case (1978).

The above data probably reflect a significant decrease in the statewide opossum population between 1977 and 1978. The record cold and heavy snowfalls during the winters of 1977 and 1978 could have resulted in extensive opossum mortality, especially in the northern portion of the state. Unfortunately, there are no reliable opossum population data available for this period to provide a basis for comparison and the relationship between opossum population levels and road-kills is currently unknown. As a result no definite conclusions regarding opossum population trends may be drawn from the road-kill index at the present time.

The 1977 and 1978 seasonal road-kill indexes for striped skunks generally increased compared to previous years (Fig. 5). An index value of 4.73, the highest recorded to date, was calculated for the 1978 growth-fattening/post-reproductive period. Year to year comparisons of index values for the breeding period indicate a decline of 7 percent between 1977 and 1978. On the other hand, the growth fattening/post-reproductive period index remained stable from 1976 to 1977 and increased 43 percent between 1977 and 1978. Hubert (1978) stated that the peak periods of highway mortality for skunks, viz. breeding and growth-fattening/post-reproductive, are probably the most reliable for making comparisons between years. In addition, the hypothesis that trends in skunk road-kills reflect actual population trends (although the magnitude of the changes may differ) is supported by Verts (1967). It appears likely that the statewide skunk population during the fall of 1978 was definitely higher than in the fall of 1977. If this was true, a shift in the sex ratio of adult skunks which favored females should have occurred (Verts 1967). However, no sex ratio data are available for the period in question.

The data presented emphasize the major problem associated with the road-kill index, i.e. a minimal knowledge of the actual relationship between frequency of road-kills and animal density. This problem must be resolved on a species by species basis. The only way to accomplish such a goal is through a long-term population monitoring program which includes road-kills as a data source. For best results any program related to opossums and striped skunks should include intensive population monitoring on selected sample areas and comparison of population indices available from other sources, e.g. pelt harvests and trapper success data, with road-kill information.

RECOMMENDATIONS:

Little interest in the opossum and striped skunk as furbearers has existed in recent years due to comparatively low pelt values. Most fur buyers in Illinois purchase only a small number of opossum and skunk pelts. A few opossums are bought for their carcasses, but even the combined value of pelt and carcass is usually not enough to result in quantity purchases. Many buyers refuse to handle skunk pelts due to their unpleasant odor and few trappers (or hunters) make an effort to harvest this species. For these reasons and because the opossum and skunk are highly adaptable and widespread in Illinois, there is no need to set the seasons for hunting and trapping these species other than to open them concurrently with the seasons for raccoons.

The project leader should continue to examine unskinned opossums at fur houses to determine sex and method of harvest. In addition, an attempt to collect age data on the available specimens should be made. Sex and age data should also be collected from a sample of road-killed opossums throughout the year. Future fur house and road-kill sex/age studies should include striped skunk.

The road-kill survey of opossums and skunks should continue. Statistical analysis of the data available to date should be made to determine the sensitivity of this index and whether or not the data can be compiled on a regional basis. Additional sources of road-kill data should be explored and attempts to reduce or eliminate the impact of variables on the index continued. Ideally, the population trends indicated by the road-kill indexes should be compared to annual censuses of the opossum and skunk populations and trend data collected by other methods such as live or steel-trapping and sex and age ratios.

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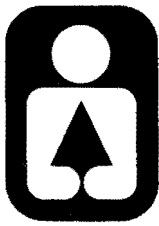
DATA AND REPORTS:

Original data and reports in this investigation are on file in the Division of Wildlife Resources Office, Illinois Department of Conservation, Springfield, IL 62706.

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DATE: 19 April 1979

GH:jmm



Illinois
Department of
Conservation
life and land together

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office memorandum

to: Road-Kill Survey Participants

from:

date:

subject: Instructions for Road-Kill Survey

1. Familiarize yourself with four button tally counter. Check counter to make certain it is operating properly.
2. Mount tally counter in your Department vehicle. Do NOT affix counter to top of dashboard. The plastic buttons on the counter will melt if placed in the sun for too long a period.
3. Record each road kill you observe while driving for the following species:
 - a. Cottontail rabbit
 - b. Raccoon
 - c. Striped skunk
 - d. Opossum
4. Do NOT record an individual road kill more than once even if you drive past it several times.
5. Record road-killed animals from both rural and urban areas. This provides consistency among observers.
6. Maintain road kill records on a monthly basis. At the end of each month submit the following information on the monthly road kill report cards provided:
 - a. Observer's name
 - b. Month and year
 - c. Total miles traveled
 - d. Numbers of road-killed rabbits, raccoons, skunks, and opossums observed during month.
7. Submit your monthly report card to: _____, Division of Wildlife Resources, 100½ E. Washington, Springfield IL 62706.

Figure 1. Intra-departmental memorandum containing instructions for road-kill survey data collection.

<u>DIVISION OF WILDLIFE RESOURCES - D.O.C.</u> MONTHLY ROAD KILLS	
Observer _____	Month/Year _____
Miles Traveled _____	
Numbers Observed	
Rabbits _____	Skunks _____
Raccoons _____	Opossums _____
Submit monthly to:	D.O.C., Spfld, IL

Figure 2. Report form/card used to submit monthly road-kill data.

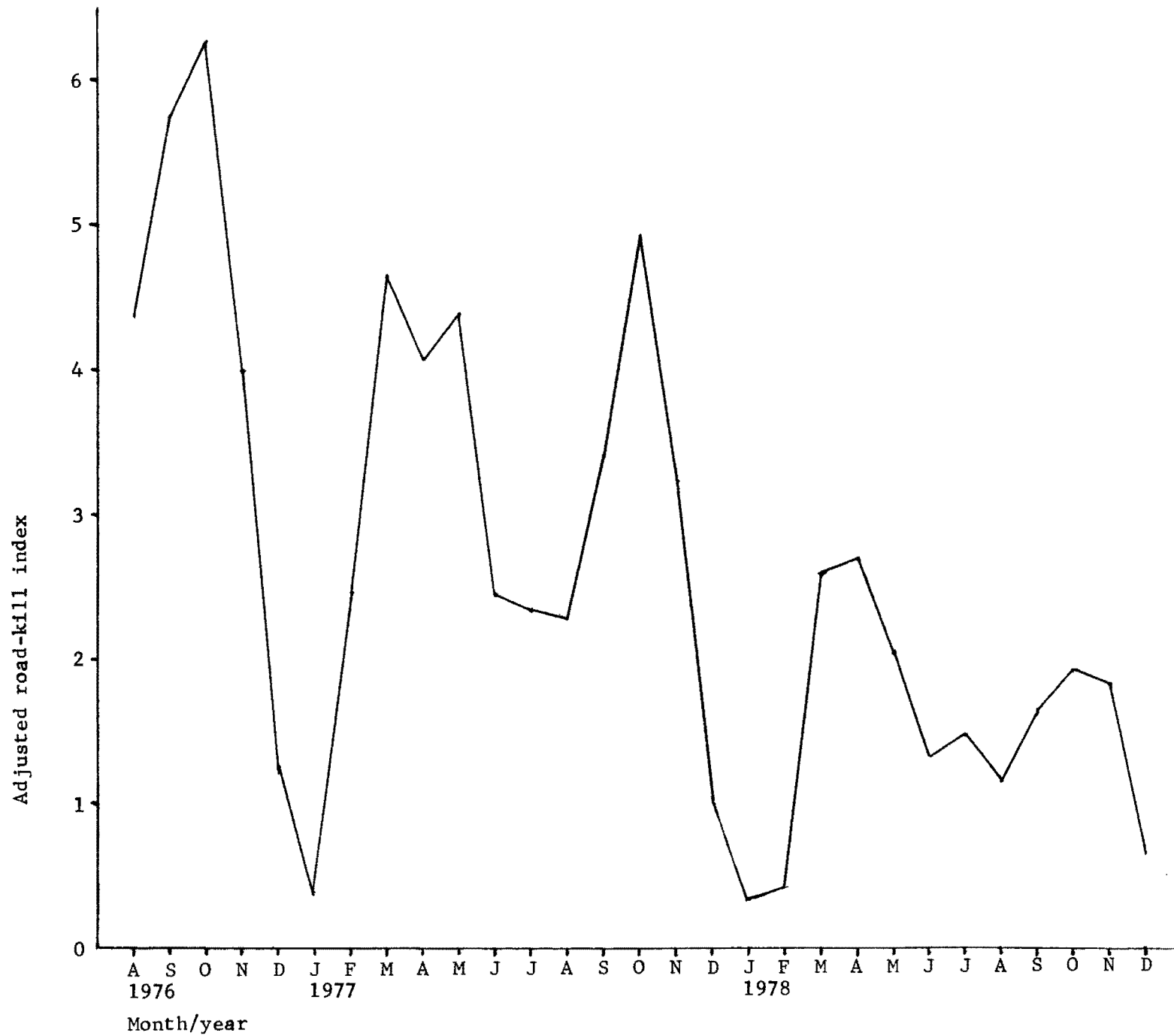


Figure 4. Trends in monthly adjusted road-kill index for opossum in Illinois, August 1976-December 1978.

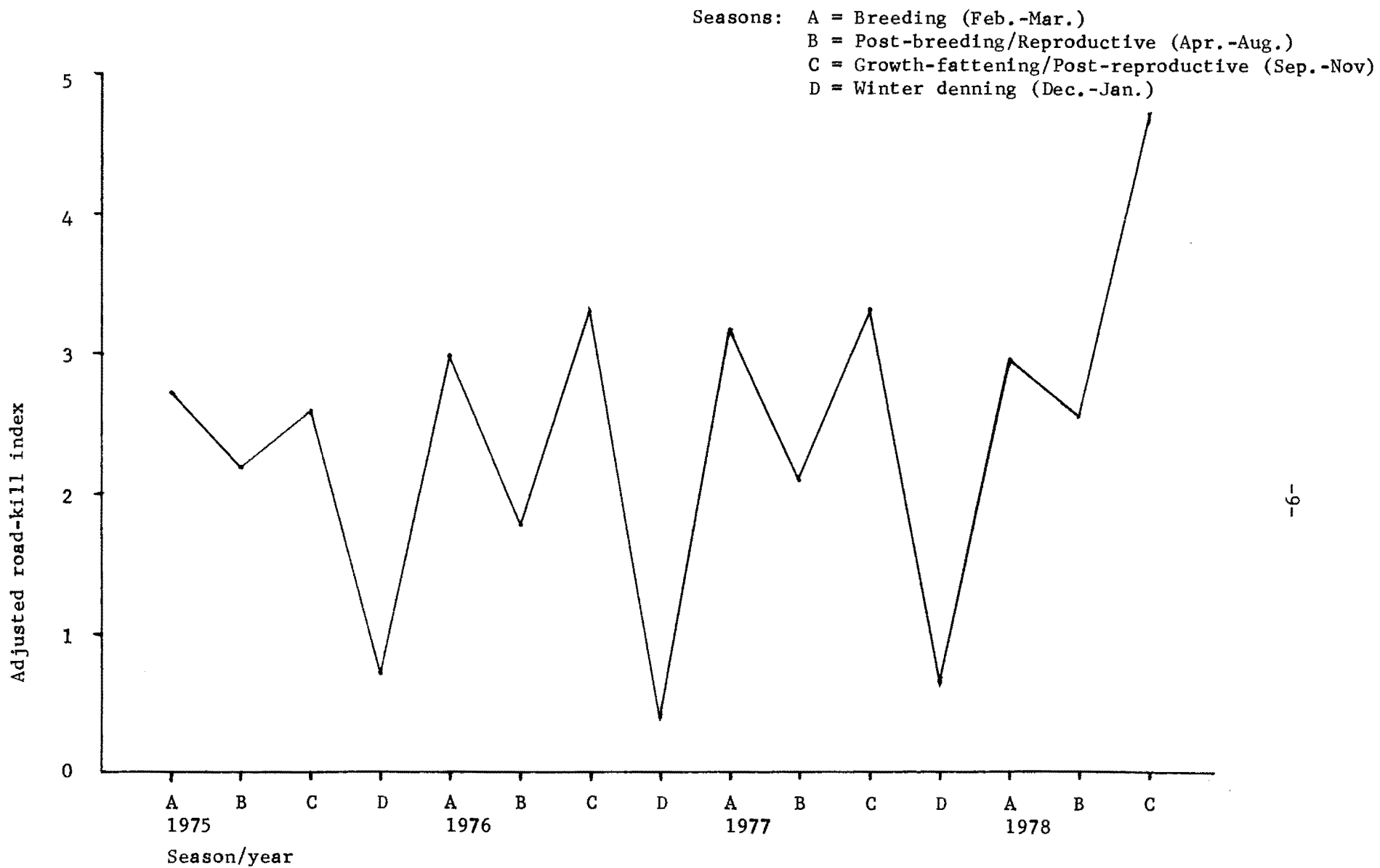


Figure 5. Trends in seasonal adjusted road-kill index for striped skunk in Illinois, February 1975-November 1978.

Table 1. Sex ratios and causes of mortality for opossums examined at fur houses in Grand Prairie and Southern Plain wildlife management units, Illinois, November 1978-January 1979.

Sex	Cause of mortality			Totals
	Hunt	Trap	Road-kill	
<u>Grand Prairie Unit</u>				
Male	10	8	2	20
Female	<u>5</u>	<u>6</u>	<u>2</u>	13
Subtotals	15	14	4	33
<u>Southern Plain Unit</u>				
Male	17	3	0	20
Female	<u>11</u>	<u>0</u>	<u>0</u>	11
Subtotals	28	3	0	31
<u>All Units</u>				
Male	27	11	2	40 (62.5)
Female	<u>16</u>	<u>6</u>	<u>2</u>	24 (37.5)
Totals	43 (67.2) ^a	17 (26.6)	4 (6.2)	64 (100.0)

^a Numbers in parentheses are percentages of totals.

Table 2. Sex ratios of road-killed opossums examined by project personnel in Illinois, May - November 1978.

Month	Sex		Totals
	Male	Female	
May	2	1	3
June	5	3	8
July	3	3	6
August	2	2	4
September	3	2	5
October	5	0	5
November	<u>4</u>	<u>1</u>	<u>5</u>
Totals	24 (66.7) ^a	12 (33.3)	36 (100.0)

^a Number in parentheses are percentages of totals.

Table 3. Sample sizes for opossum and striped skunk road-kill study, January 1978 - December 1978.

Month	Number of observers	Number of miles sampled	Number of road-kills observed	
			Opossum	Striped Skunk
Jan.	23	35,642	12	18
Feb.	21	32,959	15	27
Mar.	23	53,036	141	260
Apr.	23	40,708	115	156
May	20	39,563	85	115
June	21	46,910	64	102
July	19	40,801	63	110
Aug.	20	52,142	63	141
Sep.	25	57,562	97	204
Oct.	26	54,037	108	332
Nov.	23	44,131	78	264
Dec.	21	35,206	23	66
Totals	--	532,697	864	1,795
Monthly averages ^a	22	44,391	72	150