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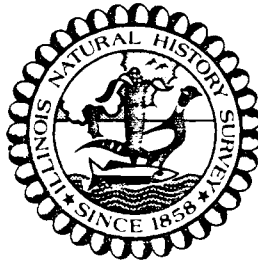
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W-87-R-6

June 1985

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ILLINOIS NATURAL HISTORY SURVEY



Section of Wildlife Research

Cooperative Wildlife Research

W-87-R-6

Annual Job Progress Report

By

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and

Lonnie P. Hansen

Illinois Natural History Survey

1 July 1984 through 30 June 1985

Performance Report
Annual Job Progress Report

State: Illinois

Project Number: W-87-R-6

Project Type: Research

Sub-project VII: Illinois Deer Investigations

Period Covered: 1 July 1984 through 30 June 1985

This performance Report covers reports of progress for the jobs active under the R-6 segment.

Study No. VII-A; Title: Landscape Heterogeneity and Deer Abundance.

Study Objectives:

1. To define those landscape characteristics that determine seasonal distribution and abundance of deer.
2. For the northern area of Illinois, to provide the Department of Conservation with a county-by-county listing of sites used by deer in winter, with appropriate descriptions of plant communities and human impacts that affect deer.

Job No. 101.2; Title: Data analysis and reporting.

Objectives: To analyze the data collected during this study and to provide the Illinois Department of Conservation with a deer range appraisal for the northern two-thirds of Illinois.

(a) Activity:

In the R-5 study segment, we reported on the results of a discriminant analysis of landscape characteristics (39 variables) collected from 6 areas where deer concentrate in winter and from 6 areas they avoid in winter, both types of areas were located in 3 east-central Illinois counties.

That preliminary analysis indicated that winter deer use of an area depended on a relatively few landscape characteristics--area of refuge, area of upland hardwoods having >50% crown closure, and area of shrub-old field habitat--that appeared to have positive influences on habitat selection. The number of occupied houses and number of light duty roads present seemingly had a negative influence on wintering deer (Brewer 1985).

Expansion of discriminant techniques to 12 additional areas in east-central Illinois (6 areas of deer concentration and 6 non-concentration areas) found that area of refuge, area of bottomland forest with <50% crown cover and the total topographic relief of the area positively affected selection of wintering sites which the amount of unimproved roads and upland hardwoods with <50% crown cover (mostly active pastures) negatively affected deer occurrence. Use of these variables in a discriminant model correctly classified 11 of 12 concentration areas in westcentral (Marshall and Putnam counties = 6 areas) and northern (Stephenson and Winnebago counties = 6 areas) Illinois. A second discriminant model minus refuge and including the same variables noted above correctly classified 5 of 6 sites in east-central Illinois and 4 of 6 of the areas in west-central and northern Illinois. The presence of a refuge accounted for nearly 59% of the variation in landscape characteristics between concentration and non-concentration areas.

Deer that disperse or migrate away from a refuge suffer mortality rates significantly higher than deer that remain close to a refuge throughout the year. For marked females, mortality rates for dispersing deer were more than double that of sedentary does. Heavily hunted areas featuring high deer death rates act as dispersal sinks, offering does solitude for fawn rearing and the opportunity for yearling males to breed (unlikely where adult males are abundant).

Although discriminant function models derived from landscape characteristics of sites examined in east-central Illinois correctly classified most of the known winter deer concentration sites in Marshall-Putnam (west-central) and Stephenson-Winnebago (northern) counties, it was possible that landscapes avoided by deer might have somewhat different characteristics than were found in east-central Illinois. Therefore, cover mapping and land owner interviews of nonconcentration areas in Marshall, Putnam, Winnebago, and Stephenson counties were conducted during this segment. Information obtained from those surveys is currently being quantified and added to computer files for later analysis.

A robust discriminant analysis technique is also currently being explored to improve the classification model for winter concentration areas. Outliers (values which lie outside the normal range for each variable) in a multivariate data set can create problems in interpretation

of statistical analyses. In the case of discriminant analysis, such outliers result in nonhomogeneous covariance matrices. This is an important problem in discriminant analysis because 1) variances and covariances in such analyses are extremely sensitive to outliers, and 2) discriminant analysis is based on estimates of covariance matrices.

Most practitioners of multivariate analysis have chosen to ignore or live with the consequences of outlier effects, primarily because techniques and/or computer programs to deal with their effects were unavailable. Work currently under way at West Virginia University is helping to solve these problems, and we are currently in communication with researchers there in an effort to make use of their findings. We hope that with the cooperation of WVU and modifications by INHS statisticians, the discriminant model will soon be easier to understand and interpret.

In the recent project segment, we completed our survey of Illinois counties for sites traditionally used by deer in winter. We located 283 wintering sites in the region north of the solid line shown in Figure 1. South of this line forest cover becomes extensive, topography becomes rougher, and deer have access to numerous remote, sheltered sites in which to winter. The locations of the 283 sites are presented in Table 1, with a brief legal description of the principal wooded area nearest the center of each site of deer concentration.

For each wintering site, we are currently describing landscape characteristics (woody cover, human uses, crops, highways, etc.) within a 4 mi² area centered on the principal wooded portion of the site. These data should prove useful in several ways: 1) These sites of deer concentration typically represent the best deer range left in each county--examination of the landscapes at these sites will provide the first quantitative appraisal of "deer range" in central and northern Illinois; 2) The dispersion of recent deer harvests over these counties will be examined in relation to the dispersion of wintering sites to evaluate the importance of secure wintering sites to deer harvests; 3) Determination of the present and future outlook as to retention of habitat at each of those sites. This will help us speculate on the future of deer numbers and harvest in the respective counties. In many counties fewer than 6-8 such secure wintering sites remain (Table 1) and any further losses of such areas will mean a further reduction in deer harvests.

(b) Target Date for Achievement:

Final Report - September 1986.

(c) Date of Accomplishment: On Schedule.

(d) Significant Deviations: None.

(e) Remarks: None.

(f) Recommendations: See recommendations for future research, p.18.

(g) Cost: Federal - \$30,151; State - \$10,050; Total - \$40,201

Literature Cited

- Brewer, P. 1985. Winter concentration areas of white-tailed deer (Odocoileus virginianus) in Illinois: A discriminant analysis. M.S. Thesis. Eastern Illinois Univ., Charleston. 64pp.

Study No. VII-B; Title: Population Dynamics of the Illinois Deer Herd--
Past History, Current Status, and Future Manage-
ment Options.

Study Objectives:

1. To define regional boundaries ecologically for deer and make recommendations based on herd dynamics.
2. To simulate herd dynamics under various harvest strategies.
3. To provide the Department of Conservation with management strategies for regional deer herds based on life history, seasonal requirements, and harvest strategies.

Job No. 102.2; Title: Regional analysis of the Illinois deer herd.

Objectives: To determine the landscape characteristics most affecting harvest of deer in Illinois and to evaluate current regional boundaries.

(a) Activity:

Cluster analysis (Everitt 1980) was used in preliminary groupings of ecologically similar counties. The cluster program starts with a given county and, based upon designated criterion variables, determines which other county is closest (most ecologically similar) to the first. The 2 counties are then "grouped" as a "cluster." As a cluster, these 2 counties are compared with the other counties to determine which one is closest to that first cluster. One must then somehow decide at what cluster level additional counties should be grouped. Cluster analysis is

not a stringent statistical method and the resulting groupings can not be easily tested for statistical validity. However, using land use data, deer population indices, and human population data, cluster analysis indicates various associations among Illinois counties of potential management significance.

In the preliminary analysis, 13 variables (Table 2) were used to group counties at approximately the 1.0 level of the distance matrix (Table 3 and Figure 2). These grouping levels are preliminary and, therefore, are not the final recommendation for regional management designations. Other grouping levels are currently being evaluated. Information on additional variables, including the acreages in public ownership and projected demands for deer hunting permits are currently being examined for inclusion in future analyses.

(b) Target Date for Achievement:

Progress Report - 30 September 1985.

Final Report - 30 September 1986.

(c) Date of Accomplishment: On Schedule.

(d) Significant Deviations: None.

(e) Remarks: None.

(f) Recommendations: See recommendations for future research, p.18.

(g) Cost: Federal - \$14,070; State - \$4,690; Total - \$18,760

Literature Cited

Everitt, B.S. 1980. Cluster Analysis, 2nd Edition, Heineman Books Ltd., London.

Job No. 102.3; Title: Population dynamics of the Illinois deer herd--history, current status, and future management options.

Objectives: To develop management strategies for regional deer herds.

(a) Activity:

Demands for permits to hunt deer in Illinois have increased rapidly during the last 5 years and are expected to exceed 100,000 during the next 5 years (Table 4). Currently, a random draw of requests determines who is successful at getting a permit. Unfortunately, more and more requests are being denied because the demand exceeds the quotas for permits. This is especially true in the eastern and central counties where the demand for permits is more than double the number available (Figure 3). Recognizing this problem, Department of Conservation biologists and the Deer Technical Advisory Committee proposed a change in regulations in which a limited number of "any deer" and an unlimited number of "antlered only" permits would be issued in each county. This would accommodate all hunters and allow reasonable growth in deer numbers and herd control in designated areas.

The following questions, however, have been raised about the impact of such a system: 1) Would hunters unduly

concentrate in the better counties; and 2) What would the effects be on long term trends in the deer population? Although field experimentation with the proposed regulations would be desirable, the long lag times inherent in such tests are not desirable. Also, the potential public distrust in the Department of Conservation resulting from unexpected impacts are undesirable. Computer simulation provides an alternative to field experimentation with deer harvest regulations.

The effects of the proposed modified antlerless deer hunting season on hunter distribution were determined by evaluating trends in the "1st choice" requests for permits actually made during 1980-1984, projecting such requests for 1985, and adding the expected number of landowner requests for permits. The "1st choice" requests for permits were used because they reflected true demands for permits.

Concern has been expressed that if unlimited permits were available for each county, most hunters would choose to hunt the high deer kill counties in western and southern Illinois. This was not found to be the case (Figure 4). In fact, based on "first choice" requests, we would expect declines or only small increases in the numbers of permit requests in those counties. The problem area, if such would be the case, could most logically occur in the central and east central part of the state where 1-2 times as many additional permits might be requested in several, perhaps 20 counties. To avoid potential problems resulting from

high hunter densities, limits on even the number of "antlered only" permits issued may be desirable in selected counties depending on future demand and land owner tolerance of hunters and of deer.

Data from Region 4 were used as an example to simulate the long term effects of the proposed changes in hunting regulations on deer population dynamics. The numbers of requests for permits from 1985-1990 were projected from recent trends in permit requests. Two schemes to accommodate all requests for permits were evaluated: 1) Scheme 1 - The number of "any deer" permits was reduced from 11,041 in 1984 to 9,477 in 1985 but was increased annually by 300 permits thereafter. "Antlered only" permits were issued on request to any hunters not successful in getting "any deer permits". 2) Scheme 2 - "Any deer" permits were issued to all hunters requesting permits. Trends of abundance in the pre-season deer population under the 2 schemes were simulated. In these simulations 3 principal mortality periods were recognized--late fall-winter, summer, and hunting season. Annual mortality rates were derived from life table analyses of harvest age ratio data, and these rates were apportioned to the mortality periods according to information from the Allerton study (Nixon et al. 1984). Reproductive rates used were from studies done in west-central Illinois. The harvest of deer from each sex-age class (10 classes) was assumed as a function of the number of hunters and the numbers of deer in the various

age-sex classes. The harvest rates used were based on past harvest data and do not necessarily reflect differences that might possibly result from the proposed changes in the new system. Differential vulnerability of the sex-age classes was based on information from statewide harvest data for Illinois, the Allerton study (Nixon et al. 1984), and from McCullough (1979).

Under Scheme 1 we predict the regional population would increase rapidly during the 5-year simulation period while under Scheme 2 the population would decline due to over-harvest of does (Figure 5). It appears that projected demands for deer hunting can not be met under the current permit system but that a limited "any deer" with unlimited "antlered only" system is a viable alternative that would allow both more deer and more deer hunting in Illinois.

- (b) Target Date for Achievement: 30 September 1986.
- (c) Date of Accomplishment: On Schedule.
- (d) Significant Deviations: None.
- (e) Remarks: None.
- (f) Recommendations: See recommendations for future research, p.18.
- (g) Cost: Federal - \$3,015; State - \$1,005; Total - \$4,020

Literature Cited

- Nixon, C.M., L.P. Hansen, and P.B. Brewer. 1984. Illinois deer investigation. III. Perf. Rep. Pittman-Robertson Proj. W-87-R-4. 34pp.
- McCullough, D.R. 1979. The George Reserve deer herd. University of Michigan Press, Ann Arbor. 271pp.

Study No. VII-C; Title: Life History and Ecology of Deer In Intensively Farmed Landscapes.

Study Objectives:

1. To determine sex and age specific natality and mortality.
2. To determine daily, seasonal, and annual movements of deer as they relate to crop phenology, weather, and hunting pressure.
3. To evaluate the role of nutrition (digestible energy, protein, and minerals) relative to seasonal dispersion of deer in natural and cultivated plant communities.
4. To determine the importance of refuges to deer population dynamics in intensively farmed landscapes.
5. To construct population models that mimic deer population dynamics in intensively farmed landscapes.

Job No. 103.1; Title: Life history and ecology of deer in intensively farmed landscapes.

Objectives: (Same as study Objectives).

(a) Activity:

We continued to monitor life history and ecology of marked deer on the 7,191 acre Piatt County Study Area (PCSA) as scheduled. See Annual Progress Report W--87-R-5 for a description of the land use on the study area.

Deer Captures

As of 30 June 1985, when we stopped marking deer, we had captured 288 deer a total of 373 times. During the R-6

segment, we captured 70 deer (males--31 fawns, 2 yearlings, 2 adults; females--21 fawns, 3 yearlings, 11 adults) between September 1984 and March 1985. Males were marked with ear streamers and a few (8) with radio collars; females were marked with plastic neck collars bearing reflective symbols and a few (12) were marked with radios. All captured deer were ear tagged with numbered metal tags.

A total of 46 deer were radio tracked for varying periods during the R-6 segment (males--7 fawns, 3 yearlings, 5 adults; females--6 fawns, 5 yearlings, 20 adults). Radio tracking provides data on sex and age specific natality and mortality rates, dispersal, and use of natural and agricultural habitats as affected by seasons, farming schedules, weather, and hunting. We also continued to collect information on seasonal dispersion and patterns of adult and yearling males and females who remain on the PCSA.

Population Levels

Aerial deer counts indicate that the number of deer that winter on the PCSA has doubled from a minimum of 82 deer found during the winter of 1980-81 to a minimum of 171 deer counted in 1984-85. This represents an annual rate of increase close to 20 percent.

The pre-hunt fall population is also increasing on the study area; in 1984 up an estimated 30% over 1983 (Table 5). Mortalities (all deer, marked or not) also nearly doubled in fall 1984 compared with 1983, but still only totaled about

29% of the pre-hunt deer population. As expected, archery and shotgun hunting deaths accounted for most of the known mortalities on the study area but poaching losses in 1984 were the highest since the study began in 1980 (Table 6). Previous calculations using natality and survival data from the PCSA deer herd indicate that mortalities must exceed 35% of the female population or the population as a whole will continue to increase.

The availability of a marked sample of deer, some with radio transmitters, allowed us to preliminarily estimate crippling losses for deer in east-central Illinois. For all marked deer through the 1983 archery and shotgun seasons, the ratio of deer unretrieved as cripples to those legally reported killed averaged 31% for gun hunters and 45% for archers (Table 7). Losses were higher for radio marked deer compared with other methods of marking because it was easier to locate radio marked carcasses after death. Adult females were most likely and yearling males the least likely to be crippled and unretrieved. These observed differences in the likelihood of crippling losses may relate to differences among sex and age classes in their relative wariness.

Yearling and adult males become less wary during the gun season associated with breeding activities whereas adult females tend to remain on a small home range during the fall except during their relatively short estrous period and evidence no observable decrease in wariness to humans. Thus, adult females may present relatively more difficult

and less conspicuous targets than males (relative body size may also influence crippling rates with hunters more likely to hit and kill the larger males).

As could be expected, the ratio of cripples lost to deer legally harvested was higher for archery hunters (Table 7). The presence of a refuge within the Platt County Study Area (PCSA) undoubtedly increased crippling losses because crippled deer, once within the refuge, would not be killed or found by other hunters as often occurs on hunted lands. On the other hand, such sanctuaries of one kind or another are recurring features of the Illinois landscape, and the crippling rates shown here may not be unreasonable for much of central and northern Illinois.

Recruitment

Fawn production remained high on the PCSA in 1984. Fawns alive on October 1 exceeded 1.8 per marked doe for females observed often enough to provide reliable fawn counts (Table 8). The proportion of fawn does breeding was less than previous years (45% vs. 65%) but, our small yearly samples may not accurately reflect the true extent of fawn breeding each year. The high recruitment of fawns at approximately 4 months old means that fawn losses between birth and fall continue to be very low in central Illinois.

Dispersal and Migration

As shown in Table 9, most deer in east-central Illinois

do not remain on a small fixed home range throughout life. While dispersal and migratory behavior appear to diminish with age in males, females continue to make seasonal movements into old age. Nearly 31% of our marked does over 2 years old continue to migrate between summer and winter ranges each year. Two of these females dispersed from the study area after their 2nd birthday and after they had raised fawns on their old ranges. In males, dispersal behavior was most evident between 9 and 13 months of age (Table 9). After that age males tend to remain on home ranges that continue to increase in size as the males rises in the dominance hierarchy .

Other Data Collections

We conducted weekly spotlight observations along a 13-mile route in and adjacent to the PCSA from August 1984 through May 1985. Spotlight observations of marked deer enable us to locate and monitor marked deer that are not radio collared, and, by using the number of radio collared yearling and older does as a known marked sample, to calculate a Lincoln Index estimate of the number of yearling and older deer present along the spotlight route. A simulated age structure derived from deer mortality and natality rates for the study area allows us to expand this number to include the remaining sex and age classes in the population (Table 5).

Drive counts of deer were conducted twice each season (July, October, January, April) on 454 acres selected to sample the principal forest types present on the PCSA. Along with radio tracking, these counts help define seasonal changes in deer use of forest types.

Blood samples were collected from some captured deer to investigate genetic variability and possible effects of genetic differences on dispersal behavior. These samples are being examined at the INHS using starch gel electrophoresis. We also continued to collect chest girth and hind foot measurements from fawns and yearlings captured between 1 January and 31 March 1985, to evaluate winter condition in these age classes.

We continued to monitor the number of deer present in mid-summer and in mid-winter on 7 privately owned areas known to have been summer habitat for pregnant and nursing does. In July 1984, a minimum of 26 deer were present on the 7 areas; in February 1985, only 2 deer, who were together in 1 woodlot, were present in the 7 areas. We believe that changes in deer numbers of this magnitude are common between winter and summer for hunted woodlots in central and northern Illinois as deer leave them in late fall to journey to traditional wintering sites.

- (b) Target Date of Achievement: 30 September 1986.
- (c) Date of Accomplishment: On Schedule.
- (d) Significant Deviations: None.
- (e) Remarks: None.

(f) Recommendations: See recommendations for future research,
p. 18.

(g) Cost: Federal - \$53,266; State - \$17,755; Total - \$71,021

Recommendations

We have completed all field work for W-87-R. Studies of deer range appraisal, deer harvest analysis and life history and ecology of farmland deer provide the DOC with improved information and data bases for managing regional deer herds (see annual reports W-87-R).

At the conclusion of the W-87-R-7 segment (30 June 1986), the DOC will receive completion reports for the deer range appraisal and the deer harvest analysis. These reports will include quantitative descriptions of deer range and detailed analysis of present and projected future regional deer populations, harvests and harvest strategies. The DOC will not receive a comprehensive final report dealing with the life history and ecology of farmland deer as was anticipated. Unfortunately, due to the budget cutbacks imposed in FY86, we will not have sufficient manpower to complete all three studies by 30 June 1986 as previously scheduled.

We propose to build future research efforts on farmland deer on the data bases staff, facilities and experience established during the W-87-R research. Such efforts would be undertaken to provide the DOC with information needed for future management of the Illinois deer herd on a regional basis. Our proposals can be grouped into 3 general areas but would be implemented as a single study--the extension of W-87-R or its equivalent.

Title: Management of regional deer herds in Illinois.

Objectives:

1. Preparation of a book, bulletin or monograph entitled: Life history and ecology of the white-tailed deer in an intensively farmed

landscape. This document would summarize the data collection during the 5-year Allerton study and would provide the Department of Conservation with a comprehensive perspective of deer population dynamics, movements, and landscape utilization of deer in central and northern Illinois.

2. a. Analysis of harvest data--With increasing demands on the deer resource and rapidly increasing herd size in many parts of the state, changes in harvest regulations are imminent. The ability to "sell" alternate programs and "follow up" the outcome of these programs can only be appreciated if adequate analyses of the harvest data are maintained. We propose to annually update and analyze the harvest data and evaluate hunter demands for deer hunting permits, and when necessary, project effects of alternate harvest strategies on regional deer herds and to evaluate the outcome of any changes in regulations when imposed.

b. Determination of regional deer population goals for Illinois--The problem is to define regional deer population goals, particularly where both agriculture and deer are important resources. We propose basing realistic deer population goals on farmer attitudes toward deer densities rather than on crop damage complaints and by trial and error, methods in current use in Illinois. We propose to utilize the results of the recent Illinois landowner questionnaire (Kube 1983, Assessment of deer management by Illinois landowners, Illinois Department of Conservation, Springfield, 11 pp.) with some additional followup questioning of landowners. Recent population models in conjunction with landowners attitude data will provide deer density estimates to determine optimum population goals for regional deer herds.

3. Management of secure wintering sites for deer in central and northern Illinois--Objectives include:

a. Determination of an optimal distribution of secure winter concentration areas necessary to restock all suitable existing summer deer habitat. We would use two methods to assess the optimum distribution of wintering areas.

b. Determination of the desirable size of individual wintering areas that would provide sufficient numbers of deer to restock depleted habitats and yet minimize deer-human conflicts such as crop damage and accidents in the immediate vicinity of such wintering areas.


c. Evaluation of the effectiveness of land management activities presently in use on wintering areas--such as food plots, supplemental feeding, and mechanical barriers to deer movements--in reducing deer-human conflicts.

d. Evaluation of the management decisions including hunting and landscape characteristics that combine to create overpopulations of deer on existing wintering areas.


e. Propose possible strategies for managing a system of secure wintering sites for deer in all or parts of 51 counties in Illinois where winter concentration behavior currently occurs and appears significant to sustain abundance of local and regional deer herds.

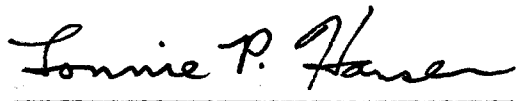
While past deer research in Illinois has been funded under PR, recent reductions in PR revenues make a sustained high level of funding difficult if not impossible. It is quite possible that future deer research as proposed here be sustained by IDOC revenues other than those from PR, revenues from deer hunting license sales, for example.


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Date: 5 September 1985

Table 1. Legal description of land used as sites of deer concentration in winter. Legal descriptions apply to the principal forested area nearest the center of each concentration area. The 7.5' quadrangles cover a 4 mi² area used to sample the characteristics of each site of deer concentration.

Deer Region	County	Concentration Area	7.5 min. Topo Quadrangle	Legal Description
1	Boone	1	Belvidere NW	SE1/4 Sect. 31, SW 1/4 Sect. 32, T46N, R3E
		2	Caladonia Cherry Valley	S1/2 Sect. 29, T44N, R3E, Belvidere Twp.
		3	Belvidere N&S	S1/2 Sect. 33, T44N, R4E, Bonus Twp.
1	Carroll	No evidence of deer concentration behavior. Only E. half of county glaciated, rest well forested. Possible deer concentration in Lake Carroll area which is now under development.		
1	McHenry	1	Woodstock	S1/2 Sect. 35, T45N R7E, Greenwood Twp.
		2	Harvard	SE1/4 Sect. 19, T46N, R6E, Alden Twp.
		3	Marengo North	S1/2 Sect. 13, T44N, R5E, Marengo Twp.
		4	Marengo South	N1/2 Sect. 7, T43N, R6E, Coral Twp.
		5	Fox Lake	SE1/4 Sect. 17, T46N, R19E, Burton Twp.
1	Joe Daviess	This unglaciated county with rugged topography and extensive forests provides deer with wintering sites throughout the county.		
1	Ogle	1	Dixon 15'	NW1/4 Sect. 28, T23N, R10E, Nashua Twp.
		2	Dixon 15'	SW1/4 Sect. 18, T23N, R9E, Oregon Twp.
		3	Kishwaukee	SE1/4 Sect. 16, T23N, R11E, Byron Twp.
		4	Dixon 15'	S1/2 Sect. 9, T23N, R9E, Pine Creek Twp.

1	Stephenson	1	Lena	SE1/2 Sect. 17, T28N, R5E, West Point Twp.
		2	Dakota, Lena Freeport E&W	NW1/4 Sect. 36, T27N, R7E, Buckeye Twp.
1	Whiteside	1	Morrison 15'	SE1/4 Sect. 31, T21N, R4E, Clyde Twp.
		2	Erie Prophetstown	N1/2 Sect. 11, T19N, R4E, Portland Twp.
		3	Erie NW	E1/2 Sect. 17, T20N, R3E, Newton Twp.
		4	Clinton 15'	SW1/4 Sect. 4, T22N, R4E, Ustick Twp.
		5	Erie	W1/2 Sect. 18, T20N, R4E, Newton Twp.
2	Bureau	1	Princeton North	N1/2 Sect. 32, T17N, R9E, Dover Twp.
		2	Princeton South, Depue	N1/2 Sect. 20, T15N, R10E, Leepertown Twp.
		3	Princeton South	NW1/4 Sect. 20, T15N, R9E, Arispie Twp.
		4	Princeton North	SW1/4 Sect. 14, T17N, R9E, Dover Twp.
		5	Depue	N1/2 Sect. 29, T16N, R10E, Selby Twp.
		6	Neponset	NW1/4 Sect. 31, T16N, R6E, Mineral Twp.
2	DeKalb	1	Shabbona Grove Waterman	E1/2 Sect. 26, T38N, R3E, Shabbona Twp.
		2	Genoa	W1/2 Sect. 25, T42N, R4E, Kingston Twp.
		3	Fairdale, Kirklind	N1/2 Sect. 22, T42N, R3E, Franklin Twp.
		4	Kirklind	N1/2 Sect. 21, T42N, R3E, Kingston Twp.
		5	Somonauk	NE1/4 Sect. 31, T38N, R5E, Squaw Grove Twp.

		6	Somonauk	W1/2 Sect. 14, T37N, R5E, Sandwich Twp.
		7	Shabbona Grove	SE1/4 Sect. 10, T37N, R3E, Paw Paw Twp.
2	Ford	1	Perdueville	SE1/4 Sect. 10, T23N, R9E, Patton Twp.
		2	Piper City	SE1/4 Sect. 31, T26N, R9E, Brenton Twp.
2	Grundy	1	Coal City, Minooka	E1/2 Sect. 4, T33N, R8E, Goose Lake Twp.
		2	Coal City	N1/2 Sect. 19, T33N, R8E, Wauponsee Twp.
		3	Seneca	S1/2 Sect. 29, T33N, R6E, Norman Twp.
		4	Lisbon Stavanger	SW1/4 Sect. 24, T34N, R6E, Nettle Creek Twp.
		5	Minooka	SE1/4 Sect. 8, T34N, R8E, Aux Sable Twp.
2	Henry	1	Nekoma	NE1/4 Sect. 17, T14N, R3E, Weller Twp.
		2	Kewanee North Neponset	N1/2 Sect. 2, T15N, R5E, Annawan Twp.
		3	Kewanee North	S1/2 Sect. 24, T15N, R4E, Burns Twp.
		4	Geneseo, Green Rock	S1/2 Sect. 3, T17N, R2E, Hanna Twp.
		5	Spring Hill	NE1/4 Sect. 28, T18N, R4E, Loraine Twp.
		6	Hillsdale	N1/2 Sect. 19, T18N, R3E, Phenix Twp.
2	Iroquois	1	Donovan Leesville	N1/2 Section 24, T29N, R11W, Beaverville Twp.
		2	Beaverville, Gilman 15'	S1/2 Section 20, T29N, R12W, Papineau Twp.
		3	Sheldon	W1/2 Sect. 19, T27N, R10W, Concord Twp.

		4	Milford Cissna Park 15'	S1/2 Sect. 29, T26N, R12W, Belmont Twp.
		5	Wellington Cissna Park 15'	N1/2 Sect. 29, T25N, R12 W, Milford Twp.
		6	Gilman 15'	N1/2 Sect. 34, T28N, R12 W, Chebanse Twp.
		7	Gilman 15'	E1/2 Sect. 9, T27N, R13W, Iroquois Twp.
		8	Buckley 15'	S1/2 Sect. 8, T24N, R9E, Loda Twp.
		9	Cissna Park NW	N1/2 Sect. 14, T26N, R14W, Onarga Twp.
		10	Cissna Park NW	W1/2 Sect. 31, T25N, R14W, Onarga Twp.
2	Kankakee	1	Bonfield	SE1/4 Sect. 5, T31N, R10E, Salina Twp.
		2	Bourbonnais	NW1/4 Sect. 15, T31N, R11E, Bourbonnais Twp.
		3	Bourbonnais	NW1/4 Sect. 5, T31N, R11E, Limestone Twp.
		4	St. Anne	N1/2 Sect. 19, T30N, R14E, Pembroke Twp.
		5	Leesville	NW1/4 Sect. 7, T31N, R10W, Pembroke Twp.
		6	Kankakee	NW1/4 Sect. 33, T30N, R12E, Otto Twp.
		7	Kankakee	SW1/4 Sect. 13, T30N, R12E, Aroma Twp.
2	Kendall	1	Newark	SE1/4 Sect. 19, T36N, R6E, Fox Twp.
		2	Plano, Yorkville	N1/2 Sect. 14, T37N, R6E, Little Rock Twp.
		3	Plano	NW1/4 Sect. 16, T37N, R6E, Little Rock Twp.
		4	Plano	N1/2 Sect. 34, T37N, R6E, Little Rock Twp.

2	LaSalle	1	Sheridan	SE1/4 Sect. 17, T36N, R5E, Northville Twp.
		2	LaSalle	SW1/4 Sect. 7, T33N, R2E, Waltham Twp.
		3	Marseilles	S1/2 Sect. 32, T33N, R5E, Brookfield Twp.
		4	LaSalle	SW1/4 Sect. 29, T33N, R2E, Deer Park Twp.
		5	LaSalle	NW1/4 Sect. 20, T33N, R2E, Deer Park Twp.
		6	Leonore	SE1/4 Sect. 32, T32N, R3E, Bruce Twp.
		7	Marseilles, Seneca	S1/2 Sect. 34, T33N, R5E, Brookfield Twp.
		8	Wedron	W1/2 Sect. 33, T35N, R4E, Serena Twp.
		9	Troy Grove	NE1/4 Sect 34, T34N, R1E, Dimmick Twp.
		10	Serena	S1/2 Sect. 20, T35N, R5E, Mission Twp.
2	Lee	1	Harmon Walton	N1/2 Sect. 18, T19N, R9E, East Grove Twp.
		2	Polo, Grand Detour	SW1/4 Sect. 17, T22N, R9E, Dixon Twp.
		3	Franklin Grove	W1/2 Sect. 34, T21N, R10E, China Twp.
		4	Grand Detour	E1/2 Sect. 15, T22N, R9E, Dixon Twp.
		5	Compton Sublette	NW1/4 Sect. 3, T37N, R1E, Viola Twp.
		6	Amboy	NW1/4 Sect. 36, T20N, R10E, Lee Center Twp.
		7	Amboy Walton	W1/2 Sect. 33, T20N, R10E, May Twp.
		8	Amboy	E1/2 Sect. 9, T19N, R10E, May Twp.

		9	Walton	NE1/4 Sect. 3, T19N, R9E, East Grove Twp.
2	Livingston	1	Blackstone Pontiac NW	S1/2 Sect. 6, T29N, R5E, Esmen Twp.
		2	Forrest North Southeast Pontiac	NE1/4 Sect. 26, T27N, R6E, Avoca Twp.
		3	Northwest Pontiac	W1/2 Sect. 36, T29N, R4E, Amity Twp.
		4	Southeast Pontiac	S1/2 Sect. 31, T28N, R6E, Pontiac Twp.
		5	Streator South	N1/2 Sect. 18, T30N, R4E, Newtown Twp.
		6	Streator South Flanagan North	S1/2 Sect. 2, T29N, R3E, Long Point Twp.
		7	Colfax 15'	S1/2 Sect. 32, T25N, R5E, Indian Grove Twp.
		8	Sibley 15'	SW1/4 Sect. 21, T25N, R7E, Chatsworth Twp.
2	McLean	1	McLean	W1/2 Sect. 17, T22N, R1E, Funks Grove Twp.
		2	Gridley Lexington	W1/2 Sect. 4, T25N, R3E, Money Creek Twp.
		3	Holder Bloomington East	E1/2 Sect. 28, T23N, R3E, Oldtown Twp.
		4	Heyworth	E1/2 Sect. 27, T22N, R2E, Randolph Twp.
		5	El Paso	S1/2 Sect. 18, T25N, R2E, Hudson Twp.
		6	Danvers Mackinaw	E1/2 Sect. 31, T25N, R1W, Danvers Twp.
		7	Arrowsmith Holder	SE1/4 Sect. 34, T23N, R4E, Dawson Twp.
2	Stark	1	Wyoming	N1/2 SEct. 26, T13N, R6E, Toulon Twp.
		2	Elmira Wyoming	W1/2 Sect. 11, T13N, R6E, Toulon Twp.

		3	Bradford	SE1/4 Sect. 29, T14N, R7E, Osceola Twp.
		4	Elmira	SE1/4 Sect. 16, T14N, R6E, Elmira Twp.
2	WIII	1	Bonfield	W1/2 Sect. 28, T32N, R10E, Custer Twp.
		2	Wilton Center	SW1/4 Sect. 10, T33N, R11E, Wilton Twp.
		3	Steger	SW1/4 Sect. 1, T34N, R13E, Monee Twp.
		4	Steger Frankfort	NE1/4 Sect. 32, T34N, R13E, WIII Twp.
		5	Dyer	N1/2 Sect. 27, T34N, R14E, Crete Twp.
		6	Dyer	N1/2 Sect. 7, T35N, R15E, Crete Twp.
		7	Essex	W1/2 Sect. 33, T32N, R9E, Reed Twp.
		8	Wilmington	NE1/4 Sect. 15, T33N, R9E, Wilmington Twp.
		9	Channahon	W1/2 Sect. 31, T34N, R10E, Jackson Twp.
		10	Symerton	N1/2 Sect. 8, T33N, R10E, Florence Twp.
		11	Mokena	E1/2 Sect. 27, T35N, R11E, Homer Twp.
3	Fulton			This county is excluded from this list because forest cover is extensive offering deer winter cover throughout the county.
3	Henderson	1	Keithsburg	N1/2 Sect. 1, T12N, R5W, Bald Bluff Twp.
		2	Keithsburg	E1/2 Sect. 11, T12N, R5W, Bald Bluff Twp.
		3	Keithsburg Oquawka	N1/2 Sect. 25, T12N, R5W, Oquawka Twp.
		4	Oquawka	N1/2 Sect. 30, T11N, R4W, Rozetta Twp.

	5	Rozetta	S1/2 Sect. 33, T12N, R4W, Bald Bluff Twp.
	6	Gladstone	S1/2 Sect. 27, T10N, R5W, Gladstone Twp.
	7	Burlington Gladstone	W1/2 Sect. 8, T9N, R5W, Stronghurst Twp.
	8	Burlington	SW1/2 Sect. 23, T10N, R6W, Gladstone Twp.
	9	Stronghurst	S1/2 Sect. 4, T8N, R5W, Terre Haute Twp.
	10	Lomax	W1/2 Sect. 24, T8N, R6W, Terre Haute Twp.
	11	Lomax	N1/2 Sect. 33, T8N, R6W, Lomax Twp.
3		Knox	
	1	Williamsfield	S1/2 Sect. 32, T12N, R4E, Victoria Twp.
	2	Williamsfield	NW1/4 Sect. 18, T11N, R4E, Truro Twp.
	3	Appleton Persifer	N1/2 Sect. 35, T10N, R3E, Persifer Twp.
	4	Williamsfield, Appleton, Yates City, Maquon	S1/2 Sect. 1, T10N, R3E, Haw Creek Twp.
	5	Oneida, Victoria, Appleton	SE Sect. 27, T12N, R3E, Copley Twp.
	6	Appleton	W1/2 Sect. 7, T11N, R3E, Persifer Twp.
	7	Appleton Oneida	S1/2 Sect. 30, T12N, R3E, Copley Twp.
	8	North Henderson	NE1/4 Sect. 6, T12N, R1E, Henderson Twp.
	9	Maquon	E1/2 Sect. 11, T9N, R2E, Chestnut Twp.
	10	DeLong	S1/2 Sect. 36, T10N, R1E, Cedar Twp.
	11	DeLong	N1/2 Sect. 24, T10N, R1E, Cedar Twp.

3	Marshall	1	LaRose	W1/2 Sect. 26, T28N, R1E, Bell Plain Twp.
		2	Rome	N1/2 Sect. 24, T29N, R3W, Richland Twp.
		3	Wenona Varna	N1/2 Sect. 9,, T30N, R1W, Roberts Twp.
3	Mason	1	Biggs	W1/2 Sect. 26, T20N, R8W, Kilbourne Twp.
		2	Biggs	W1/2 Sect. 13, T20N, R8W, Kilbourne Twp.
		3	Duck Island Manito	W1/2 Sect. 27, T23N, R7W, Quilver Twp.
		4	Manito Duck Island	W1/2 Sect. 2, T22N, R7W, Forest City Twp.
		5	Topeka	E1/2 Sect. 14, T21N, R8W, Havana Twp.
		6	Clear Lake Chandlerville	W1/2 Sect. 20, T19N, R10W, Lynchburg Twp.
		7	Easton	S1/2 Sect. 25, T20N, R7W, Crane Creek Twp.
		8	Kilbourne	E1/2 Sect. 23, T20N, R9W, Bath Twp.
3	Mercer	1	New Windsor	N1/2 Sect. 1, T13N, R1W, North Henderson Twp.
		2	Matherville Orion	N1/2 Sect. 17, T15N, R1W, Richland Grove Twp.
		3	Buffalo Prairie	W1/2 Sect. 19, T15N, R3W, Perryton Twp.
		4	Eliza, Blanchard Island	SW1/4 Sect. 5, T15N, R4W, Eliza Twp.
		5	Eliza	E1/2 Sect. 29, T15N, R5W, Eliza Twp.
		6	Joy, Aledo West	NE1/4 Sect. 6, T13N, R4W, Abington Twp.
		7	Aledo West	S1/2 Sect. 10, T13N, R4W, Abington twp.

		8	Joy	N1/2 Sect. 4, T13N, R5W, Keithsburg Twp.
		9	Viola	E1/2 Sect. 1, T13N, R2W, Suez Twp.
3	Peoria	1	Spring Bay	S1/2 Sect. 21, T10N, R8E, Medina Twp.
		2	Spring Bay	W1/2 Sect. 9, T10N, R8E, Medina Twp.
		3	Glasford Pekin	N1/2 Sect. 24, T7N, R6E, Timber Twp.
		4	Glasford	S1/2 Sect. 9, T7N, R6E, Timber Twp.
		5	Oak Hill	S1/2 Sect. 27, T10N, R6E, Jubilee Twp.
		6	Princeville Oak Hill	E1/2 Sect. 9, T10N, R6E, Jubilee Twp.
		7	Dunlap	N1/2 Sect. 28, T10N, R7E, Radnor Twp.
		8	Dunlap Peoria West	S1/2 Sect. 17, T9N, R7E, Kickapoo Twp.
		9	Hanna City Oak Hill	N1/2 Sect. 22, T9N, R6E, Rosefield Twp.
		10	Rome	S1/2 Sect. 22, T11N, R8E, Hallock Twp.
		11	Rome	E1/2 Sect. 11, T11N, R8E, Hallock Twp.
		12	Rome	N1/2 Sect. 9, T11N, R8E, Hallock Twp.
3	Putnam	1	Putnam	S1/2 Sect. 13, T14N, R9E, Senachwine Twp.
		2	Florid, Depue	NW1/4 Sect. 13, T15N, R2W, Hennepin Twp.
		3	McNabb	NE1/4 Sect. 21, T31N, R1W, Magnolia Twp.
		4	Florid	NW1/4 Sect. 1, T31N, R2W, Hennepin Twp.

3	Rock Island	1	Montpellier	N1/2 Sect. 3, T17N, R4W, Buffalo Prairie Twp.
		2	Illinois City Montpellier	E1/2 Sect. 6, T16N, R4W, Buffalo Prairie Twp.
		3	Illinois City	E1/2 Sect. 2, T16N, R5W, Drury Twp.
		4	Montpellier Andalusia	N1/2 Sect. 5, T16N, R3W, Andalusia Twp.
		5	Andalusia Milan	E1/2 Sect. 32, T17N, R2W, Blackhawk Twp.
		6	Eliza Blanchard Island	S1/2 Sect. 29, T16N, R5W, Drury Twp.
3	Tazewell	1	Mackinaw	S1/2 Sect. 2, T24N, R2W, Mackinaw Twp.
		2	Mackinaw	SW1/4 Sect. 33, T25N, R2W, Deer Creek Twp.
		3	Hopedale	NW1/4 SEct. 14, T23N, R3W, Hopedale Twp.
		4	Delavan North	NE1/4 Sect. 16, T23N, R4W, Dillon Twp.
		5	South Pekin Delavan North	S1/2 Sect. 12, T23N, R5W, Sand Prairie Twp.
		6	Washington Pekin East	S1/2 Sect. 9, T26N, R3W, Washington Twp.
		7	Washington Peoria East	S1/2 Sect. 7, T26N, R3W, Washington Twp.
		8	Hopedale	W1/2 Sect. 28, T23N, R3W, Hopedale Twp.
3	Warren	1	Greenbush Roseville	NW1/4 Sect. 15, T8N, R2W, Swan Twp.
		2	Roseville Greenbush	NE1/4 Sect. 8, T8N, R2W, Swan Twp.
		3	Cameron	S1/2 Sect. 19, T11N, R1W, Coldbrook Twp.
		4	Monmouth	NW1/4 Sect. 7, T11N, R2W, Monmouth Twp.

		5	Roseville Raritan	E1/2 Sect. 29, T9N, R3W, Ellison Twp.
		6	Galesburg West, Cameron	W1/2 Sect. 21, T11N, R1W, Coldbrook Twp.
		7	North Henderson, Alexis, Cameron, Galesburg West	NE1/4 Sect. 27, T12N, R1W, Kelly Twp.
		8	Abingdon	NE1/4 Sect. 26, T10N, R1W, Floyd Twp.
3	Woodford	1	El Paso, Secor	S1/2 Sect. 33, T26N, R1E, Palestine Twp.
		2	Secor	SW1/4 Sect. 34, T26N, R1W, Olio Twp.
		3	Secor El Paso	N1/2 Sect. 18, T25N, R1E, Kansas Twp.
		4	Germantown Hills	E1/2 Sect. 11, T27N, R3W, Worth Twp.
		5	Germantown Hills	E1/2 Sect. 27, T28N, R3W, Partridge Twp.
		6	Chillicothe	S1/2 Sect. 14, T28N, R3W, Partridge Twp.
		7	Chillicothe	S1/2 Sect. 2, T28N, R3W, Partridge Twp.
4	Cass	1	Arenzville West	N1/2 Sect. 10, T17N, R12W, Hagener Twp.
		2	Chandlersville Virginia	N1/2 Sect. 24, T18N, R10W, Sangamon Valley Twp.
		3	Chandlersville Virginia	N1/2 Sect. 15, T18N, R10W, Sangamon Valley Twp.
		4	Newmansville	W1/2 Sect. 36, T19N, R9W, Panther Creek Twp.
		5	Ashland, Newmansville, Chandlersville, Virginia	S1/2 Sect. 21, T18N, R9W, Panther Creek Twp.

		6	Arenzville East	NW1/4 Sect. 34, T18N, R11W, Bluff Spring Twp.
		7	Arenzville East	NW1/4 Sect. 20, T17N, R11W, Arenzville Twp.
		8	Arenzville East, Clear Lake	W1/2 Sect. 14, T18N, R11W, Bluff Springs Twp.
		9	Cooperstown Meredosia	W1/2 Sect. 33, T17N, R2W, Hagener Twp.
		10	Clear Lake	SW1/4 Sect. 15, T19N, R11W, Lynchburg Twp.
4	Morgan	1	Lynnville	NW1/4 Sect. 15, T14N, R11W, Road District 6
		2	Concord	NE1/4 Sect. 11, T16N, R11W, Road District 3
		3	Concord	NE1/4 Sect. 27, T16N, R11W, Road District 3
		4	Concord	S1/2 Sect. 3, T15N, R11W, Road District 6
		5	Literberry	N1/2 Sect. 21, T16N, R10W, Road District 2
		6	Prentice, Literberry	W1/2 Sect. 16, T16N, R9W, Road District 1

Area south of Murrayville, Woodson, Franklin and Waverly not included in this survey because of extensive forest cover.

4	Macoupin	Only the NE corner of Macoupin is north of the deer concentration line. There were no concentration areas reported for this limited area.		
5	Champaign	1	Mahomet Rising	NW1/4 Sect. 2, T20N, R7E, Mahomet Twp.
		2	St. Joseph Homer	W1/2 Sect. 31, T19N, R11E, Ogden Twp.
		3	Rankin	S1/2 Sect. 6, T22N, R14W, Kerr Twp.
		4	Thomasboro	SW1/4 Sect. 1, T19N, R9E, Urbana Twp.
5	Christian	1	Taylorville	SE1/4 Sect. 4, T12N, R2W, Johnson Twp.

		2	Kincaid	NW1/4 Sect. 30, T13N, R4W, South Fork Twp.
5	DeWitt	1	DeWitt	S1/2 Sect. 34, T20N, R3E, Harp Twp.
		2	DeWitt	W1/2 Sect. 11, T20N, R3E, Harp Twp.
		3	Maroa	S1/2 Sect. 14, T19N, R2E, Texas Twp.
5	Logan	1	Broadwell	N1/2 Sect. 18, T18N, R3W, Elkhart Twp.
		2	Middletown	SW1/4 Sect. 15, T19N, R4W, Corwin Twp.
		3	Armington	S1/2 Sect. 8, T20N, R2W, Eminence Twp.
		4	Mount Pulaski, Broadwell, Lincoln East, Lincoln West	NW1/4 Sect. 12, T19N, R3W, Broadwell Twp.
5	Macon	1	Friends Creek	S1/2 Sect. 17, T17N, R4E, Whitmore Twp.
5	Menard	1	Oakford	W1/2 Sect. 26, T19N, R8W, Road District 5
		2	Petersburg	N1/2 Sect. 7, T18N, R6W, Road District 4
		3	Salisbury	E1/2 Sect. 6, T17N, R6W, Road District 9
		4	Salisbury, Athens	N1/2 Sect. 34, T18N, R6W, Road District 4
		5	Biggs, Oakford Easton, Petersburg	N1/2 Sect. 3, T19N, R7W, Road District 5
5	Moultrie	1	Sullivan	W1/2 Sect. 16, T13N, R6E, Johnathon Creek Twp.
		2	Lovington	SE1/4 Sect. 29, T15N, R5E, Lovington Twp.
		3	Kirksville	S1/2 Sect. 19, T13N, R4E, Sullivan Twp.

		4	Kirksville Lovington	N1/2 Sect. 31, T14N, R5E, Sullivan Twp.
5	Platt	1	Weldon East, Bement, Monticello, Cerro Gordo	E1/2 Sect. 21, T18N, R5E, Willow Branch Twp.
		2	Monticello	N1/2 Sect. 31, T19N, R6E, Sangamon Twp.
		3	Seymour, Mahomet	NW1/4 Sect. 12, T19N, R6E, Sangamon Twp.
5	Sangamon	1	Athens, Springfield West & East, Williamsville	N1/2 Sect. 3, T16N, R5W, Springfield Twp.
		2	Mechanicsburg, Springfield East	W1/2 Sect. 26, T16N, R4W, Clear Lake Twp.
		3	Salisbury, Farmingdale	NE1/4 Sect. 33, T17N, R6W, Salisbury Twp.
		4	Farmingdale	NE1/4 Sect. 35, T16N, R7W, Cartwright Twp.
		5	Salisbury Farmingdale	S1/2 Sect. 31, T17N, R6W, Cartwright Twp.
		6	New City Edinburg	SE1/4 Sect. 34, T15N, R4W, Rochester Twp.
6	Clark		The area surveyed includes only that portion of Clark County north of I-70.	
		1	Clarksville Marshall	N1/2 Sect. 29, T12N, R12W, Douglas Twp.
		2	Marshall	S1/2 Sect. 22, T12N, R12W, Douglas Twp.
		3	Marshall	SE1/4 Sect. 32, T12N, R11W, Wabash Twp.
		4	Westfield East	SW1/4 Sect. 7, T11N, R13W, Douglas Twp.
		5	Casey Westfield East	N1/2 Sect. 25, T11N, R14W, Parker Twp.

6	Coles	1	Ashmore	S1/2 Sect. 11, T13N, R10E, East Oakland Twp.
		2	Westfield West	N1/2 Sect. 20, T12N, R10E, Hutton Twp.
		3	Westfield West Ashmore	N1/2 Sect. 9, T12N, R9E, Ashmore Twp.
		4	Charleston South	W1/2 Sect. 36, T11N, R9E, Charleston Twp.
		5	Charleston South	E1/2 Sect. 11, T11N, R10E, Hutton Twp.
		6	Oakland	SE1/4 Sect. 21, T14N, R10E, Morgan Twp.
6	Cumberland		Includes only the area north of a line from Neoga to Greenup. From Greenup east to Clark county the area Includes only the area north of I-70.	
		1	Toledo Charlestown South	SW1/4 Sect. 27, T10N, R9E, Cottonwood Twp.
		2	Toledo Union Center	S1/2 Sect. 30, T10N, R10E, Greenup Twp.
6	Douglas	1	Arthur	NE1/4 Sect. 27, T15N, R7E, Bourbon Twp.
		2	Arthur Arcola	N1/2 Sect. 13, T14N, R7E, Bourbon Twp.
		3	Oakland	S1/2 Sect. 35, T15N, R10E, Sargent Twp.
		4	Oakland	N1/2 Sect. 34, T15N, R10E, Sargent Twp.
6	Edgar	1	Paris North	NW1/4 Sect. 5, T15N, R11W, Edgar Twp.
		2	Grandview	W1/2 Sect. 2, T12N, R13W, Grandview Twp.
		3	Paris South	NW1/4 Sect. 5, T13N, R11W, Stratton Twp.
		4	Paris South Sandford	S1/2 Sect. 22, T13N, R11W, Elbridge Twp.
		5	Sandford	N1/2 Sect. 35, T13N, R11W, Elbridge Twp.

		6	St. Bernice	S1/2 Sect. 36, T15N, R11W, Brouillets Creek Twp.
6	Vermillion	1	Potomac	W1/2 Sect. 23, T21N, R13W, Blount Twp.
		2	Collison Danville NW	E1/2 Sect. 36, T21N, R13W, Blount Twp.
		3	Danville NW Collison	W1/2 Sect. 29, T20N, R12W, Blount Twp.
		4	Danville NW Collison	N1/2 Sect. 5, T19N, R12W, Blount Twp.
		5	Danville SE	W1/2 Sect. 14, T18N, R11W, McKendree Twp.
		6	Danville SE	S1/2 Sect. 35, T19N, R11W, Danville Twp.
		7	Oakwood, Danville SW	E1/2 Sect. 19, T19N, R12W, Oakwood Twp.
		8	Humrick	E1/2 Sect. 2, T17N, R11W, McKendree Twp.
		9	Oakwood	S1/2 Sect. 21, T19N, R13W, Oakwood Twp.
7	Shelby		Includes only that portion of the county north of a line bisecting Tower Hill, Shelbyville, Strasburg, and Neoga.	
		1	Tower Hill	N1/2 Sect. 36, T12N, R2E, Rural Twp.
		2	Shelbyville	SW1/4 Sect. 21, T12N, R4E, Okaw Twp.
		3	Middlesworth Kirksville	N1/2 Sect. 13, T12N, R4E, Okaw Twp.
		4	Middlesworth	S1/2 Sect. 30, T12N, R5E, Windsor Twp.

Table 2. Variables used to group Illinois counties by an average linkage clustering method.*

StForest = Forest (Dates variable)

StCorn = Corn (1979)

StSoy = Soybean (1979)

StOWRBS = OWRBS (Oats, wheat, rye, barley, sorghum - 1979)

StHay = Hay (1979)

StOther = Other (Land in pasture, farmstead, and idle acres - 1979)

StKill = Deer Harvest (1983)

StSuccess = Success (% of successful hunters - 1983)

StUrban = Urban (Urban non-federal land area - 1977)

StRural = Rural (Total rural land area - 1977)

StRoads = Roads (Federal and state road area - 1977)

StHpop = Hpop (Human population - 1980)

HuntDen (Number of hunters)

*All variables are standardized by dividing by county area.

Table 3. Table showing the counties in each region determined by grouping at the 1.0 cluster level.

Region	Counties			
1	Adams	Pike		
	Schuyler	Brown		
	Alexander	Calhoun		
	Union	Hardin		
2	Jackson			
3	Jefferson			
	Massac			
	Williamson			
4	Bond	Clay	Marion	Champaign
	Fayette	White	Crawford	Christian
	Macoupin	Montgomery	Wayne	Vermilion
	Richland	Hamilton	Jasper	Coles
	Franklin	Edgar	Shelby	DeKalb
	Mason	Wabash	Menard	Kendall
	Morgan	Gallatin	Clark	LaSalle
	Cumberland	Lawrence	Effingham	McLean
	Cass	Fulton	Greene	Grundy
	Scott	Saline	Edwards	DeWitt
	Jersey	Hancock	Henderson	Douglas
	Knox	Mercer	McDonough	Logan
	Putnam	Monroe	Randolph	Ford
	Perry	Pulaski	Boone	Livingston
	Ogle	Whiteside	Henry	Platt
	Bureau	Lee	Woodford	Iroquois
	Marshall	Stark	Warren	Moultrie
5	Kankakee	Macon	Madison	
	Sangamon	Tazewell		
	McHenry	Peoria		
6	Clinton	Washington		
7	Carroll			
8	Stephenson			
9	JoDaviess	Johnson		
10	Rock Island			
11	Will	Winnebago		
12	StClair			
13	Pope			

Table 4. The number of "1st choice" permits issued in 1985 and projected for 1990. The projections are based on data from the period 1980-1984. This demand for permits does not include free and paid landowner permits or "special area" permits.

Region	1984	1989	% Increase
1	8,097	12,733	57
2	6,378	9,775	53
3	10,940	13,597	24
4	8,520	13,942	64
5	3,026	6,420	112
6	4,703	10,740	128
7	14,612	28,913	98
8	14,196	17,942	26
Total	70,472	104,637	48

Table 5. Estimated pre-hunt deer populations and known fall deaths on the Platt County Study Area, 1981-1983.

	Fall 1981		Fall 1982	Fall 1983		Fall 1984
	Estimate ^a	Estimate ^b	Estimate ^a	Estimate ^a	Estimate ^b	Estimate ^b
	106	132	170	179	186	242
Known Mortality	27	27	37	40	40	71
% of Est. Fall Pop.	25	20	22	22	21	29

^a Aerial counts in late fall plus known fall deaths.

^b Calculated from simulated fall sex and age structure and the number of yearling-adult females calculated from spotlight counts of radio marked females.

Table 6. Known deer mortalities on the PCSA from 1 July 1984 through 30 June through 30 June 1985.

Sex and Age	Cause of Death					Total
	Shotgun	Archery	Poach	Auto	Misc.	
	Number of Deer					
Fawn male	5	2	5	0	1	13
Fawn female	3	1	2	0	1	7
Fawn sex unknown	-	-	-	-	-	4
Yearling male	5	6	1	3	0	15
Yearling female	5	3	2	1	0	11
Adult male	3	1	1	1	0	6
Adult female	6	4	1	2	0	13
Adult cripples sex unknown (likely died)	-	2	-	-	-	2
Totals	27	19	12	7	2	71

Table 7. Crippling losses of deer attributed to shotgun and archery hunters on the 7,100-acre Platt County Study Area.

Sex and age	Number of deer available		Legal kill		Deer lost as cripples		Percent of legal kill crippled and lost	
	gun season	archery season	gun season	archery season	gun season	archery season	gun season	archery season
Radio Marked Deer								
Adult males	10	10	5	0	2	0	40	0
Adult females	19	19	5	0	3	1	60	100
Yearling males	7	9	1	0	0	2	0	200
Yearling females	14	14	3	1	1	0	33	0
Subtotals	50	52	14	1	6	3	43	300
Other Marked Deer								
Adult males	7	8	5	2	0	0	0	0
Adult females	18	19	5	0	2	2	40	0
Yearling males	19	25	8	7	2	0	25	0
Yearling females	16	17	3	1	1	0	33	0
Subtotals	60	69	21	10	5	2	24	20
Grand totals	110	121	35	11	11	5	31	45

Table 8. Fawn production from marked females on the PCSA in 1984. Fawn counts represent fawns alive on 1 October 1984, the beginning of archery deer hunting.

Age at Breeding	Number of marked deer	Number Breeding	Percent Breeding	Number of fawns per Breeding Doe	Number of fawns for all does
Fawn	11	5	45	1.4	0.6
Yearling	6	6	100	1.8	1.8
Adult	27	27	100	1.9	1.9
Totals	44	38	86	1.6	1.4

Table 9. Dispersal and migratory behavior shown by deer marked on the PCSA, 1980-1984.

Age when marked	Sex	Number marked	Number dispersing ^a	Number migrating ^b	% migrating or dispersing
Fawn	male	94	52	11	67
	female	60	30	2	53
Yearling	male	13	0	2	15
	female	32	6	7	41
Adult	male	12	1	2	25
	female	26	2	8	38

^a Deer who leave the study area and never return.

^b Deer who leave the study area, usually in the spring, and return the following fall or winter.

Original
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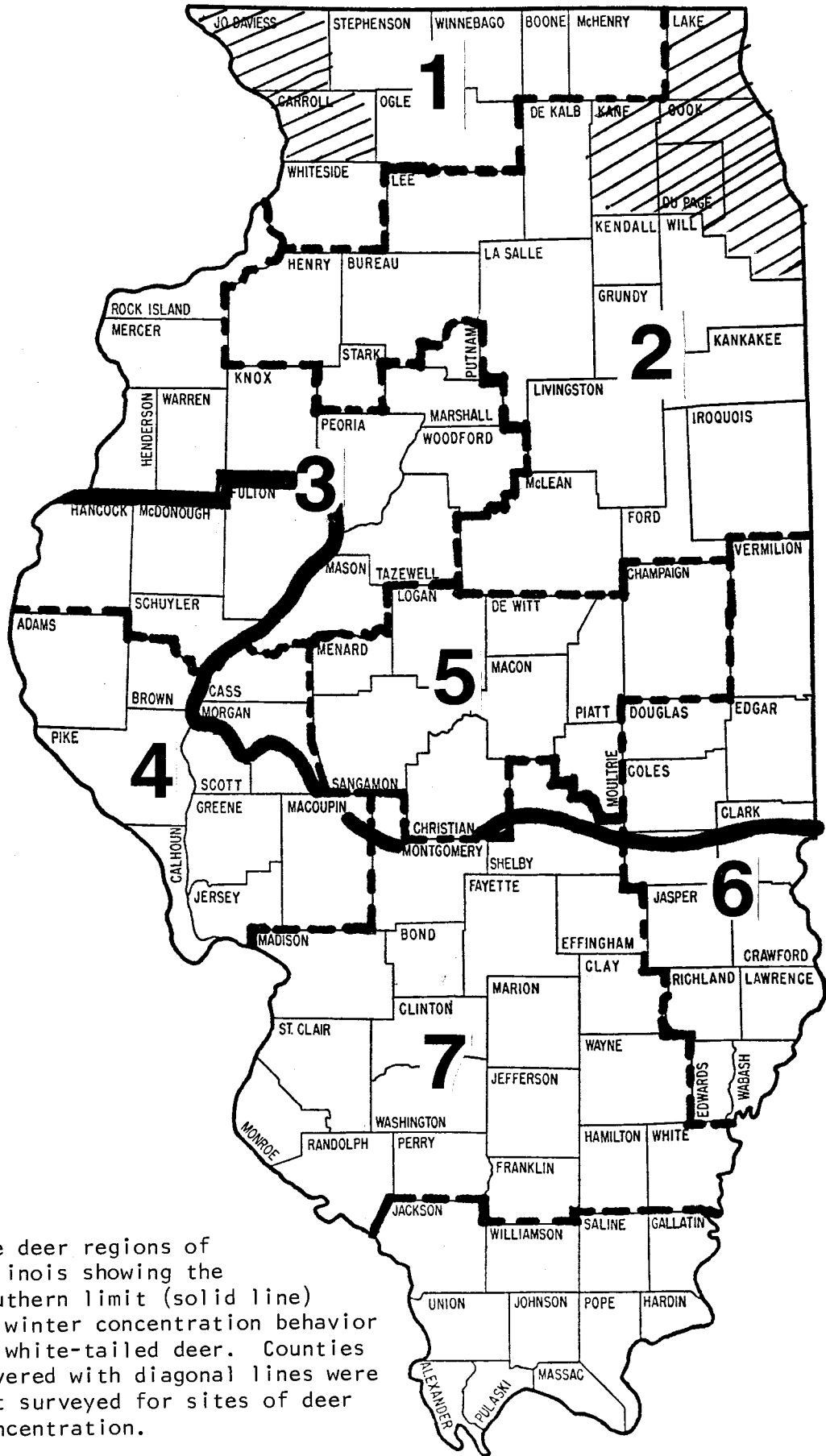
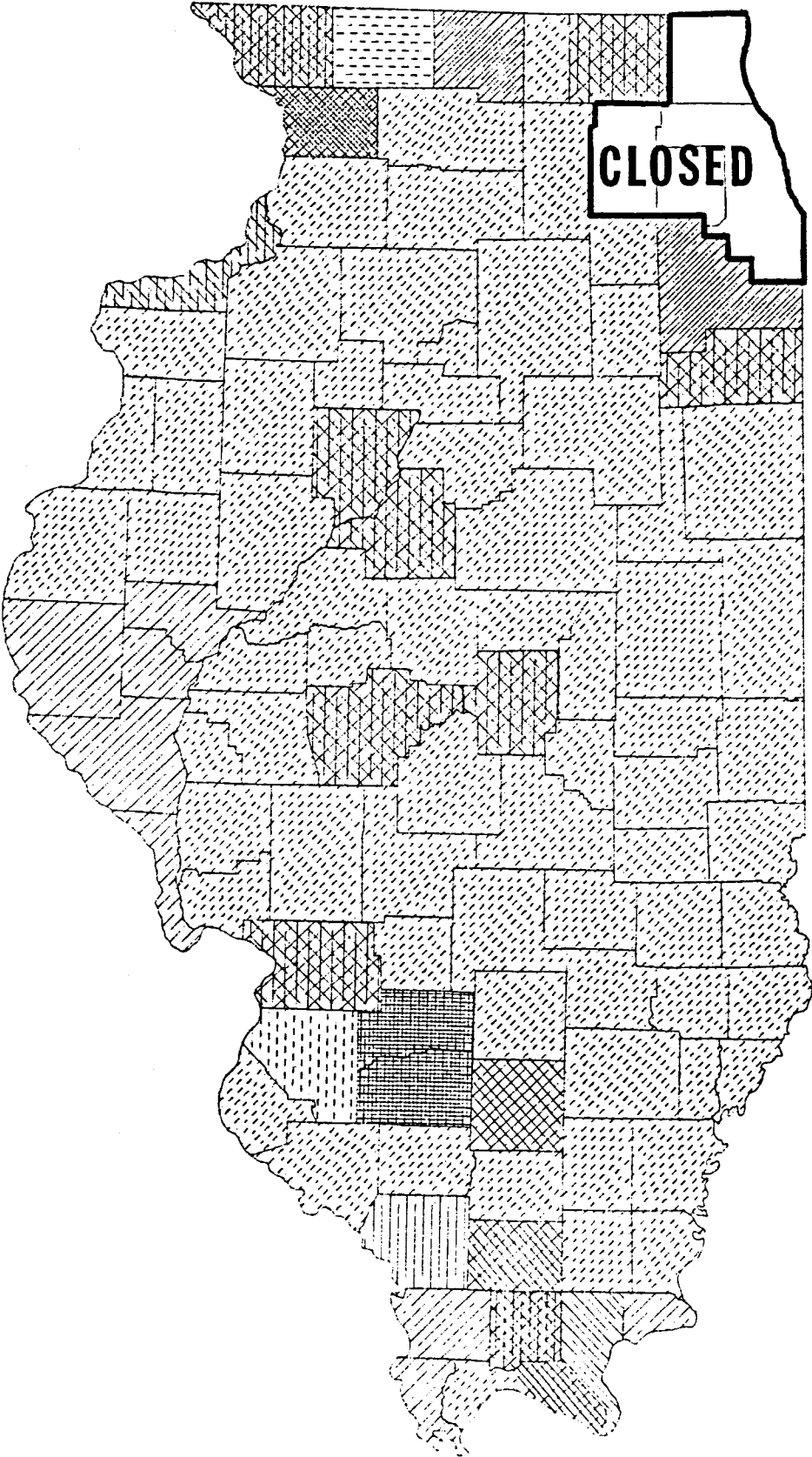


Figure 1. The deer regions of Illinois showing the southern limit (solid line) of winter concentration behavior by white-tailed deer. Counties covered with diagonal lines were not surveyed for sites of deer concentration.

Figure 2. Map of Illinois showing the 13 deer regions grouped at the 1.0 cluster level.



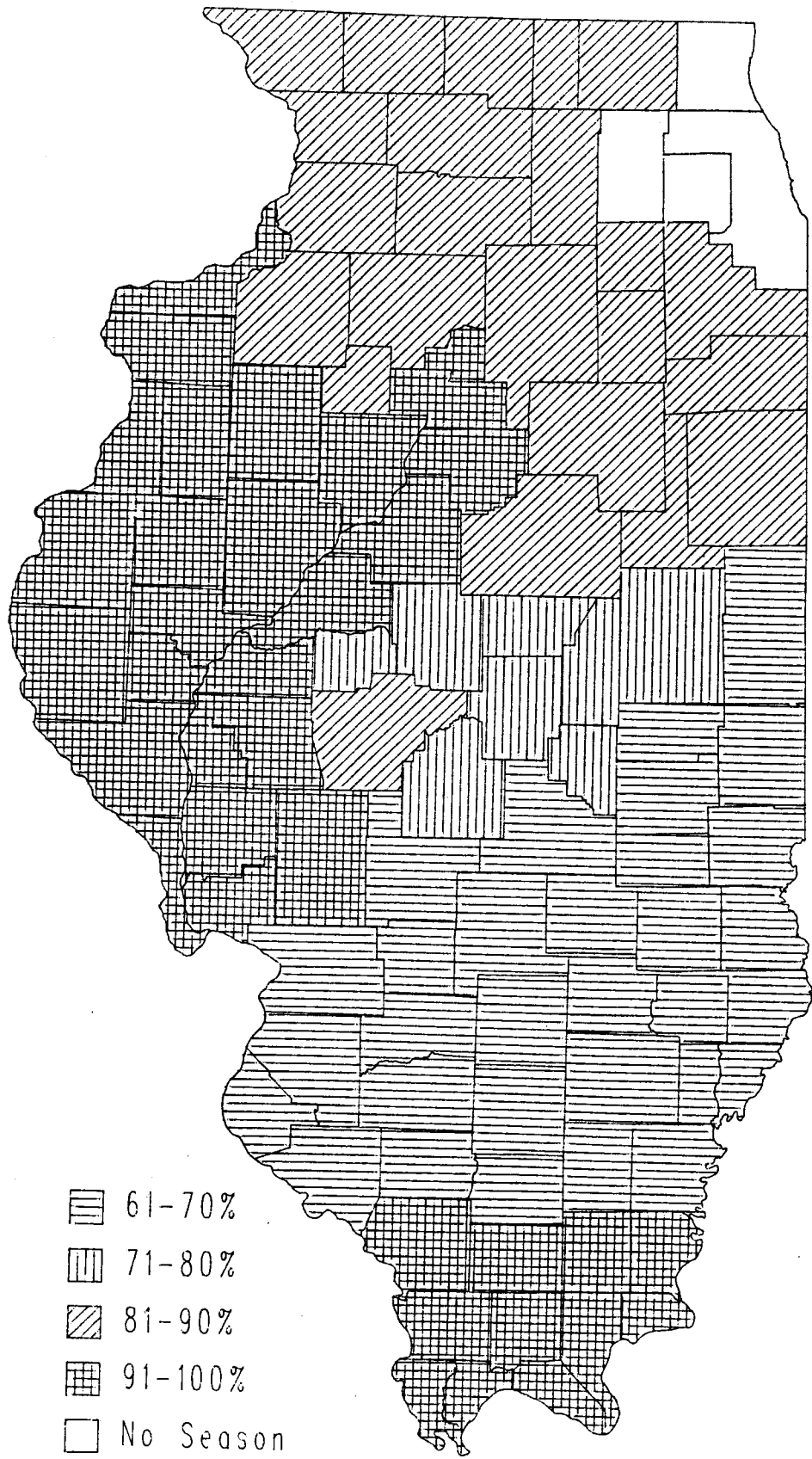


FIGURE 3. Percent of "first choice" requests for shotgun deer permits satisfied in the deer management regions of Illinois

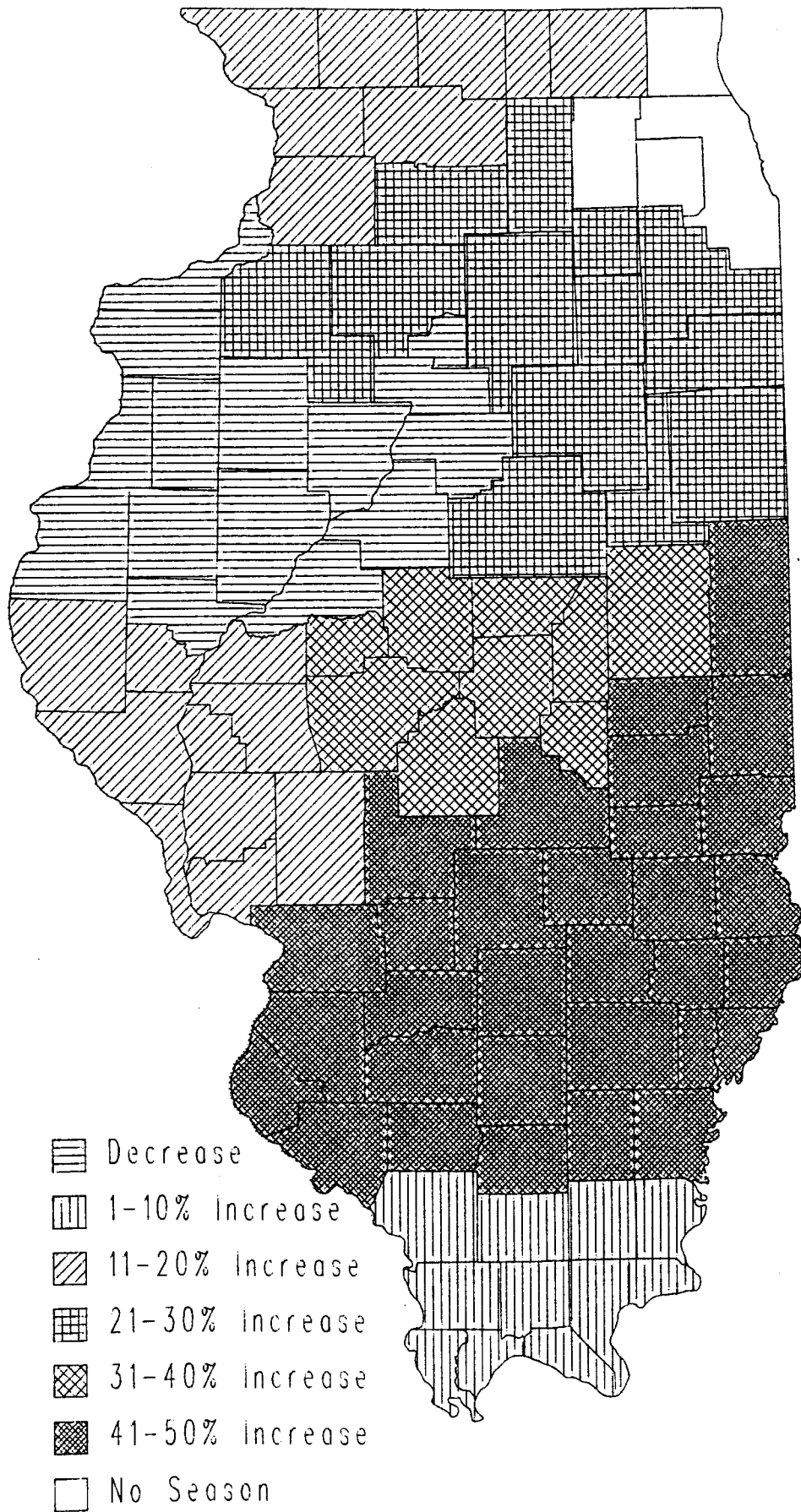


Figure 4. Percent change in distribution of gun permits to hunt deer in Illinois under the proposed limited "any deer" with unlimited "antlered only" season.

Figure 5. Simulated population response to 2 proposed harvest schemes. Under Scheme 1 a limited number of "any deer" permits would be issued with all other requests provided with "antlered only" permits. Under Scheme 2 an unlimited number of "any deer" permits would be issued.

