

Quantifying Partial Migration in an Alpine Ungulate

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ABSTRACT As migratory species across a wide array of taxa face global declines, ecologists have shown a renewed interest in understanding the significance of movement behavior. Even so, the ecological significance of migration remains poorly understood. This lacuna is partly a function of past difficulty in rigorously defining migratory behavior. Consequently, attempts to account for migration have largely relied on untested assumptions about animal movement. For example, numerous studies assume that ungulate migratory behavior is fixed even though this assumption contradicts long-standing knowledge of broad behavioral variation in ungulate life history. We used non-linear modeling methods to quantify variation in migratory behavior across: 1) space, 2) time, and 3) individuals from 8 populations of Sierra Nevada bighorn sheep (*Ovis canadensis sierrae*), a partially migratory and federally endangered alpine ungulate. We found that although migratory distance varied by population, population and year were unable to explain variation in the timing and duration of migratory movements. Furthermore, we present strong evidence that individuals frequently change strategy among years. These results directly contradict the prevailing assumption in ungulate ecology that migratory behavior is fixed. To our knowledge this is the first study to quantify variation in migratory behavior in a caprid.

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