MIGRATORY PATTERNS OF BLACK-TAILED DEER ON A SPRING STAGING AREA: BIAS OF HERD COMPOSITION ESTIMATES?

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Abstract: We studied the social dynamics and behaviors of black-tailed deer (Odocoileus hemionus columbianus) during spring migration to evaluate how these characteristics may influence estimates of herd composition on the spring staging area. Large aggregations of the Cow Creek Herd, at an intermediate elevation between winter and summer ranges in Shasta County, California, were monitored daily to identify times of arrival and departure of marked animals and numbers of deer by age and sex class. Dates of first arrival, duration on the staging area, fawn:doe ratios, and cessation of staging behavior differed significantly between 1986 and 1987. The implications of these findings on herd censuses are discussed.

INTRODUCTION

Altitudinal migration of black-tailed deer each spring and autumn occurs in herds distributed over California and Oregon, (Russell 1932, McCullough 1964, Bertram and Rempel 1977, Smith 1983, Loft et al. 1984, Smith 1989). Some of these herds also exhibit delayed migration as deer remain several weeks on staging areas (or holding area) at intermediate elevations between the winter and summer ranges (Russell 1932, Bertram and Rempel 1977, Loft et al. 1984, Smith 1989). When large aggregations of deer occur in open habitats on the staging areas, the age and sex structure of the population may be sampled for estimates of fawn survival and herd status. Censuses conducted during any timeperiod of the spring migration have generally been considered reliable because large numbers of animals are available for visual classification, with all sex and age classes represented. We describe how changes in social dynamics and behaviors of deer on the spring staging area may influence estimates of herd composition.

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STUDY AREA

The study was conducted on Blue Mountain (925 m elevation), located between the summer and winter

range, approximately 45 km northeast of Redding, California. This area has traditionally been used as a spring staging area by the Cow Creek Herd for at least the past 30 years. Historically, the ridge was dominated by blue oak (*Quercus douglasii*), black oak (*Q. kelloggü*), digger pine (*Pinus sabiniana*) and ponderosa pine (*P. ponderosa*). In the 1950s, the area was logged and the habitat has since been maintained as an open meadow of clover (*Trifolium sp.*) and grasses such as intermediate wheatgrass (*Agropyron sp.*), orchard grass (*Dactylis sp.*), and Harding grass (*Phalaris tuberosa*) for cattle grazing.

METHODS

Deer were randomly captured on the winter range (Flueck 1989) using capture nets and helicopters (Jessup et al. 1984). All animals were sexed, aged by tooth examination, and marked with color-coded ear streamers. Only females older than 24 months of age were fitted with radio-transmitter collars. Thus of the 29 animals (7 M, 22 F) captured in 1986, only 18 were radio-collared: and in 1987, 10 animals (2 M, 8 F) were captured and 6 were radio-collared. This cohort of marked animals was augmented by 4 deer (2 M, 2 F) ear-marked in studies prior to 1986 and 11 deer (2 M, 9 F) distinctively marked by papillomas or pelage.

Deer on the spring staging area were visually monitored with the aid of a scope (20-40x) from a camouflaged stationary blind 7m above the ground located on the perimeter of the meadow. Observations began before sunrise and continued after sunset, when animal classification was not impeded by darkness. Throughout the staging period, scans (Altmann 1974) were completed hourly to determine the total number of deer visible. Sex and age composition were estimated from censuses conducted daily using scan sampling techniques to classify each identifiable deer as an adult male, adult female, or fawn. Classification was de-

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- LINSDALE, J.M. and P.Q. TOMICH. 1953. A herd of mule deer. University California Press, Berkeley. 567pp.
- LOFT, E.R., J.W. MENKE, and T.S. BURTON. 1984. Seasonal movements and summer habitats of female black-tailed deer. J. Wildl. Manage. 48:1317-1325.
- MCCULLOUGH, D.R. 1964. Relationship of weather to migratory movements of black-tailed deer. Ecology 45:249-256.
- RUSSELL, C.P. 1932. Seasonal migration of mule deer. Ecol. Monogr. 2:1-46pp.
- SMITH, D.O. 1983. The Cow Creek Deer Herd management plan. Calif. Dep. Fish and Game. P.R.W.-51-R. 36pp.
- SMITH, J.M. 1989. Social dynamics of black-tailed deer (Odocoileus hemionus columbianus) on the staging area during spring migration. M.S. thesis. University of California, Davis, CA. 84pp.