ELK CALF SURVIVAL IN NORTHCENTRAL IDAHO: INFLUENCE OF PREDATOR HARVEST, BIOLOGICAL FACTORS, AND LANDSCAPE

Craig G. White, Idaho Department of Fish and Game, 3101 S. Powerline Road, Nampa, ID 83686
Peter Zager, Idaho Department of Fish and Game, 3316 16th Street, Lewiston, ID 83501
Michael W. Gratson, Idaho Department of Fish and Game, 3316 16th Street, Lewiston, ID 83501

Abstract: We evaluated survival of elk (Cervus elaphus) calves on 2 contrasting study areas in northcentral Idaho from 1997 to 2004. Recruitment was modest (>30 calves:100 cows) and stable on the South Fork study area, and low (<20 calves:100 cows) and declining on the Lochsa study area. The primary proximate cause of calf mortality on both study areas was by black bears (Ursus americanus) and mountain lions (Puma concolor). We experimentally manipulated populations of black bears and mountain lions on a portion of each study area. Black bear harvest (harvest density/600 km²) initially doubled on the Lochsa treatment after manipulating season bag limits. Mountain lion harvest also increased by 60%, but varied widely during the manipulation period. Harvest seasons were closed for black bears and mountain lions on the treatment portion of the South Fork study area. Using Cox proportional hazards model we examined the effects of landscape structure, predator harvest levels, and biological factors on summer calf survival. We used Akaike's Information Criteria (AICc) and multi-model inference to assess a number of potentially useful predictive factors relative to calf survival. Our models predicted that calf survival was influenced by biological factors, the landscape surrounding calf locations, and predator harvest levels. The model that best explained mortality risk to calves on the Lochsa included black bear harvest (harvest density/600 km²), estimated birth mass of calves, and percentage of shrub cover surrounding calf locations. Model averaging indicated that estimated birth mass of calves and black bear harvest were twice as important as the next variables, but the age of calves at capture was also influential in calf survival. The model that best explained mortality risk to calves on the South Fork included black bear harvest, age of calves at capture, and gender of calves. These results suggested that levels of predator harvest, and presumably predator density, resource limitations expressed through calf birth mass, and habitat structure had a substantial effect on calf survival.

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