Elk Restoration and Health in the Sudbury Area

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Abstract

Ontario's oldest elk herds located in the Burwash/French River area have been subjected for generations to the influence of copper-nickel-iron ore smelting operations in Sudbury. Metal levels in selected body tissues, preferred forage items and fecal pellets were determined and their potential effects on health and reproductive viability assessed. Significant age effects were apparent in 13 out of 31 tissue metal values obtained, with most age-related differences attributable to elevated concentrations in fetal tissues. Cu and Zn levels were 4 to 6 times higher in livers and 1.5 to 2 times higher in the bones of fetuses, as compared to post-natal animals. Enhanced pre-natal tissue burdens were also noted for Co, Ni and Pb in muscles. However, mean Cd levels in kidney, liver and muscle tissues, as well as hepatic Fe concentrations, shoved significant increases with age. Although Cd levels in the kidneys of older elk were still well below the reported threshold for irreversible organ damage, and not considered to be health-threatening, detailed histological study of the cortical tissues for subtle patho-toxicological effects may be warranted. Unlike renal and hepatic tissues, Cd concentrations in skeletal muscle were minimal and within levels considered acceptable for human consumption. Forage species collected in the elk range generally showed higher (2 to 8 times) Ni and Fe levels than the corresponding plants from a non-contaminated reference site. The highest Ni and Fe burdens were carried by eastern white cedar, a preferred winter food item for elk. No consistent, site-related trends were demonstrated by Cu, Zn, Co, Pb, Cr, and Cd forage levels. Mean concentrations in fecal pellets generally exceeded the mean composite forage levels by a factor of 3, except for Ni, which was 5 times more concentrated in feces. Significantly elevated Ni and Fe levels in preferred browse species and fecal pellets of the Sudbury-area elk could be of concern and warrant further investigation.

Between 1998 and 2001, 174 elk (*Cervus elaphus*) from Elk Island National Park, Alberta were released between Sudbury and the north shore of Georgian Bay in an effort to boost a remnant population and to restore a formerly endemic species to viable numbers in the local habitat. During the first 2 years of the program, over 30% of winter-released elk did not survive until spring. During the last 2 release years, holding elk in an enclosure until spring improved initial survival to 98%. Until 2002, mortality of released animals exceeded recruitment. The dominant cause of mortality (50% of all recorded deaths) has been wolf predation, mainly during winter and early spring, followed by accidental death (vehicle collisions)(18%), and drowning(15%). Other recorded causes of mortality include winter starvation (11%) and accidental shooting/poaching (6%). The survival of calves was estimated at 30-40% during the first 6 months, dropping to less than 10% during some winters. Observed recruitment in remnant herds, introduced in the 1940s was considerably higher (30-40% during winter). Interaction of introduced animals with the remnant elk population, favorable snow conditions and improved predator avoidance enhanced recruitment in the winter of 2002/03. It is suggested that acclimatization and learning period of a decade or more is required to achieve a sustained elk population growth.