GROUSE ABUNDANCE AND JUNE TEMPERATURES IN WELLS GRAY PARK, BRITISH COLUMBIA

by R. W. Ritcey and R. Y. Edwards

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Abstract: A study of weather records and the annual grouse kill in Wells Gray Park, British Columbia showed a relationship between June weather and the fall kill. A positive correlation coefficient of 0.913 was found to exist between the fall grouse kill and the mean maximum June temperature. The grouse involved were chiefly ruffed grouse (*Bonasa umbellus).* It seems apparent that high temperatures in late spring and early summer are an important factor in the reproductive success of grouse.

This study was undertaken to explore the possible relationship between weather and fall grouse populations in Wells Gray Park, British Columbia. It was hoped that the results might be useful in forecasting population trends as well as in contributing to knowledge of the ecology of the species.

Field observations for a 10-year period in Wells Gray Park suggest to the writers that warm weather in spring and early summer is associated with high populations of ruffed grouse in the fall.

Two sets of data were used to test this hypothesis: (1) weather data for the park, compiled regularly at Park Headquarters for the Government of Canada, and (2) records kept since 1952 of all game species killed in the park.

Records of the annual grouse kill were assumed to give at least a rough indication of fall population levels. Grouse are not abundant in the park and are usually killed along roads and trails by hunters seeking big game. A few local people hunt grouse for sport. Bag limits and length of hunting season varied during the study period, but these variations do not seem to have affected the kill. Few hunters obtained bag limits anyway, and most grouse were killed before November 1, even though the season was in some years extended beyond that date.

Hunters have shown repeatedly that they cannot distinguish among the three most common species of grouse in the park -- ruffed grouse, spruce grouse (*Canachites canadensis),* and blue grouse *(Dendragapus obscurus)* -- so all grouse are included in figures showing the annual kill. We estimate that approximately 85 percent of the annual kill consists of ruffed grouse, with little variation through the years. This estimate is based on both our own hunting experience and the contents of hunters' bags which we were able to examine.

June weather was more closely linked to the fall kill than was May or April weather. The mean maximum daily temperature for the month was found to be more significant in relation to kill data than were other mean temperatures or precipitation. Fig. 1 shows the relationship between mean maximum temperatures in June and the grouse kill of the following autumn. Here the coefficient of correlation is 0.913, which is significant at the 1 percent level.

Other workers have attempted to explain fluctuations in populations of gallinaceous birds on the basis of weather. Larsen and Lahey (1958:69) worked with ruffed grouse in Wisconsin. They found that warm springs and summers tended to be associated with high grouse populations the following April, and mild winters with low grouse density in April. Also in Wisconsin, Dorney and Kabat (1960:58) found that ruffed grouse production was above average following high average temperatures in May but that a cold May resulted in low production.

Shelford and Yeatter's (1955) quantitative analysis of weather records in relation to populations of male greater prairie chickens *(Tympanuchus cupido)* on booming grounds of a southeastern Illinois study area during 1935 - 48 showed that the number of males present generally conformed to a paired-factor diagram showing the number of inches of rainfall and precent of possible hours of sunshine during April of the previous breeding season. This indicates that weather during the late stages of reproductive-cell development was important from the standpoint of population size.

Kozicky et al. (1955) concluded from a pheasant *(Phasianus colchicus)* study in Iowa that cold temperatures in May or June or both were not conducive to an increase in fall pheasant populations and that warm weather in March or April or both did not bring about populations increases. Siivonen (1957:39-40), however, found that winter food conditions, which determine the well-being of female in spring, constituted the basic factor underlying fluctuations in grouse populations. He also concluded that the immediate cause of fluctuations was the availability of green food just before laying, which in turn depended on temperatures in that short period.

Investigators agree that weather has an