West Nile Virus and Greater Sage Grouse

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West Nile virus (WNv) has emerged as a new issue in conservation of native avifauna in orth America. Mortalities from WNv decreased survival of female greater sage grouse (*Centrocercus urophasianus*) by 25 percent across four populations in Wyoming and Montana, USA, and Alberta, Canada. Findings are troubling because survival of adult females is a limiting factor in population growth, and losses from WNv come at a time of year when survival typically is high. An outbreak of WNv in 2003 resulted in the local extirpation of a ~130-km^2 area in the Powder River Basin (PRB) in northeast Wyoming. In 2004 WNv spread to popula-tions in Colorado and California, and female survival was 10 percent lower (86%) at four sites with confirmed WNv mortalities than at eight sites without. Mortality from WNv was ~2 percent in 2005 in the PRB in Montana and Wyoming, and decreased prevalence of infec-tion and mortality in sage grouse, humans, and horses left many wondering if the worst had passed. Unfortunately, mortality from WNv increased again in 2006 in the PRB as hot tem-peratures returned, and three more states reported mortality for the first time (Oregon, Idaho and Nevada). In separate trials at the Wyoming State Veterinary Laboratory, all sage grouse

(n = 44) experimentally infected with WNv died in 6-8 days regardless of dosage, thus confirming extreme susceptibility to this disease. In 2003 and 2004 in the PRB, all live-captured birds tested seronegative for neutralizing antibodies to WNv. In spring 2005 and spring 2006, 10.3 and 1.8 percent, respectively, of newly-captured females tested seropositive and represented the first documented cases of sage grouse surviving infection with WNv. However, a consistent pattern of low WNv-related mortality in summer followed by low seroprevalence the following spring in all years suggests that, to date, only ~14 percent of sage grouse in the PRB have been infected. Naturally low infection rates and survival of sage grouse following WNv suggested that most sage grouse in the PRB have not yet been exposed to the virus and remain susceptible. For sage grouse, severity of future WNv epizootics in the PRB will likely depend more on temperature and changes in vector distribution than on resistance to disease. Until we better understand epizootiology of WNv in sage grouse habitat, we suggest that management to reduce its impacts focus on eliminating man-made water sources that support breeding mosquitoes known to vector the virus.