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EFFECTS OF CONTROLLED HUNTING
ON ROCK PTARMIGAN

By

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Final Report
Federal Aid in Wildlife Restoration
Projects W-13-R, W-17-1, W-17-2 and W-17-3
Jobs B-7 and 10.3R

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FINAL REPORT (RESEARCH)

State: Alaska

Cooperators: Jerry D. McGowan

Project No.: W-13-R Project Title: Small Game, Waterfowl, and
W-17-1 Furbearer Investigations
W-17-2
W-17-3

Job No.: 10.3R & B-7 Job Title: Effects of Controlled Hunt-
ing on Rock Ptarmigan

Period Covered: January 1, 1967 to December 31, 1970

SUMMARY

An experiment was designed to test the effects of fall hunting of rock ptarmigan on subsequent spring densities. Two areas representing typical interior Alaska rock ptarmigan breeding range, where no hunting occurs, were selected.

A census of territorial males was made on both areas in May of 1967-70. On one area 40 percent of the estimated fall population was shot in the falls of 1967-69. After the first removal spring densities of males rose 42 percent on the removal area, but only 37 percent on the control area. After the second removal spring densities rose 1 percent, but decreased 15 percent on the control area. After the last removal breeding densities dropped only 4 percent on the removal area and showed no change on the control area. Fall hunting at the 40 percent level for three consecutive years does not seem to depress spring breeding density. Data from the nearby Eagle Creek area where public hunting occurs also substantiate this finding. Spring hunting may have very different effects on breeding stocks than fall hunting.

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BACKGROUND

Rock ptarmigan are heavily hunted during the fall and spring, and to a lesser extent in winter throughout interior Alaska. Checking station operations at Eagle Creek (Mile 110 Steese Highway) in past years have yielded useful information on hunting pressure, hunting success, number of birds taken, and age-sex composition of the harvest. However, no information has been previously available to indicate safe harvest levels in Alaska. This three-year study was started in 1967 and was designed to test the effect of 40 percent removal of the fall population of rock ptarmigan on subsequent spring breeding densities. The results are directly applicable to management situations expected in interior Alaska within the next five to ten years.

OBJECTIVES

To determine the influences of known hunting pressures on local populations of rock ptarmigan, spruce grouse, and other small game.

To estimate safe harvest levels under particular environmental and demographic situations.

PROCEDURES

Two study areas, an experimental removal area (Ptarmigan Creek) and a control area (Golddust Creek), were selected which represent typical interior Alaska rock ptarmigan breeding range. Both areas are about 100 miles northeast of Fairbanks in the Tanana Hills near Eagle Creek where intensive productivity studies of rock ptarmigan have been conducted since 1959. The experimental areas are essentially the same physically and vegetatively as Eagle Creek described by Weeden (1968). Both the Ptarmigan Creek area (5 square miles) and the Golddust Creek area (4 square miles) are located about three miles from the Steese Highway and normally receive no hunting by the public.

Direct counts of territorial males were made on both areas during mid to late May in 1967-1970. Because of their behavior and plumage coloration during the breeding season, male ptarmigan are easily observed, and these spring counts are believed to be at least 95 percent accurate in determining the actual number of territorial males present. In 1967 only half of the Golddust area was covered during the spring census due to an extended period of poor counting conditions. The total number of breeding male rock ptarmigan at Golddust Creek was estimated from the abbreviated count in 1967, but in all other years complete counts were made on both areas, as well as the 15-square mile Eagle Creek area.

In the falls of 1967-1969 approximately 40 percent of the estimated fall population of rock ptarmigan was shot by Department biologists. The following demographic estimates of production at Ptarmigan Creek (based on summer studies at nearby Eagle Creek) were used to calculate number of ptarmigan to be removed.

1. Number of hens nesting
2. Number of hens hatching eggs
3. Chicks per brood in August
4. Total chicks on area in August
5. Total adults in area in August

In 1969 the average number of chicks per brood was estimated from counts at Ptarmigan Creek, but in the other years brood size data from Eagle Creek were used. Most of the removal work was conducted between mid August and mid September each year (for exceptions see Table 1). In 1967 and 1968 shooting was selective so that 40 percent of the adult males, adult females, and young of the year were taken; however, in 1969, 40 percent of the estimated fall population was removed with no consideration of the proportion of various age-sex groups. Consequently, the 1969 removal closely simulated non-selective hunting by sportsmen.

FINDINGS

Removals

A summary of the Ptarmigan Creek removals shows that in three falls a total of 541 ptarmigan were shot (Table 1). In 1967, 63 (13 male, 5 female and 45 juveniles) birds were taken from one slope because snow conditions made it impractical to travel to certain portions of the Ptarmigan Creek area, but in other years shooting was spread over all parts of the area. While hunting by the public does not usually occur at Ptarmigan Creek, a trail construction crew working the area took an estimated 41 ptarmigan of unknown age and sex in 1968. These birds were included in our computation for removal. In 1969, 18 birds were crippled but not recovered, and these were assumed to have died but their age and sex were not determined.

Table 1. Summary of rock ptarmigan removals, Ptarmigan Creek, Alaska.

Year	Adult Male	Adult Female	Juvenile	Unknown	Total
1967*	22	23	85	6	136
1968**	31	33	95	41	200
1969	<u>32</u>	<u>47</u>	<u>108</u>	<u>18</u>	<u>205</u>
Total	85	103	288	65	541

* Five males and 3 females removed in early August.

** Fourteen males and 7 females taken in late July.

Spring Density Trends

Spring density trends are summarized in Table 2. In 1968 spring counts indicated a population increase on all three areas, and despite a 40 percent removal the previous fall, the Ptarmigan Creek population showed the greatest increase (42 percent). In 1969 numbers at Golddust and Eagle Creeks decreased, while at Ptarmigan Creek numbers stayed about the same (1 percent increase). The 1970 population at Golddust Creek showed no change, while populations on the other two areas decreased; however, at Ptarmigan Creek this was slight (4 percent). From these data it is apparent that fall removal at the 40 percent level for three consecutive years did not significantly depress subsequent spring breeding stocks, in fact populations on the removal area rose faster and held up longer than those on unhunted or lightly hunted areas.

Most hunting at Eagle Creek occurs within one half mile on each side of the Steese Highway and well over one half of the ptarmigan shot yearly are taken from this zone. The zone near the road has supported unusually high numbers of breeding birds, and a high proportion of yearlings when compared to zones of similar size and vegetative composition further from the road. This was true at Eagle Creek in all years since 1959 with the exception of 1968-1970. These observations have led to the belief that fall hunting may be responsible for higher densities in fall hunted areas. This information certainly augments the results of removal experiments conducted at Ptarmigan Creek. In the last three years spring hunting complicated comparison of breeding numbers, and suggested that spring hunting may actually depress breeding densities.

A definite explanation of just how fall hunting may favor increased breeding numbers cannot be made at this time. Males are known to be harvested more heavily at Eagle Creek than females. It is probably true of rock ptarmigan, as with other tetraonides, that when an established male is removed from a territory, replacement is by a yearling. Possibly the younger birds defend smaller territories allowing more individuals to occupy a given amount of range. We have no data on territory size, and this is merely offered as a possible explanation. The age ratio of birds at Ptarmigan Creek was not determined, but I would expect a high proportion of yearlings in view of known age ratios over the years on the more heavily hunted portions of the Eagle Creek area.

Table 2. Spring density trends of male rock ptarmigan on removal, control, and Eagle Creek areas.*

Area	1967	1968	1969	1970
Ptarmigan Creek (40 percent removal area)	57	99(42+)	98(1-)	94(4-)
Golddust Creek (Control area - no hunting)	60	95(37+)	81(15-)	81(0)
Eagle Creek (Normal hunting by public)	98(18+)	120(18+)	113(6-)	102(10-)

*Percent increase (+) or decrease (-) compared to previous year in parenthesis.

DISCUSSION

This study has given us a basis for determining safe harvest levels of rock ptarmigan in interior Alaska, and the findings are probably applicable to other tetraonids throughout the state. It must be remembered, however, that removals were done on a relatively small area, surrounded by similar unhunted habitat. Ptarmigan are most heavily hunted in the fall, and hunters usually restrict their activities to areas close to access points. This presents a situation directly comparable to our controlled hunting experiment. As long as this is the pattern of fall hunting, we are not in danger of excessive harvest even if 40 percent of the fall populations are taken. Recent check station data suggest that we are well below that level at Eagle Creek, and this is probably the case in other well known hunting areas.

It must be remembered that our data suggest spring hunting may have very different effects than fall hunting. Experiments designed to test the effects of spring hunting will begin in 1971. At present it appears that we are not in danger of over harvest due to fall hunting in any of the popular ptarmigan hunting areas. Game managers must be aware of any significant changes in access patterns or seasonal harvest trends which could reverse this situation.

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LITERATURE CITED

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