

EFFECTS OF HUNTING ON RUFFED GROUSE POPULATIONS IN SMALL WOODLOTS IN ASHE AND ALLEGHANY COUNTIES, NORTH CAROLINA

by

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ABSTRACT

Nine woodlots were selected in Ashe and Alleghany counties, North Carolina, to study grouse populations from 1969 to 1972 relative to the effects of hunting pressure in habitat characteristic of small woodlots.

The nine study areas were divided equally into the categories of control, regulated and unregulated hunting areas. Pre-hunting season and post-hunting season population levels were estimated by flushing censuses. Numbers of flushes and kills during bi-weekly hunting on the three regulated areas were recorded. Bi-weekly bird dog hunting on the regulated hunting areas yielded hunter hours per kill of 31.5, 28.0 and 63.0+ respectively for the 1969-1971 hunting seasons. Personal contacts with landowners and sportsmen were used to estimate the kill on the unregulated hunting areas. The three year average recruitment rates from post-season to following pre-season periods on control, regulated and unregulated hunting areas were 57.5 percent, 68.8 percent and 37.5 percent respectively. The results of the three year study indicate that hunting pressure has no detectable adverse effect on ruffed grouse populations in small woodlots from fall to fall. This conclusion is supported by the high number of hunter hours per kill which demonstrates a low vulnerability of grouse to hunting pressure. Observed avoidance movement patterns of grouse in response to flushing and gunning pressure and high population recruitment rates also indicate the ability of grouse to cope with heavy hunting pressures.

INTRODUCTION

It has been demonstrated by numerous research studies throughout ruffed grouse range in North America that hunting pressure has little effect on grouse populations. Madson (1969) stated, however, that during cyclic lows, special consideration may be given to farming areas where woodlots are relatively small and isolated, and where the grouse breeding stock is more accessible and vulnerable to gunning than in larger forest areas.

Several North Carolina mountain counties are characterized by small isolated woodlots. This study was initiated to determine trends of grouse populations in woodlots and their relationship to hunting pressure. Woodlots in Ashe and Alleghany counties, North Carolina, were selected for this study. Farming and grazing practices over the years has resulted in the conversion of a large percentage of the forestland to pastureland (Figure 1). As a result a considerable percentage of the remaining forested area in Alleghany and Ashe counties is a patchwork of woodlots surrounded by pastureland.

The purpose of this study was to evaluate the effects of hunting pressure on ruffed grouse populations in woodlots. If grouse native to isolated woodlots are more vulnerable to hunting, then more restrictive hunting regulations would be appropriate. Conversely, if hunting has a nominal effect on grouse populations in woodlots, then liberalized regulations to more fully utilize this recreational resource would be in order.

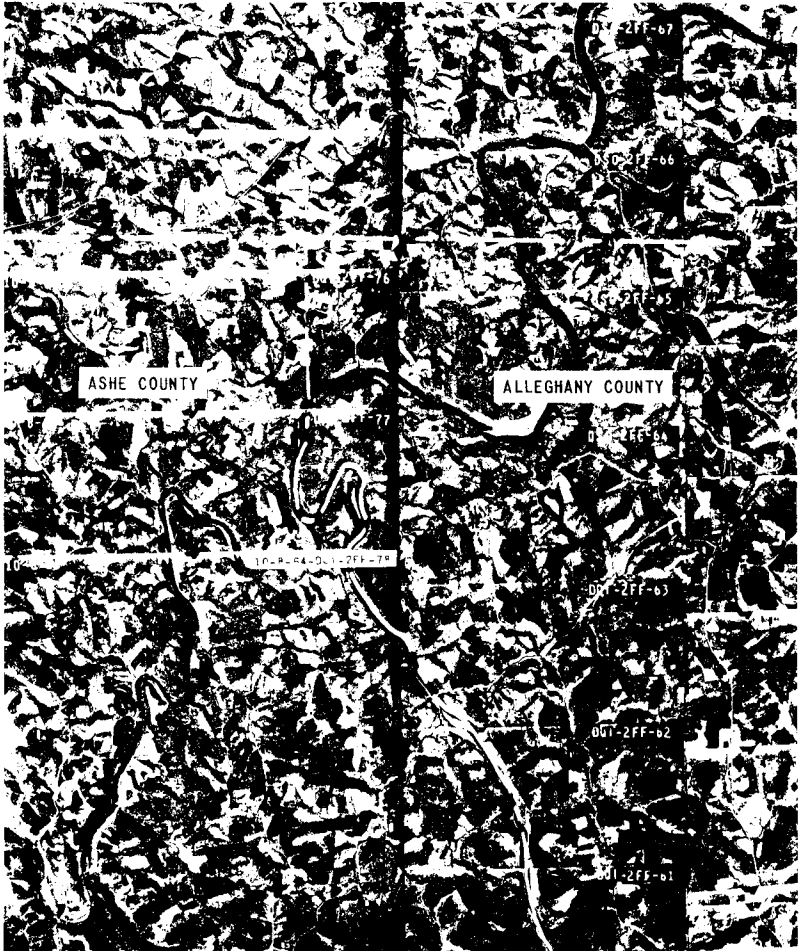


Figure 1. Aerial Photograph Depicting Woodlot Situation Typical of the Study Area in Ashe and Alleghany Counties, North Carolina.

STUDY AREA

The study was conducted in Alleghany and Ashe counties, North Carolina, in the northwest corner of the state. The topography of the study area is mountainous, and the vegetation consists basically of mixed hardwoods and conifers with laurel and rhododendron thickets.

Nine study areas, averaging in size from 20 to 35 acres, were selected over the two counties. Three areas were open to uncontrolled public hunting; three areas were subjected to regulated hunting pressure; and three areas were closed to hunting to serve as controls.

METHODS

Two pre-hunting season (mid-November) and two post-hunting season (mid-February) flushing censuses were conducted on each of the nine areas during the November 1969 to February 1972 period by thirteen project personnel and one temporary laborer with two bird dogs.

Bird dog hunting and flushing censuses were conducted bi-weekly on the three regulated hunting areas throughout the mid-November 1969 to mid-February 1972 open hunting seasons.

The data compiled from this survey were analyzed to determine population trends of grouse populations in woodlots subjected to varying levels of hunting pressure.

FINDINGS

Total Forest Area Versus Woodlots

The total land area in Alleghany County is composed of 147,200 acres with 47 percent or 69,400 acres in forest. Of the forested area, 20.9 percent of 14,544 acres is composed of woodlots 35 acres or less in size. The total land area in Ashe County is composed of 273,300 acres with 56 percent or 150,600 acres in forest. Of the forested area, 12.7 percent or 19,176 acres is composed of woodlots 35 acres or less in size. The prevalence of woodlots in these counties make them ideal for studying grouse populations under these woodlot circumstances.

Grouse Movements and Population Trends

The results of the pre-season and post-season grouse flushing censuses are presented in Table 1.

Differences were noted between the two consecutive day pre- and post-hunting season flushing censuses on the same areas. In most cases the first flushing

WOODLOT NUMBER	HUNTING PRESSURE	1969-1970		1970-1971		1971-1972		GRAND TOTAL	
		PRE-SEASON (November)	POST-SEASON (February)	PRE-SEASON (November)	POST-SEASON (February)	PRE-SEASON (November)	POST-SEASON (February)	PRE-SEASON (November)	POST-SEASON (February)
1	None	3	1	2	1	2	4	7	6
4	None	4	1	2	2	3	1	9	4
7	None	3	2	3	2	2	0	8	4
Subtotal		10	4	7	5	7	5	24	14
2	Biweekly	5	5	12	3	4	1	21	9
5	Biweekly	3	3	3	1	2	1	8	5
8	Biweekly	0	0	0	0	0	0	0	0
Subtotal		8	8	15	4	6	2	29	14
3	Unrestricted	2	1	0	0	0	2	2	3
6	Unrestricted	0	0	0	0	0	0	0	0
9	Unrestricted	1	0	1	1	4	4	6	5
Subtotal		3	1	1	1	4	6	8	8
Grand Total		21	13	23	10	17	13	61	36
Grand Mean (1969-1972)								20.3	12

Table 1. Numbers of Grouse flushed in pre- and post-season censuses on small woodlots in Ashe and Alleghany counties, North Carolina. 1969-1972

census yielded a greater number of birds than the second census on the same area. In a few cases, however, the reverse was true. These differences can be explained, in part, by natural movements of birds to and from the woodlots during varying weather conditions, and in their response to previous flushing. Therefore, the greater of the two consecutive census figures on each woodlot was used as the estimate of the number of birds utilizing the woodlot during the census period.

It was noted that several of the birds flushed during the censuses temporarily left the woodlots to secure more extensive cover. The two consecutive censuses, during both pre-season and post-season periods, were spaced one to two days apart. Nevertheless, it was apparent in many cases, from the greater number of birds flushed on the first census, that several birds had not returned to the woodlots by the time of the second census.

The frequency at which grouse leave the woodlots when flushed is regulated mainly by the degree of disturbance and the amount of available cover. Some birds left the woodlots on the first flush while others flushed several times before leaving the areas. The total number of flushes in relation to the number of birds leaving was used in determining the percent frequency at which grouse left the three types of woodlots when flushed during pre-season, season and post-season periods. The frequencies at which grouse left the three types of woodlots when flushed during different census periods are presented in Table 2. The results show that birds tended to leave all types of woodlots more frequently when flushed during pre-season periods than at post-season periods. Combining the 1969-70, 1970-71 and 1971-72 pre-season census figures shows that flushed birds left the control, regulated, and uncontrolled hunting areas at the rates of 12.2 percent, 21.7 percent and 6.7 percent of the time, respectively. Combining the 1969-70, 1970-71 and 1971-72 post-season census figures shows that flushed birds left the control, regulated, and uncontrolled hunting areas at the rates of 4.0 percent, 17.4 percent and 0 percent of the time, respectively. Bi-weekly bird dog hunting and flushing censuses during the season resulted in the birds leaving the woodlots with regulated hunting 27.9 percent of the time when flushed. This increase over both pre-season and post-season periods may be explained by the added disturbance of gunning in addition to flushing.

During the 1969-70 censuses, the control and uncontrolled hunting woodlots showed population decreases of 60 percent and 67 percent, respectively, from pre-season to post-season periods. Only one kill was reported during the 1969-70 season in all the woodlots with uncontrolled hunting combined. Furthermore, this kill was made on woodlot number 6 which produced no flushes during both

LEVEL OF HUNTING PRESSURE	TOTAL NUMBER OF FLUSHES			NUMBER LEAVING WOODLOTS			PERCENT LEAVING WOODLOTS		
	PRE-SEASON	SEASON	POST-SEASON	PRE-SEASON	SEASON	POST-SEASON	PRE-SEASON	SEASON	POST-SEASON
Control	41	no data	25	5	no data	1	12.2	-	4.0
Regulated	46	43	23	10	12	4	21.7	27.9	17.4
Uncontrolled	15	no data	15	1	no data	0	6.7	-	0.0
Combined	102	43	63	16	12	5	15.7	27.9	7.9

Table 2. Frequency at which Grouse leave woodlots when flushed during pre-season, season and post-season periods during the 1969-70, 1970-71 and 1971-72 flushing censuses combined.

pre-season and post-season periods. The woodlots with regulated hunting, however, showed no change in population in spite of two birds being killed by hunters during the season and one observed predator kill. These instances further substantiate the previously described movements of grouse to and from the woodlots.

The 1970-71 censuses showed population decreases on control and regulated hunting woodlots of 29 percent and 73 percent, respectively, from pre-season to post-season periods. A part of the population decrease on control areas was accounted for by one observed predator kill and another bird which had flown into a fence. Hunting mortality had only a minor affect on the 73 percent population decrease on the regulated hunting areas. Only two birds were harvested, one was crippled, and there was one observed predator kill adjacent to regulated woodlot number 2. Known hunting and natural mortality combined accounted for only 27 percent of the population decrease. Natural movements would most likely account for the remaining 46 percent decrease. The woodlots with uncontrolled hunting pressure showed no change in population, and no kills were reported.

The 1971-72 censuses showed population decreases on control and regulated hunting woodlots of 29 percent and 67 percent, respectively, from pre-season to post-season periods. Natural mortality, predation and movement of birds are the factors accounting for the decline in population on control areas. The same factors are attributed to the population decrease on regulated hunting areas, since no kills were made by hunters. Converse to these decreases, the uncontrolled hunting woodlots showed a 50 percent population increase from pre-season to post-season periods despite considerable hunting pressure which resulted in two reported kills. A natural ingress of birds into these areas can account for this population increase.

Hunter Success

Data for the bi-weekly bird dog hunting and flushing censuses on the regulated hunting areas is presented in Table 3.

Bi-weekly bird dog hunting and flushing censuses were conducted on the regulated hunting areas throughout the mid-November through mid-February open hunting seasons in 1969-70, 1970-71 and 1971-72.

During the 1969-70 season the three regulated hunting areas combined were subjected to a total of 63 hunter-hours, which resulted in 15 flushes and two kills. The average flushing rate was 4.2 hunter-hours per flush, and it took 31.5 hunter-hours per kill.

HUNTING SEASON	HUNTING TRIPS	GROUSE FLUSHED	NUMBER OF FLUSHES	GROUSE TAKEN	HOURS HUNTED	HOURS PER FLUSH	HOURS PER KILL
1969-70	6	12	15	2	63	4.2	31.5
1970-71	5	16	23	2	56	2.4	28.0
1971-72	6	4	5	0	63	12.6	63.0 ⁺
Total	17	32	43	4	182	4.2	45.5

Table 3. Results of Grouse dog hunting trips on regulated hunting woodlots during the study period.

The same three areas combined during the 1970-71 season were subjected to a total of 56 hunter-hours, which produced 23 flushes and two kills. The average flushing rate was 2.4 hunter-hours per flush, and it took 28 hunter-hours per kill.

The same areas were subjected to a combined total of 63 hunter-hours during the 1971-72 season which resulted in 5 flushes and no kills. The average flushing rate was 12.6 hours per flush, and it took 63 plus hunter-hours per kill.

Even though the flushing rate increased 43 percent from the 1969-70 season to the 1970-71 season there was only a 11 percent increase in the kill rate. Totaling the hunter-hours, flushes and kills over the three year period gives a combined average of 4.2 hunter-hours per flush and 45.5 hunter-hours per kill. These findings indicate that hunting pressure had little affect on grouse populations in these woodlots.

Recruitment Rates

Recruitment rates on the control areas were estimated by comparing post- and successive pre-season census results. From February, 1970, to November, 1970, the flushing census population index increased from 4 to 7. In February, 1971, there were 5 grouse flushed on control areas, which increased to 7 in November, 1971. Pre-season grouse populations on the non-hunted woodlots in November were 10 in 1969, 7 in 1970, and 7 in 1971. Recruitment into these non-hunted populations, on the average, was adequate to maintain a fairly constant November population.

In the woodlots with regulated, bi-weekly hunting, the post-season index of 8 grouse in February, 1970, increased to 15 the following November, which is an 88 percent increase. The post-season index of 4 in February, 1971, increased to 6 grouse flushed during the November, 1971, census. In the areas with regulated hunting pressure, the pre-season fall population responded well to recruitment to increase considerably over the previous winter's low, post-season levels. Annual fluctuations in pre-season population counts in this group of woodlots do not vary in an unexpected or unusual manner. The pre-season, November index for the woodlots with regulated hunting was 8 grouse in 1969, 15 in 1970, and 6 in 1971.

Grouse counts in the woodlots with unrestricted hunting were so low as to be meaningless when considered alone. Population counts were subject to great variability for some unexplained reason. It is possible that these woodlots were not as high quality habitat as the others, although they all appeared comparable to the investigator. The hunting pressure was greatest on these 3 woodlots; however, this factor did not influence the pre-season counts which were conducted prior to the season. Pre-season counts were as variable as post-season ones.

Since no conclusive evidence was observed to support the hypothesis that hunting pressure has an adverse effect on grouse populations, census routes on all woodlots, regardless of the hunting regime, have been combined in Table 1 to examine average pre-season and post-season census results. This increases the sample size and gives a general picture of fall and late winter population levels of ruffed grouse in this woodlot situation. November values were 21 grouse in 1969, 23 in 1970, and 17 in 1971. These pre-season census values are reassuringly consistent and within the realm of creditability from our general knowledge of grouse populations in the area. Post-season, February values were 13 grouse in 1970, 10 in 1971, and 13 in 1972, which are also believed to be reasonably accurate estimates. By totaling the three-years data for pre- and post-season estimates and averaging, a pre-season figure of 20.3 and a post-season value of 12.0 are obtained. From these average values, an over-winter loss of 40.9 percent can be calculated for grouse populations studied. The recruitment rate calculated by using the post-season average and the pre-season average is 69.1

percent. This recruitment rate expressed as young per adult female hen, assuming a 50:50 sex ratio in the population, can be figured. Given an over-wintering survival of 12.0 grouse with 6.0 hens; given a pre-season, fall population of 20.3 grouse; and assume that all recruitment is due to reproduction; then each hen must successfully rear 1.4 young grouse to November. This exercise also assumes that hen mortality over the reproductive period is zero, which it certainly is not. Loss of adult hens during the summer months would increase the 1.4 young per hen value to insure a continuing, stable population. Other known factors, especially emigration and immigration of grouse in these woodlots, affect recruitment to a great extent. Daily activity and movement patterns also determine to a large degree, the number of grouse in a particular woodlot at any certain time.

SUMMARY

In summation of the findings of this three year study of grouse populations in isolated, small woodlots, I would conclude that there is no supporting evidence that hunting pressure, predation, or any other natural mortality factor has any significant, detrimental effect on successive fall grouse populations. Very low success rates for hunting effort eliminates hunting as a serious diminishing population factor. Little evidence of predation or other natural mortality was observed. In no instance did hunting or other mortality factors affect census results to indicate a reduction in year to year population levels or annual recruitment rates. The major factors influencing grouse population levels and distribution were the availability of preferred food items (especially mast), normal activity patterns in response to weather conditions and feeding, and the reproductive success of over-wintering hens.

LITERATURE CITED

- Madson, J. 1969. Grouse Management. Pages 45-61 in Olin Mathieson Chemical Corporation, ed. Ruffed Grouse. Winchester Press, East Alton. 103 pp.

CROP-GLAND ACTIVITY IN MOURNING DOVES DURING HUNTING SEASONS IN VIRGINIA

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ABSTRACT

Breeding populations of the mourning dove (*Zenaidura macroura*) have been declining over the past decade while at the same time hunting pressure and harvest have increased. Thus, minimization of conflict between nesting activity and hunting is important in stabilizing populations. As the crop-gland activity of doves provides an indication of post-hatching nesting activity the proportion of doves with active and regressing crop-glands was studied during the 1971 and