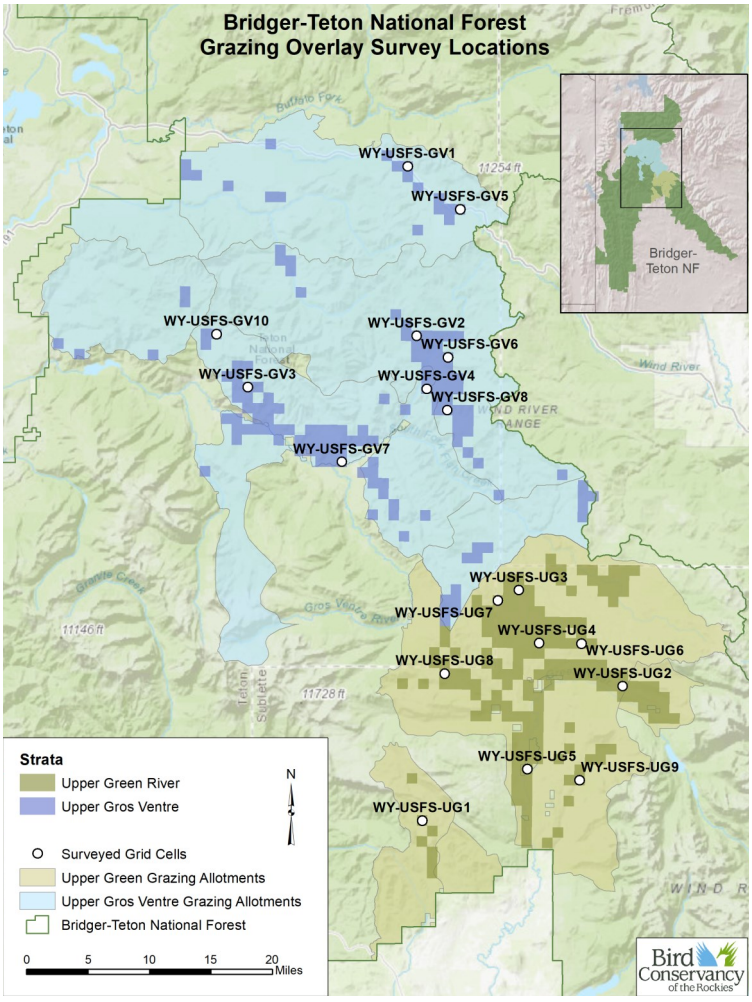
Grazing Impacts on Migratory Bird Communities in Montane Shrublands

White-crowned Sparrow, The Cornell Lab

PROJECT OVERVIEW

The U.S. Forest Service is a multi-use land management agency tasked with managing federal lands for various interests, including livestock grazing and biodiversity. The Intermountain Regional Office and the Bridger-Teton National Forest (hereafter Forest Service [FS]) partnered with Bird Conservancy of the Rockies to monitor birds in two montane shrubland sites: the Upper Gros Ventre (no grazing) and the Upper Green River (some grazing). Due to site-specific differences in productivity and a lack of replication, we focused on identifying vegetation relationships to inform potential grazing impacts on migratory birds.

View of the Bridger-Teton National Forest. Alex Van Boer



Distribution of surveyed grid cells within the Upper Green River and Upper Gros Ventre management areas.

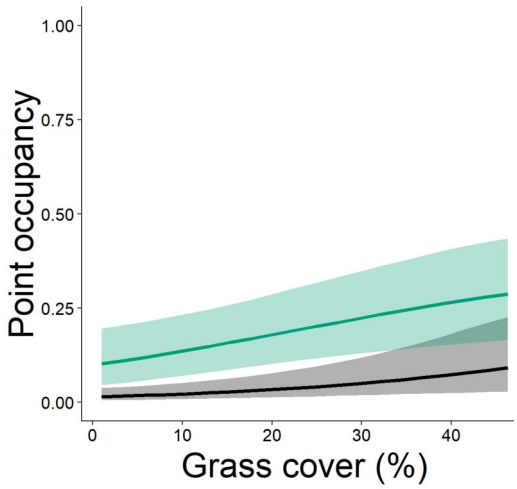
STUDY DESIGN AND METHODS

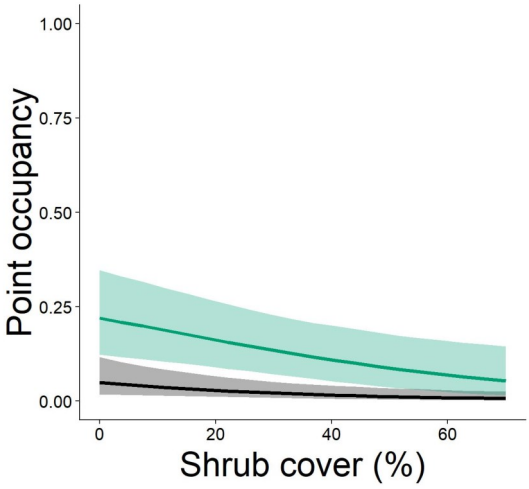
- Implemented a spatially balanced sampling design based on the Integrated Monitoring in Bird Conservation Regions (IMBCR) program
- Surveyed 8 grid cells (125 survey points) in the Upper Gros Ventre and 9 grid cells (141 survey points) in the Upper Green River from 2017-2020
- Trained observers attempted to survey up to 16 points within a grid cell in one morning during the spring breeding season
- Observers recorded all birds seen and heard within a 6-min survey period at each point
- Observers also recorded ocular estimates to describe the habitat within a 50-m radius of each survey point including overstory and understory height and composition and ground cover
- Obtained cattle stocking data from the FS for grazed pastures in the Upper Green River site
- Estimated relationships of avian species occupancy with vegetation metrics and cattle stocking data using multi-species occupancy models
- Examined correlation between stocking data and vegetation metrics to infer potential grazing impacts

Lincoln's (top) and Brewer's (bottom) sparrow, The Cornell Lab

RESULTS

- Detected 73 bird species at the two sites including most commonly white-crowned, Lincoln's, and Brewer's sparrow
- Forb cover, herbaceous height, and bare ground were greater at Upper Gros Ventre, whereas grass cover was greater at Upper Green River
- Found numerous statistically supported species occupancy relationships with vegetation metrics, such as positive relationships for savannah, vesper, and Lincoln's sparrow with grass cover and herbaceous height
- Found even stronger relationships between bird occupancy and shrub structure and composition, largely reflecting broad species associations with vegetation types
- Found a negative correlation between grass cover and cattle stocking data





Savannah sparrow occupancy probability for survey points relative to grass cover (left) and shrub cover (right). Occupancy relationships for Upper Green River in green and for Upper Gros Ventre in black.

Above: savannah sparrow, The Cornell Lab

MANAGEMENT IMPLICATIONS

- Reductions in grass cover and herbaceous height from grazing could negatively impact habitat quality for savannah, vesper, and Lincoln's sparrow, which showed positive relationships with these attributes.
- Severe grazing from domestic or wild herbivores that affects shrubs could negatively impact multiple bird species given strong species relationships with shrub structure and composition (e.g., warbling vireo and yellow warbler showed positive relationships with riparian shrub cover).
- We did not find species occupancy relationships with cattle stocking, but these relationships were limited for inferring grazing effects. Further research that includes replication, distinct evaluation of domestic and wild herbivory, and measurements of fine-scale variation in grazing intensity would complement this study to strengthen inference of grazing implications for montane shrubland birds.

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For more information about this study, contact Quresh Latif (quresh.latif@birdconservancy.org).

To download the final report, visit: https://www.birdconservancy.org/wp-content/

Integrated Monitoring in Bird Conservation Regions