

## MOVEMENT ECOLOGY

### Movements of Bighorn Rams in Extant Populations

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**ABSTRACT:** Transmission of pathogens from domesticated animals presents a substantial risk to native sheep species. Populations of wild sheep are at high risk from the bacterium *Mycoplasma ovipneumoniae* (*M. ovi*) which occurs at high rates in domestic caprids (30–70% of herds). The mountainous areas of southwest Alberta, Canada are home to significant extant populations of Rocky Mountain bighorn sheep (*Ovis canadensis canadensis*) that have experienced historic and recent livestock disease outbreaks. To assess disease transmission risks, and predict disease spread among populations, the University of Alberta, Government of Alberta, Parks Canada and multiple NGOs initiated a cooperative project to provide a thorough understanding of movement behaviour, habitat selection, and metapopulation connectivity in the region. A total of 70 bighorn rams (age 1.5–9.5, median 4.5) were net-gun captured (n=61) or chemically immobilized (n=9) and fitted with GPS collars in 2022 and 2023. Early analyses of data from collars and remote cameras collected between April 2022 and October 2023 showed variable migration patterns, occasional dispersal, and highly variable rut and foray behaviours among individuals and herds. Daily movement varied in summer (mean 3.55 km/day, 2.03–5.57) and winter (3.14 km/day, 1.07–5.67), with total seasonal cumulative distances of 753.5 km (434.7–1,010.0) and 452.1 km (176.7–697.9), respectively. Local convex hull estimates (K=25) of annual home range averaged 69.6 km<sup>2</sup> (10.3–242.7). Two rams were tracked before and during an *M. ovi* outbreak until death, allowing comparison with non-diseased ram movements. Additional analyses on forays, dispersal and habitat selection will be presented.

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**KEYWORDS:** Alberta, dispersal, extant populations, habitat selection, home range, migration, *Mycoplasma ovipneumoniae*, ram, Rocky Mountain bighorn sheep (*Ovis canadensis canadensis*).