
CONTACT PATTERNS AMONG BIGHORN SHEEP IN AND AROUND GLACIER NATIONAL PARK

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Identifying patterns of direct contacts among individual animals is important to understanding infectious disease transmission. Social behavior can be influenced by both intrinsic and extrinsic variables and can be explored at 3 levels: social network structure, dyad structure, and contact structure. We investigated drivers of contact structure using GPS locations of 87 male and female bighorn sheep (*Ovis canadensis*) in and around Glacier National Park in Montana, USA. Focusing on contacts between sheep moving separately, we examined relationships between contact locations and movement variables, land cover, distances to various resources, and variables known to influence survival using a resource selection function. Used and available points were defined as simultaneous locations within 25 m (the contact-used) and 13 km (largest step length- available) of another collared bighorn sheep, thus results of this analysis describe the strengths of these variables relative to habitat use. Data were analyzed separately according to dyad type (male-male, female-female, male-female). Most contacts occurred in March for male-male and female-female dyads and in November, December, and January for male-female dyads. For male-male dyads, contacts occurred more than expected given habitat use in conifer land cover and locations farther from perennial water sources, high NDVI, little canopy cover, and low and high solar radiation index. For female-female dyads, contacts occurred less than expected given habitat use in

grass and barren land cover and locations with intermediate terrain ruggedness, high NDVI, and low and high snow water equivalent. For male-female dyads, contacts occurred most during the night, least during the day, and at locations with intermediate elevation and farther from escape terrain. Together, these results suggest that more specific conditions apply to contact locations than general locations and that we can predict locations where contacts are most likely to occur, which may be useful for disease management.