Intact Pathway Successfully Buffers Sage Grouse Migration

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Landscape conservation is the mechanism for conserving migratory wildlife in sagebrush ecosystems. We studied a greater sage grouse (*Centrocercus urophasianus*; hereafter 'sage-grouse') population with the longest-known annual migration, ≤ 240 km round-trip, between summer and winter ranges in Saskatchewan, Canada, and northcentral Montana. We asked: Do birds fly quickly through a corridor, or do they use stopovers within a larger pathway? GPS-tracking revealed that migrating grouse frequent stopovers along multiple routes that coalesce to form an integrated pathway. Month-long fall migration in November contrasted with punctuated spring migration lasting ~2 weeks in late March/early April. Individual birds typically spent ~1 day at 9 different stopovers, migrating 71-91 km in 11-15 days. Migrating grouse used native sagebrush rangeland in proportion to its availability and avoided cropland and badlands. Birds responded to record-breaking snowfall in winter 2011 (>274 cm) by migrating another ≤ 50 km south onto windswept ridge tops where sagebrush remained above snow. Grouse selected habitat on Charles M. Russell National Wildlife Refuge most similar to typical winter habitat. Doing so was without consequence to winter survival; such was not the case for a nearby resident population. Newly identified winter range suggests that high site fidelity is tempered by an ability to adapt quickly when resources become scarce. We recommend public land policy that provides grazing opportunities while precluding large-scale energy development or whole scale removal of sagebrush. Management actions that maintain sagebrush as an emergency food source in newly identified sage grouse wintering grounds will help conserve this migratory population.