Legal Game Harvest by Indiana Landowners Hunting without a License

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Monitoring the harvest of game animals is important to wildlife management agencies. Annual harvest figures provide information on the population status and distribution of game species and the popularity of various game species to sportsmen. This information can then be used by natural resources agencies to guide management efforts.

Indiana state law requires all hunters to purchase a license to take game within the framework of established seasons and regulations. Landowners and tenants who hunt solely on their own land are exempt from purchasing a license but are still bound by hunting regulations. Surveying licensed hunters to determine game harvest is relatively straightforward because names and addresses can be obtained from receipt books maintained by vendors selling hunting licenses. The Indiana Division of Fish and Wildlife samples licensed hunters annually in this manner to determine game harvest. Determining harvest by unlicensed hunters is more difficult but is necessary to obtain more accurate estimates of the total harvest.

This paper reports on the relative contribution of unlicensed landowners to the game harvest during the 1981 hunting season in Indiana. Unlike the survey of licensed hunters which was initiated in the 1940s and has been conducted annually in its present form since 1976 (Eisenhauer 1977a), the landowner survey is conducted at 5-year intervals with the first beginning in 1976 (Eisenhauer 1977b). Besides providing harvest estimates, the present survey gives information about the willingness of landowners to allow hunting on their land.

Methods

Landowners surveyed were selected from a list of 73,000 farm operators maintained by the Agricultural Experiment Station at Purdue University in cooperation with the Statistical Reporting Service of the United States Department of Agriculture. This list contains farms with minimum annual sales of $1,000 in agricultural products. There were approximately 89,000 farms in Indiana in 1981 (United States Department of Agriculture 1982). A survey form was mailed to 12,196 Indiana landowners and tenants. The 1976 landowner survey utilized a single mailing, so a similar procedure was used in the present survey to maintain conformity. The postcard survey form contained 8 questions dealing with land ownership, hunting by family members, and whether hunting for small game and white-tailed deer (*Odocoileus virginianus*) was allowed by the landowner (Castrale and Pfingsten 1982). A table was provided to record animal harvest by species for each family member who hunted without a license on their property.

Because sportsmen typically overestimate their harvests (Atwood 1956, Eisenhauer 1977c, Filion 1980), bias correction factors derived from a previous study (Pfingsten 1980) were used to arrive at final harvest estimates. Correction factors used were as follows: squirrels (*Sciurus niger, S. carolinensis*), 0.588; eastern cottontail (*Sylvilagus*

floridanus), 0.543; northern bobwhite (*Colinus virginianus*), 0.469; ring-necked pheasant (*Phasianus colchicus*), 0.738; American woodcock (*Scolopax minor*), 0.471; and ruffed grouse (*Bonasa umbellus*), 0.812. Correction factors for white-tailed deer are calculated annually and for 1981 this figure was 0.832 (John C. Olson, personal communication).

Statistical treatments included chi-square goodness-of-fit tests, chi-square tests for independence and Spearman rank correlation coefficients.

Results and Discussion

Of 12,196 questionnaires mailed to farm operators, 3,095 (25.4%) were returned and usable and form the basis of this report. Participation in hunting by farm households showed a slight (37% vs. 34%) but significant (X^2 = 8.49, df = 1, P <0.05) increase over the previous survey (Eisenhauer 1977b). Hunting households averaged 1.69 hunters in 1981. The number of households reporting hunting exclusively on their own land without purchasing a license also showed a significant increase (21% vs 15%, X^2 = 34.61, df = 1, P<0.001) in 1981 over 1976. Households averaged 1.44 unlicensed hunters. Projecting these figures, hunting landowners numbered 55,865 or 20% of Indiana sportsmen who pursued deer and small game and 10% (27,562) of the state's estimated 283,682 deer and small game hunters were landowners hunting without a license.

Squirrels and eastern cottontails were the most commonly hunted game species (Table 1). These mammals also experienced the highest seasonal harvests per landowner which resulted in the greatest total harvests of all species. Squirrels and rabbits were also popular with licensed hunters (Rolley 1984), however, so the contribution of landowners to the total harvest of these species was actually the least of all species (Table 1). White-tailed deer were also frequently hunted by landowners, but the total kill was much lower than most other species due to more restrictive bag limits. American woodcock and ruffed grouse were of least interest to landowners, although the proportional harvest of woodcock was high.

Landowners not purchasing a hunting license appeared to be less avid, or less experienced hunters than licensed sportsmen. With the exception of deer, seasonal harvests by landowners for each species averaged 65% (range = 58-82%) below licensed hunters, assuming each household represented 1.44 hunters. The mean number of white-tailed deer taken by landowners was higher than that of licensed hunters (Olson 1981), which indicates more interest in deer, or possibly a more utilitarian attitude toward sport hunting. Landowners more interested in hunting may buy a license in order to increase their hunting opportunities or to contribute to the management of wildlife

TABLE 1. Harvest statistics by landowners and tenants hunting only on their own property during the 1981-1982 hunting season in Indiana.

Species hunted	Harvest by landowners (no. ± SE)	State harvest accounted for by landowners (%)	Landowners hunting (%)	Seasonal harvest (no./landowner)	Seasonal harvest (no./ licensed hunter)[a]
Squirrels	45,515 ± 4,049	4.5	15.5	3.30	5.59
Eastern cottontail	33,384 ± 2,699	4.9	19.5	1.92	3.39
Northern bobwhite	6,452 ± 620	6.6	7.2	1.01	1.66
American woodcock	2,357 ± 521	11.8	4.2	0.62	1.35
White-tailed deer	2,250 ± 264	12.4	11.4	0.27	0.14
Ring-necked pheasant	1,610 ± 429	7.3	5.4	0.34	0.66
Ruffed grouse	1,197 ± 407	5.0	3.7	0.37	1.42

[a]From Rolley (1984) and Olson (1981).

resources. Therefore, unlicensed hunters may hunt less often. Persons who purchase a license may be more motivated to hunt even if they restrict their efforts to their own property.

Changes in the harvests of deer and some small game species have been dramatic between survey periods (Eisenhauer 1977b). The harvest of ruffed grouse has shown the greatest increase (greater than an order of magnitude) since 1976. This species has undergone natural range expansion supplemented by the establishment of new populations by transplanting (Backs 1984). Hunting opportunities for ruffed grouse have also increased with 13 counties open to hunting in 1981 compared with 9 in 1976. Grouse hunting in Indiana is a relatively young sport, and its popularity is rapidly increasing. The estimated harvest of American woodcock by unlicensed hunters has almost tripled, although harvests by licensed hunters have declined about 50% between comparable years. Deer populations have increased in recent years (John C. Olson, personal communication), and the estimated number of white-tailed deer killed by landowners doubled over 1976. Declines in the kill of northern bobwhite and ring-necked pheasants are evident, and have been blamed on reduced populations due to unfavorable winters in the late 1970s as well as to loss of habitat. The harvest of squirrels have shown a substantial increase, while fewer rabbits were taken by landowners hunting without a license.

Harvest figures show regional differences (Table 2) which are primarily due to the relative abundance and distribution of each game species in the state. Tree squir-

TABLE 2. Regional distribution of game harvest by landowners hunting on their own property. Values given are percentages of total harvest for each species.

	Region					
	Northwest (425)[a]	Northeast (721)	Central (609)	Southwest (351)	South-central (445)	Southeast (528)
Landowners responding (3,094)[a]	13.8	23.4	19.9	11.4	14.4	17.1
Non-licensed hunters (897)	10.6	25.3	13.5	12.2	17.7	20.7
Species harvested						
Squirrels (2,519)	6.4	15.6	6.0	10.1	39.2	22.6
Eastern cottontail (2,003)	11.0	19.7	8.6	19.4	25.6	15.8
Northern bobwhite (448)	14.5	2.5	3.1	47.8	20.8	11.4
White-tailed deer (88)	12.5	29.5	4.5	5.7	23.9	23.9
American woodcock (163)	8.0	54.6	14.1	6.7	4.9	11.7
Ring-necked pheasant (71)	43.7	0.0	28.2	1.4	8.5	18.3
Ruffed grouse (48)	0.0	0.0	25.0	0.0	52.1	22.9

[a]Sample size.

rels are more common in the forested areas of southern Indiana. Changes in the regional harvests of northern bobwhite reflect more severe declines suffered by this species in northern Indiana (Castrale 1985). White-tailed deer populations are traditionally greatest in south-central Indiana, but northeastern and southeastern populations appeared to have increased. Complaints of deer damage to agricultural crops received by the Division of Fish and Wildlife have become common from these areas. Ring-necked pheasants are still principally harvested in the Northwest, but declines in this region as well as the Northeast are apparent. Releases of pheasants by conservation clubs and individuals throughout the state may help explain patterns of harvest in other areas. Ruffed grouse are no longer being harvested strictly from south-central Indiana due to the opening of other areas to grouse hunting.

Hunting of small game was allowed by 76% of the landowners responding but only 51% permitted deer hunting. This category of response was the major reason for the highly significant difference (X^2 = 455, df = 3, $P<0.001$) in the patterns of the permission categories for allowing hunting of deer and small game. Whether or not hunting is allowed on a landowner's property is related to the amount of property owned (Figures 1, 2). Large farm operators are more likely to allow hunting of both deer (rho = 0.88, df = 6, $P<0.001$) and small game (rho = 0.94, df = 6, $P<0.001$). With increasing farm size, landowners were more likely to allow small game hunting by others (rho = 0.88, df = 6, $P<0.001$) and were more likely to hunt deer themselves or allow friends of the family to hunt deer (rho = 0.88, df = 6, $P<0.001$).

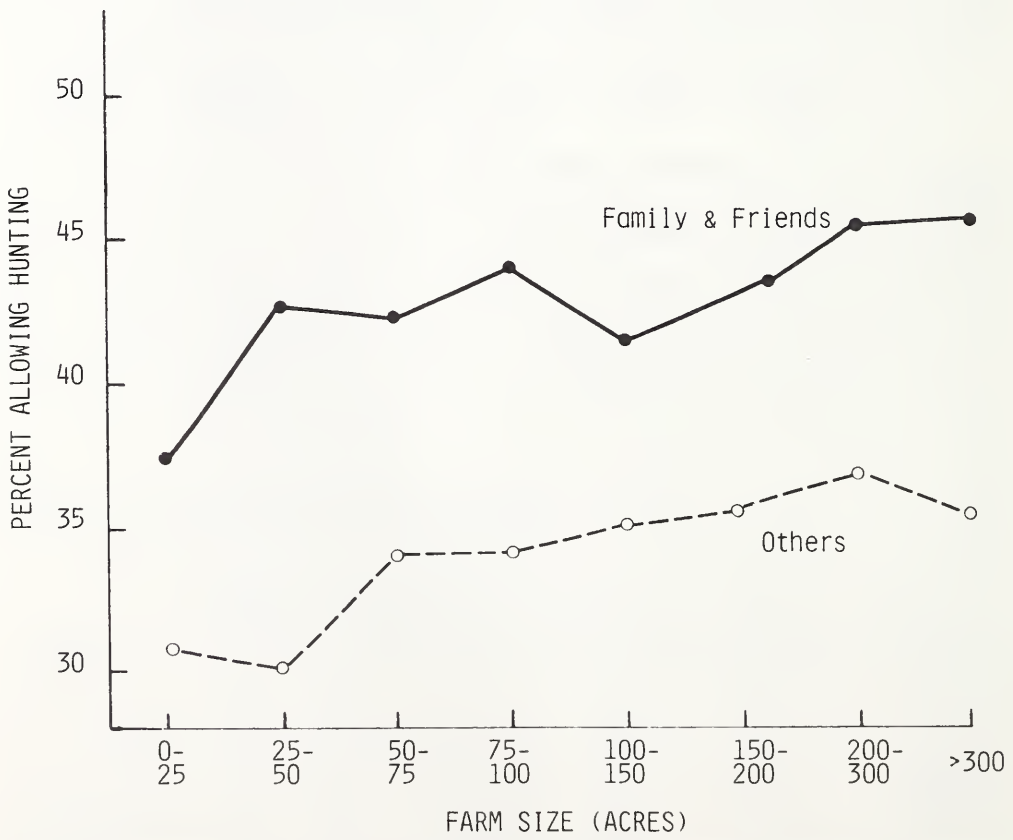

FIGURE 1. Relationship of farm size with percentage of sampled landowners allowing small game hunting by family and friends and other hunters.

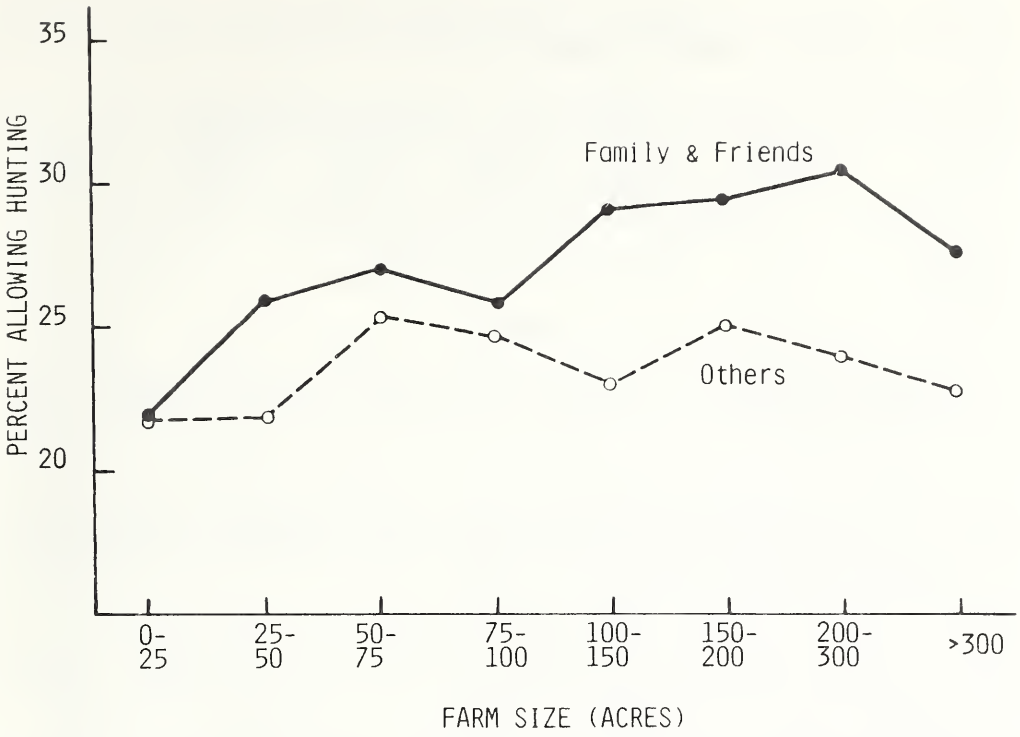

FIGURE 2. Relationship of farm size with percentage of sampled landowners allowing deer hunting by family and friends and other hunters.

Regional differences existed in a landowner's willingness to allow hunting of deer (Table 3; $X^2 = 213$, df = 10, $P<0.001$) and small game (Table 4; $X^2 = 65$, df = 10, $P<0.001$) on their property. Differences for deer hunting were primarily due to a liberal hunting attitude by northeastern Indiana landowners and a restrictive attitude by farm operators in central Indiana. A similar pattern is shown for small game hunting with northwestern and central regions showing the fewest relative opportunities for hunting. It is unclear why these regional differences exist.

Acknowledgments

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TABLE 3. Landowner's willingness to allow white-tailed deer hunting on their property. Values given are percentages of total responses by region.

Hunting permission response	Region					
	Northwest (421)[a]	Northeast (715)	Central (599	Southwest (350)	South-central (441)	Southeast (524)
No hunting	58.7	32.4	69.3	43.4	45.1	50.2
Family and friends only	25.2	34.3	17.0	29.4	24.3	30.7
Permission needed	13.8	27.1	11.4	20.3	22.4	15.6
Unrestricted	2.4	6.2	2.3	6.9	8.2	3.4

[a]No. landowners responding.

TABLE 4. Landowner's willingness to allow small game hunting on their property. Values given are percentages of total responses by region.

Hunting permission response	Region					
	Northwest (425)[a]	Northeast (721)	Central (609)	Southwest (351)	South-central (445)	Southeast (528)
No hunting	30.1	19.8	31.4	19.7	19.1	21.4
Family and friends only	44.9	40.5	40.1	44.4	42.0	46.4
Permission needed	22.1	33.6	25.8	30.8	31.9	28.8
Unrestricted	2.8	6.1	2.8	5.1	7.0	3.4

[a]No. landowners responding.

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