Obligate Grassland Birds in the Foothills Parkland: Impacts of Landscape on Field Survey Methods

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How does landscape context affect the agreement between paired Human Point Counts (HPCs) and Autonomous Recording Units (ARUs)?

ARUs are increasingly used in combination with HPCs for avian community surveys across study regions. Species-specific Effective Detection Radii (EDRs) based on paired ARU/HPC surveys with distance sampling are used to correct abundance to densities to compare between survey types[1,2]. However, the comparability of ARU/HPC has only been studied in boreal forest communities, and EDRs generally do not account for landscape context.

Prediction: as the landscape becomes more complex, the agreement between paired ARU and HPC surveys will decline as detectability decreases differently between ARUs and HPCs. These landscape-dependent differences in detectability should be accounted for in EDR corrections.

Landscape Context	→	**Detectability**	→	**Avian Community**
Composition (Habitat Amount)				
Configuration (Fragmentation)		Auditory Cues		Richness (rare species detection)
Topography (SD in Elevation)		Visual Cues		Abundance (estimation methods)

Contiguous Grassland with Consistent Topography

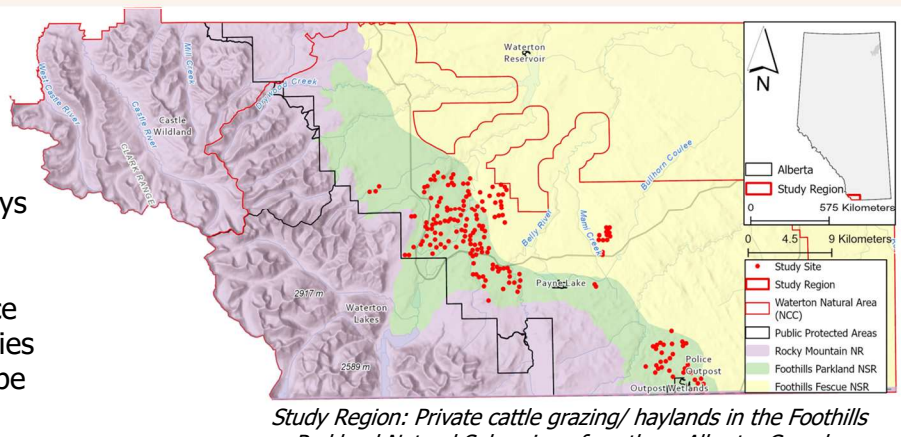
Fragmented Grassland with Variable Topography

Methods

1. Sites selected for 100m radius of consistent grassland
2. 105 Paired 5-min HPC/ARU Surveys Conducted May 24 to Jul 5, 2021
3. Ran GLMs explaining Bray Curtis Similarity, Difference in Abundance Observed, and Difference in Species Observed as functions of landscape and survey variables.

Variables Modelled

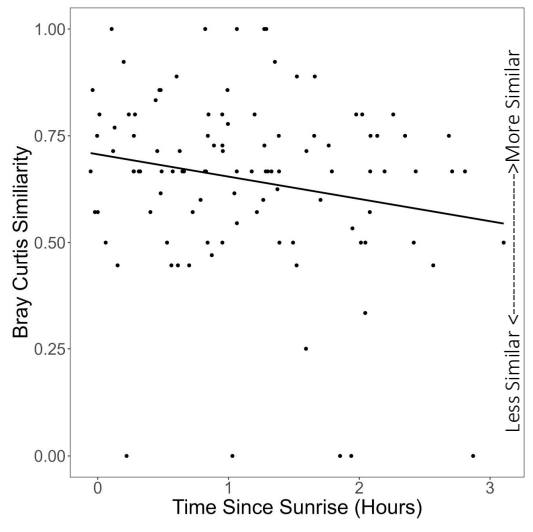
- Location (easting/northing)
- **Time of Season (Julien Day) ***
- **Time Since Sunrise ***
- **Observer/Recording Transcriber ***
- Cover of Non-native Species (~habitat mod.)
- Distance to Paved Roads
- Distance to Forest Clusters
- Amount of Grassland within 400m
- Fragmentation of Grassland within 400m
- Topographic Variation within 400m
- Amount*Fragmentation
- Amount*Topography
- Fragmentation*Topography



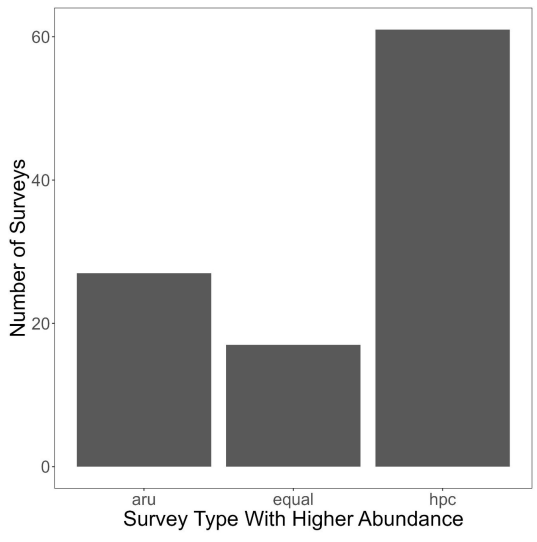
Study Region: Private cattle grazing/ haylands in the Foothills Parkland Natural Subregion of southern Alberta, Canada.

Results

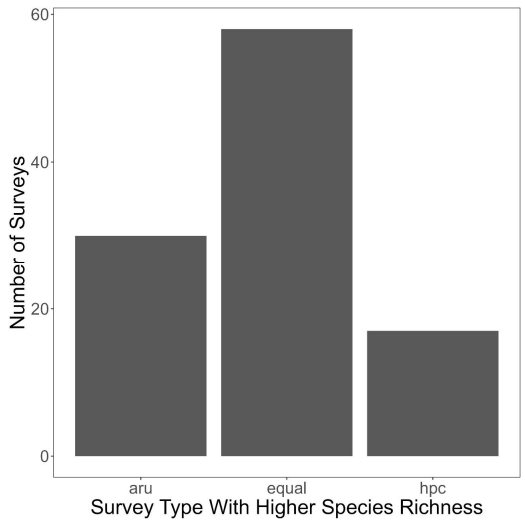
1. **Agreement did not vary significantly with any landscape variables**
2. Agreement declined with time since sunrise, indicating later morning surveys were less comparable
3. Agreement was affected by the HPC Observer/ ARU Transcriber pairing, indicating personnel effects
4. More birds were detected with HPCs, especially later in the season
5. More species were generally detected with ARUs



Survey agreement declined with Time Since Sunrise



More birds were generally detected in HPCs



More species were often detected by ARUs

Conclusion

Even without Effective Detection Radii (EDR) corrections, agreement between Autonomous Recording Units (ARUs) and Human Point Counts (HPCs) in this low diversity obligate grassland bird community does not vary significantly with landscape context. This supports that detection rates are likely consistent across sites within the site selection parameters detailed in this study, facilitating existing methods to compare ARU and HPC survey methods in future monitoring.

Acknowledgements
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References
1. Van Wilgenburg et al. Paired sampling standardizes point count data from humans and acoustic recorders. Avian Conservation and Ecology 12 (2017).
2. Sólymos, P. et al. Calibrating indices of avian density from non-standardized survey data: making the most of a messy situation. Methods in Ecology and Evolution 4, 1047–1058 (2013).