Alberta Conservation Association
2011/12 Project Summary Report

Project Name: *Sharp-tailed Grouse Habitat Inventory and Stewardship*

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Project Leader: Robb Stavne

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Partnerships

Alberta Sustainable Resource Development
High Prairie Grazing Reserve
Wanham Grazing Reserve

Key Findings

- Tested remote listening devices (song meters) to assess activity at sharp-tailed grouse leks and found reliable patterns of detection for distances out to 500 m from a known lek site.
- Detection with song meters followed predicted patterns, with greater detection as the distance to a lek decreased and when detection data from more than one day was pooled.
- Occupancy estimates indicated more than half of all historic sharp-tailed grouse leks sites we sampled in our study area were attended by dancing males.

Introduction

Sharp-tailed grouse (*Tympanuchus phasianellus*) populations may be declining in Alberta, prompting Alberta Sustainable Resource Development (ASRD) to close hunting seasons across many wildlife management units (WMUs) in northern regions. Declines may be linked to the loss of nesting and brood-rearing habitat as habitat is modified by agricultural use, although cumulative influences from a variety of changes are probable. To better understand if and where population changes may be occurring, an inventory tool is needed that can be applied over a broad area. Ground surveys that are informed by resource selection functions have been combined with distance sampling in previous years (Hamilton and Manzer 2011) to estimate lek densities, although this approach remains very time intensive. In 2011, we began testing a modified approach for detecting leks using remote listening devices (Song Meters; Wildlife Acoustics Inc. 2009). We focused our attention in the first year of our study on evaluating their utility in detecting sounds made at lek sites, and assessing if detection decreased when units were placed at intervals from 0 m to 1,000 m from a lek. Our primary objective in developing techniques with song meters is to aid in collecting repeated sampling events at lek sites from which we can develop estimates of occupancy. Ultimately, occupancy measures could provide a

suitable metric to evaluate population status. Additionally, we continued to work with grazing reserve managers and private landowners to promote habitat retention for sharp-tailed grouse.

Methods

We placed song meters at 0 m, 250 m, 500 m and 1,000 m from active lek sites and recorded sound activity over a four-day period. We used recognition software to analyze the resulting sonograms to measure detection rates in relation to distance and among days.

In a combined field effort with government staff, we surveyed known lek sites between April 15 and May 15 in a repeated survey design to detect lek attendance in WMUs 357, 358, 359, 521 and 522. We estimated occupancy measures (MacKenzie et al. 2006) using program Presence, while habitat within 1,600 m of each lek site was inventoried using Circa 2000 land cover classification and mapped using a geographic information system (GIS).

We used ArcMap 10 software to inventory nesting and brood-rearing cover for sharp-tailed grouse at the High Prairie and Wanham grazing reserves. In addition to working closely with managers at the two reserves, best management practices are being developed that provide information about nesting and brood-rearing cover and promote its retention in pastures occupied by sharp-tailed grouse leks.

We also initiated work with a private landowner who has an active lek site on his property to develop management practices that will benefit sharp-tailed grouse conservation. We provided suggestions to increase nesting and brood-rearing cover and helped to develop plans to protect nesting hens during haying operations.

Results

Song meters appear to provide sufficient information to warrant further use and investigation. Song meters deployed at 14 leks detected lekking sounds out to 500 m. As predicted, the rate of detection decreased as distance to a lek increased (Figure 1). Detection rates increased substantially when we pooled data over multiple days, which may reflect how sound carries due to changing weather conditions among days and perhaps reflects variation in actual activity levels of dancing males.

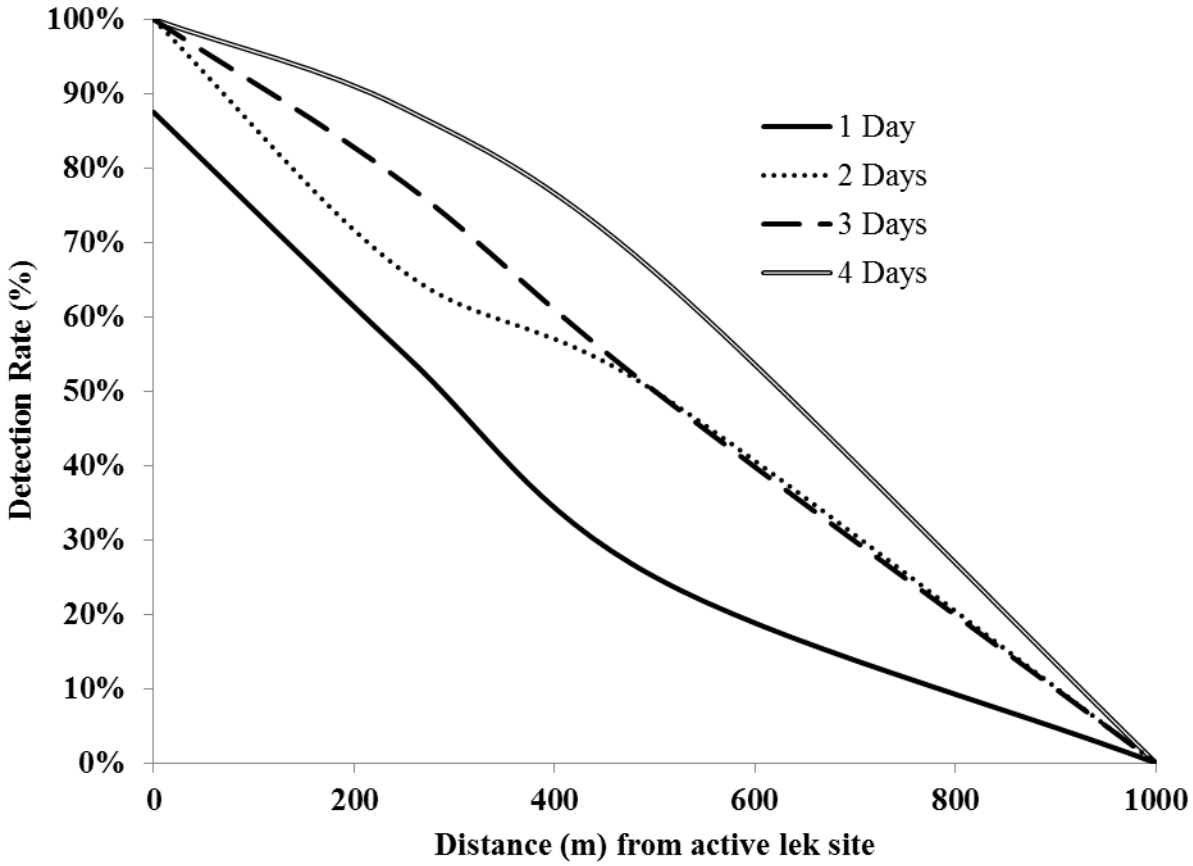

Figure 1. Detection rates of song meters in relation to distance they were placed from a sharp-tailed lek site known to be active (n = 10). Detection rates declined as distance increased; however, placing song meters for multiple days improved detection rates.

We sampled 59 historic lek sites (of 103 total) in WMUs 357, 358, 359, 521 and 522 (Figure 2). We estimated more than half of the total sites to be active (occupancy ± standard error = 0.53 ± 0.12), with reasonably high probability of detecting active leks (p = 0.61 ± 0.15 standard error).

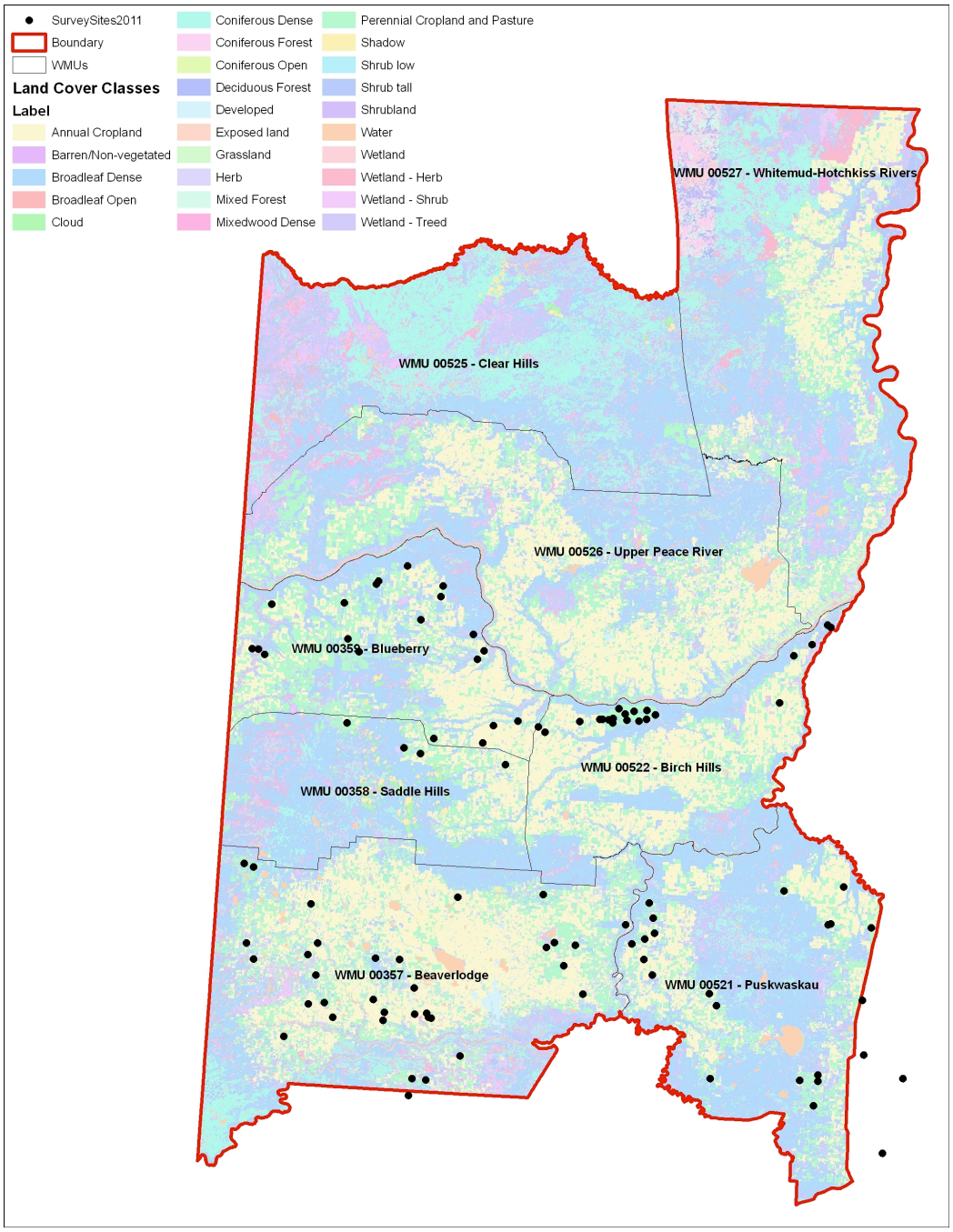

Figure 2. Historic lek sites and landcover in wildlife management units (WMUs) 357, 358, 359, 521 and 522. We sampled 59 of 103 sites and found more than half of all sites were occupied by breeding sharp-tailed grouse.

Conservation of nesting and brood-rearing cover at grazing reserves will continue in an adaptive management framework. Although we are still developing best management practice documents to be used as reference, the strength of our program lies with relationship development and establishment of trust between partner organizations. Our recommendations include maintaining

a structurally-complex habitat mosaic with specific retention of nesting cover adjacent to lek sites during pasture improvement events.

We presented breeding cover requirements to a landowner near Grande Prairie to help promote conservation of sharp-tailed grouse habitat. The producer developed a flushing bar to mount on his tractor to protect nesting hens during haying operations and will leave larger buffers of nesting and brood-rearing cover to provide enhanced areas of escape cover. Discussions with this landowner have also spawned expansion to his local community, where we will engage a larger audience in future workshops.

Conclusions

Preliminary results from song meter analyses suggest that they will be useful for future field application. Detection rates declined with distance from leks; however, placing song meters for multiple days greatly increased our ability to detect lek activity up to 500 m. Using song meters for repeated sampling, in combination with field surveys in subsequent years, should provide strong, statistically-robust estimates of occupancy across a broad landscape, while simultaneously reducing logistic hurdles and budgets.

Ongoing stewardship with current partners and development of additional relationships with other grazing reserves and private landowners will help promote conservation of breeding habitat.

Communications

- Delivered grouse pamphlets and stewardship information to participating landowner.

Literature Cited

Hamilton, S., and D. Manzer. 2011. Estimating lek occurrence and density for sharp-tailed grouse. Pages 33 – 49. *In:* B.K. Sandercock, K. Martin, and G. Segelbacher (editors). Ecology, conservation, and management of grouse. Studies in avian biology no. 39, University of California Press, Berkeley, California, USA.

MacKenzie, D.I., J.D. Nichols, J.A. Royle, K.H. Pollock, L.L. Bailey, and J.E. Hines. 2006. Occupancy estimating and modeling: inferring patterns and dynamics of species occurrence. Academic Press. Boston, Massachusetts, USA. 344 pp.

Wildlife Acoustics Inc. 2009. Song meter user manual. Concord, Massachusetts, USA.

Photo Captions


Sharp-tailed grouse performing bluff charge while dancing at a lek. (Photo: Ryan Hermanutz)


Song meter listening device used to detect lek activity. (Photo: Ryan Hermanutz)


Male sharp-tailed grouse posing for female grouse. (Photo: Ryan Hermanutz)