

DISTURBANCE DRIVES AVIAN COMMUNITIES ON A GRASSLAND-SAGEBRUSH ECOTONE

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Driving Questions: *In a patchwork of grassland and sagebrush, what role do disturbances (i.e., prairie dog colonies or historic fires) and abiotic landscape features play in shaping the bird community?*

Background: An ecotone is a transitional zone between two or more ecosystems. While these areas are often biodiversity hotspots and conservation targets, the “messy” patchwork nature of these systems can present challenges to managers.

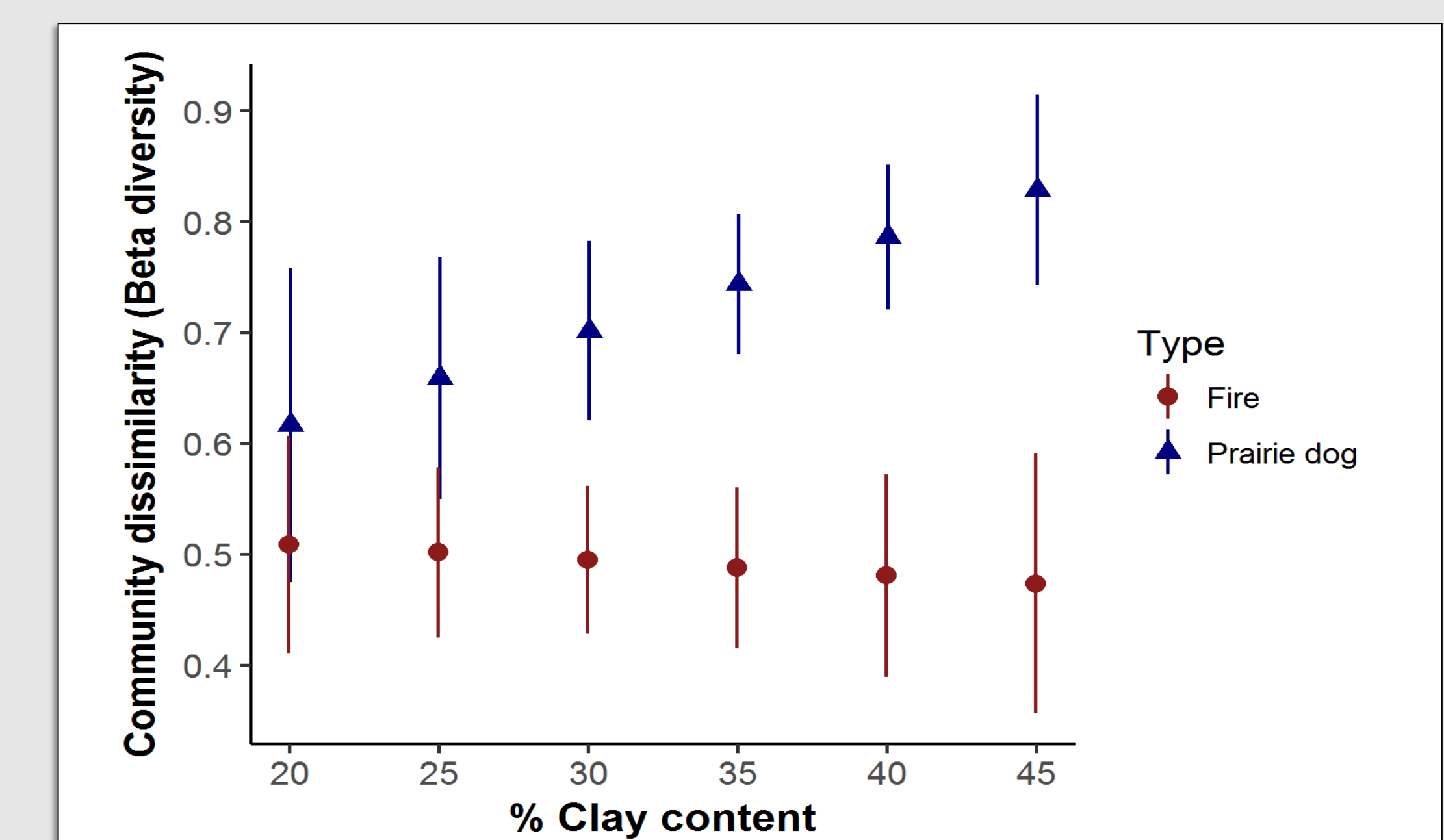
Study System: The Thunder Basin National Grassland sits at the ecotone between the Great Plains and the sagebrush steppe. It provides important habitat for grassland and sagebrush birds, two of the most imperiled bird guilds in North America.

Challenge: Grassland birds rely on frequent and intense disturbance by fires, grazing ungulates or burrowing mammals. Conversely, sagebrush birds are largely intolerant of these disturbances. **To manage all target species in this landscape, we need to examine avian community structure in disturbed patches and undisturbed habitat.**



Results

- Richness and diversity were lowest on prairie dog colonies
- Mountain plovers occurred solely on prairie dog colonies (Fig. 3)
- Grasshopper sparrows were most abundant on historic fires
- Sagebrush birds were rare on disturbed patches
- Other disturbance-independent factors, like topography and soils, also interacted with disturbance to shape communities (Fig. 4)



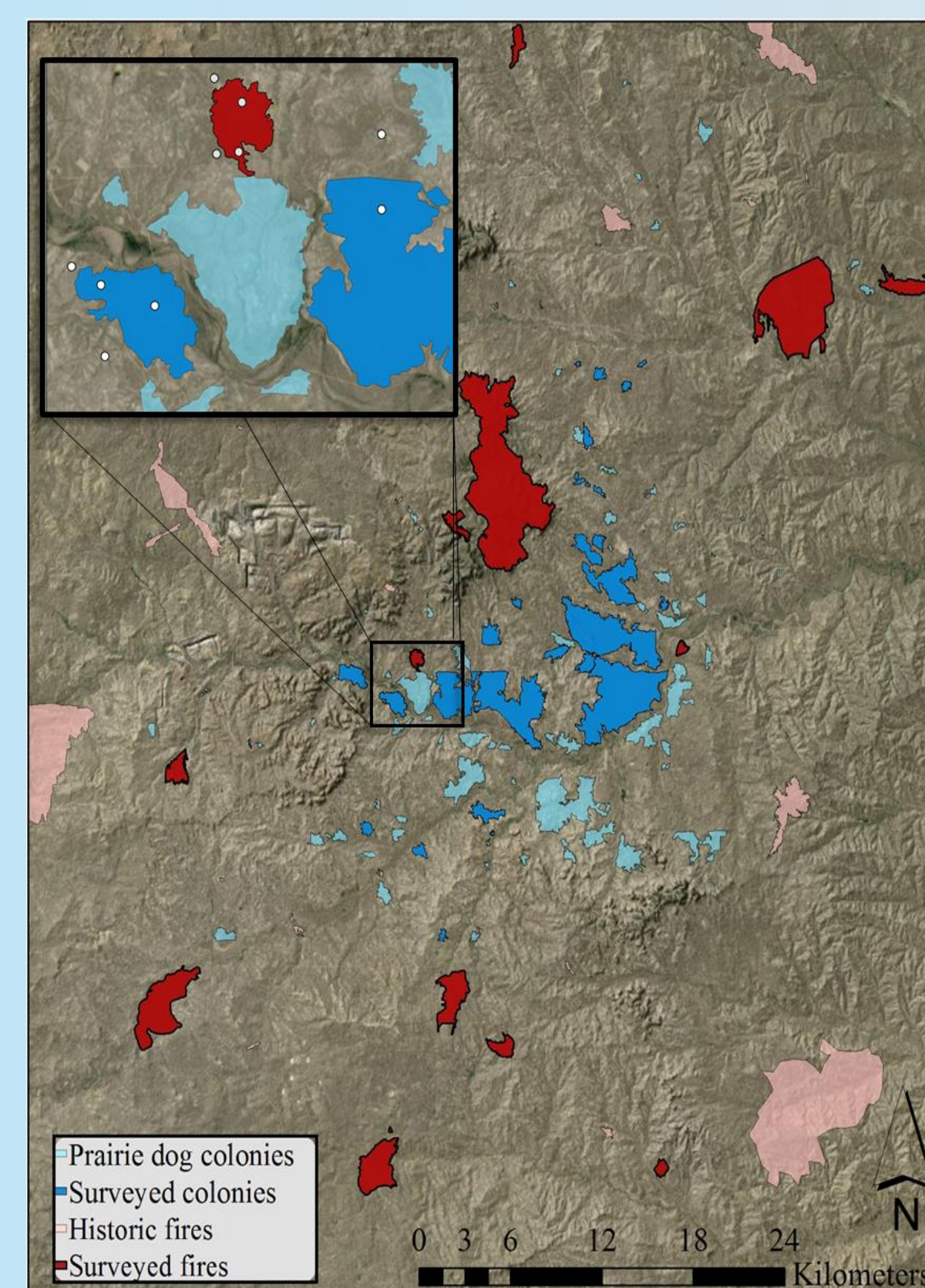
Conclusions

- **Maintaining the full suite of avian species in Thunder Basin will require multiple types of disturbance within an undisturbed matrix**
 - Prairie dog colonies provided short, sparse vegetation
 - Fires provided dense grasses
 - Only undisturbed habitat provided dense sagebrush
- **Abiotic landscape features interacted with disturbance to further alter habitat suitability**
- **Future research should explore influence of disturbance configuration on habitat suitability for each species**

Figure 1. Methods and Study Area

Survey protocol

Years: 2016-2017 (May 20-June 30) - Distance-adjusted densities



Colony

Size range (6-4000 ha)
Age range (0-15 yrs)
Point pairs surveyed (n = 40)

Fire

Size range (5-3500 ha)
Age range (5-43 yrs)
Point pairs surveyed (n = 32)

Covariate data sources

SSURGO
PRISM
Point-level line intercept data

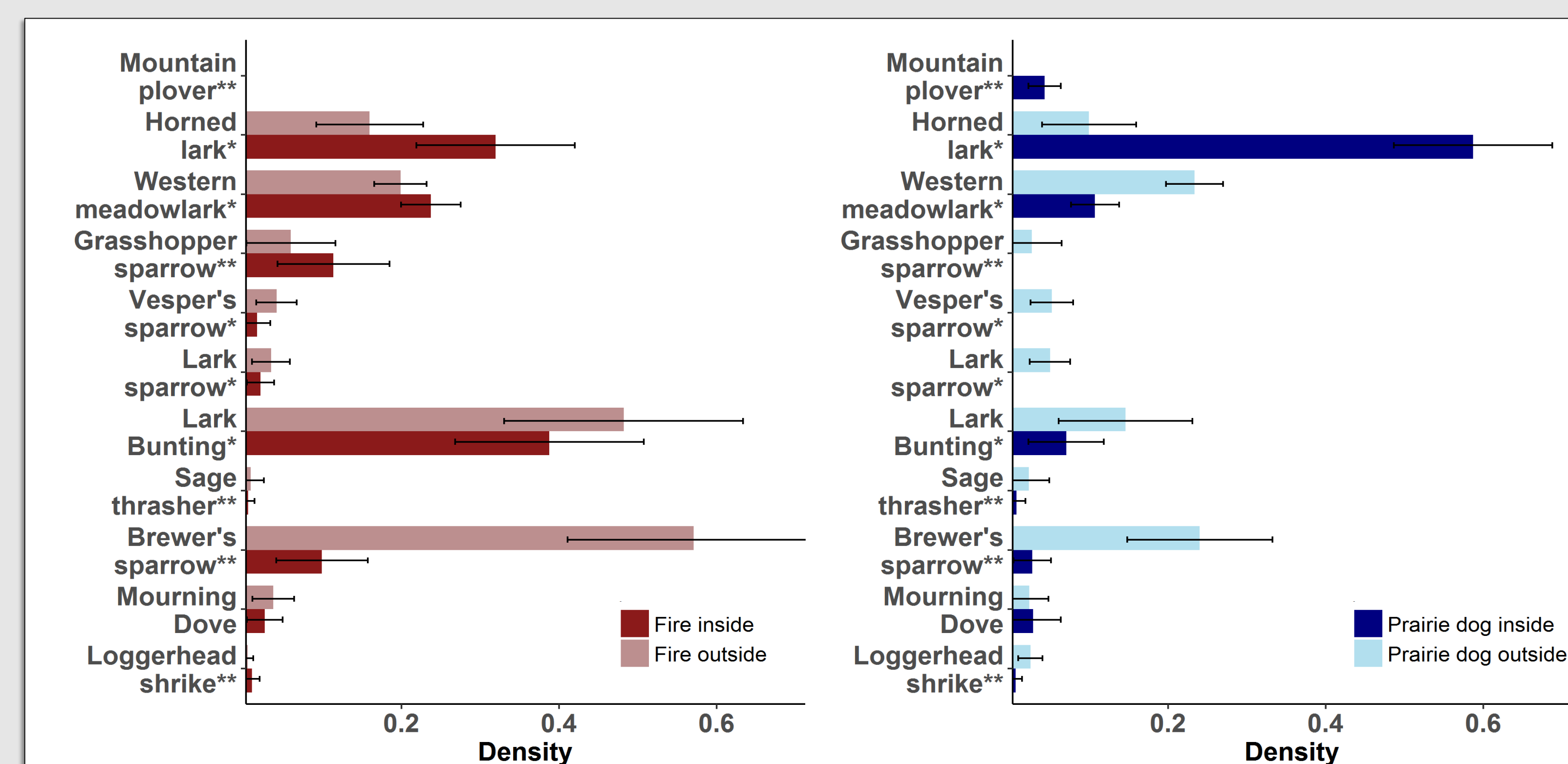


Figure 3. Distance-adjusted densities (per ha) of 11 abundant species on and off fires (red) and off prairie dog colonies (blue) averaged among years, Thunder Basin, Wyoming, 2016–2017. * indicates Partners In Flight (PIF) species in decline (rank 4 or 5), ** indicates species that are both PIF in decline and SGCN in Wyoming.

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