



## ASSESSING EXPANDABLE GLOBAL POSITIONING SYSTEM COLLARS FOR MOOSE NEONATES<sup>1</sup>

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### ABSTRACT

Deploying Global Positioning System (GPS) collars on ungulate neonates would offer notable advantages to examining their life history and influence on population performance. During 2013 and 2014, we deployed expandable GPS collars on 74 moose (*Alces alces*) neonates in Minnesota, USA, to estimate survival and cause-specific mortality during their first year. Collars slipped from 10.5% and 62.5% of calves at 15.8 ( $\pm 4.5$  [SE]) and 27.9 ( $\pm 8.1$ ) days postcapture in 2013 and 2014, respectively, from premature deterioration of the breakaway mechanism or excessive band expansion. We conducted various controlled tests on the bands to quantify potential design flaws. We placed 8 bands (with GPS package) around a polyvinyl chloride (PVC) pipe outdoors (exposed to weather) with clear plastic tubing (sleeve) to prevent neck abrasions, 7 collars outdoors with no sleeve, and 7 collars indoors with no sleeve. We dropped each pipe 10 cm 50 times in the morning and in the afternoon daily for 4 weeks to simulate animal movement and test elastic memory. Circumference of bands from the 3 treatment groups increased 14.6 ( $\pm 2.5$ ), 8.5 ( $\pm 2.9$ ), and 3.9 ( $\pm 2.4$ ) cm, respectively, with 41.9% attributed to the sleeve, 26.9% to simulated animal movement, and 31.2% to weather exposure. Circumference of control group bands (indoors, not bounced) did not change. After design modifications were made to the collar, the band length increased only  $1.5 \pm 0.6$  cm during a 4-week trial. Subsequently, we placed 6 of these collars on confined and sheltered Holstein dairy calves; 5 retained their collar during an 8-week test. After increasing the strength of the expandable loops via sewing, we placed 4 collars on pastured Angus beef calves. Three of 4 slipped their collars at 42.4 ( $\pm 8.9$ ) days. Our results indicate additional modifications of the band are needed before GPS-collaring of moose neonates is resumed. © 2018 The Wildlife Society.

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