

An Ecological-Physiological Study of Moose

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Objectives of this study are to investigate the population dynamics, life habits and habitat relationships of the moose population in Wyoming's Jackson Hole area. This project is scheduled for completion in June 1967.

Calculations indicated that the moose population on the area was composed of a resident group of approximately 200 animals, and a migratory segment of 400-500. Relative seasonal use of 15 different habitat types was determined from observations of 3,547 moose. The marsh willow type received the highest total use during all periods; the sandbar willow type second highest.

Moose forage preferences in different habitat types were determined from 22,610 instances of plant use recorded at 149 feeding sites. Browse was the major class of forage used on terrestrial habitat types during most of the year. Forbs and/or grasses and grasslike plants became important during late spring and early summer periods on certain habitats. Data concerning plant succession on major flood plain habitats suggested that succession towards climax stands will probably eventually reduce the ability of flood plains to support moose. Results from plant measurements on nine sample units showed spring, summer and fall ranges were in very acceptable conditions. Plant condition ratings for 1965 showed that 11 out of 18 willow units located on winter ranges were in poor or very poor condition. Measurements of four leader length transects were used as an index of forage production on the blueberry willow. Data showed that consistent heavy use of willows resulted in significant decreases in forage production. Production was inversely related to the proportion of severely hedged leaders in the plant crown. Significant fluctuations in willow conditions and probably in moose numbers have occurred on winter range areas between 1950 and 1965. This short term cycling of moose numbers and habitat conditions does not appear to be in conflict with National Park Service objectives of maintaining a representative flora and fauna. However, these relationships do not permit production of maximum moose harvests.

A total of 284 relocations of 43 tagged moose provided data on size of seasonal home ranges. Summer and winter ranges of adult residents were usually less than 1.5 square miles in size. Animals returned annually to the same small areas. Most adult migratory animals also returned to small winter ranges. Yearlings did not have established home ranges.

Classifications of 1848 moose were used to show seasonal herd composition. Average values of 42 percent females, 24 percent calves and 34 percent males occurred in fall and winter herds. Calf per 100 female ratios were 66, 56 and 49 for winter herds of 1963-64, 1964-65 and 1965-66, respectively. Male per 100 females ratios were 89, 72 and 78 for the same periods.

Examinations of testes from 85 moose showed that all adults and 92 percent of yearlings were physiologically capable of breeding after September 20. Ovulation rates were calculated from examinations of 131 reproductive tracts. Results showed that yearling females did not contribute significantly to the productivity of this

population. The percentage of adults ovulating in this population was very comparable to other moose populations. The low observed production of twins may be related to low percentages of multiple ovulations among adults. Examinations of 28 uteri from adult moose showed that 25 (89%) were pregnant. Data suggested that only 4-5 percent of the yearling females became pregnant. Field observations of 705 calves showed a five percent twin birth rate. Information from this and other studies suggested that a long term decrease in percentages of twins has occurred in the Jackson Hole area. These findings were discussed in relation to nutritional stresses. An expected calf per 100 female ratio of 70 was calculated from pregnancy rate and age structure data. The magnitude of annual differences between observed and expected ratios paralleled differences in winter severity and were attributed to calf mortality which occurred at or immediately following parturition. Calculations suggested that over-winter calf survival to the yearling age class has varied from probably complete to less than 50 percent survival.

Examinations of 586 jaws from hunter killed moose suggested that males were subjected to a greater harvest rate than females, which resulted in an over-all younger age structure for males. The percentages of yearling males in fall harvests have shown significant annual fluctuations. One major factor determining these values has been winter calf mortality. The over-all age composition of the harvest resembled the age structure of a relatively stable population. A comparison of the age structure of this population with others suggested that increased exploitation was possible. Hunter harvests, accidents, illegal kills and crippling losses annually removed about 300 animals from the Northern Jackson Hole area. Calculations showed that a base winter herd of 1,800 animals was necessary to sustain an annual removal of 300 animals and a 20 percent annual over-winter calf mortality.

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Analysis of the Insect Fauna of the Snake River
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Five Surber foot-square samples were taken at two week intervals at four different sampling stations throughout the summer. The contents of these samples were taken back to the research laboratory where the organisms were identified, counted and weighed. Emerging adult insects were captured at the sampling stations by taking 50 sweep samples in the vegetation along the river. Eight emergence traps were used to capture adult insects from the river at the Station. The river water was analyzed for oxygen, alkalinity, carbon dioxide and hydrogen ion concentration at monthly intervals at the sampling stations.

Hourly drift samples of stream insects were taken during four 24 hour periods. The data collected shows that very few insects drift during the daylight hours, but when it becomes dark many insects drift with the current. As many as 1000 insects were collected during hourly night samples, but during the day only about 20 insects per hour would be collected from the drift net.