

Introduction

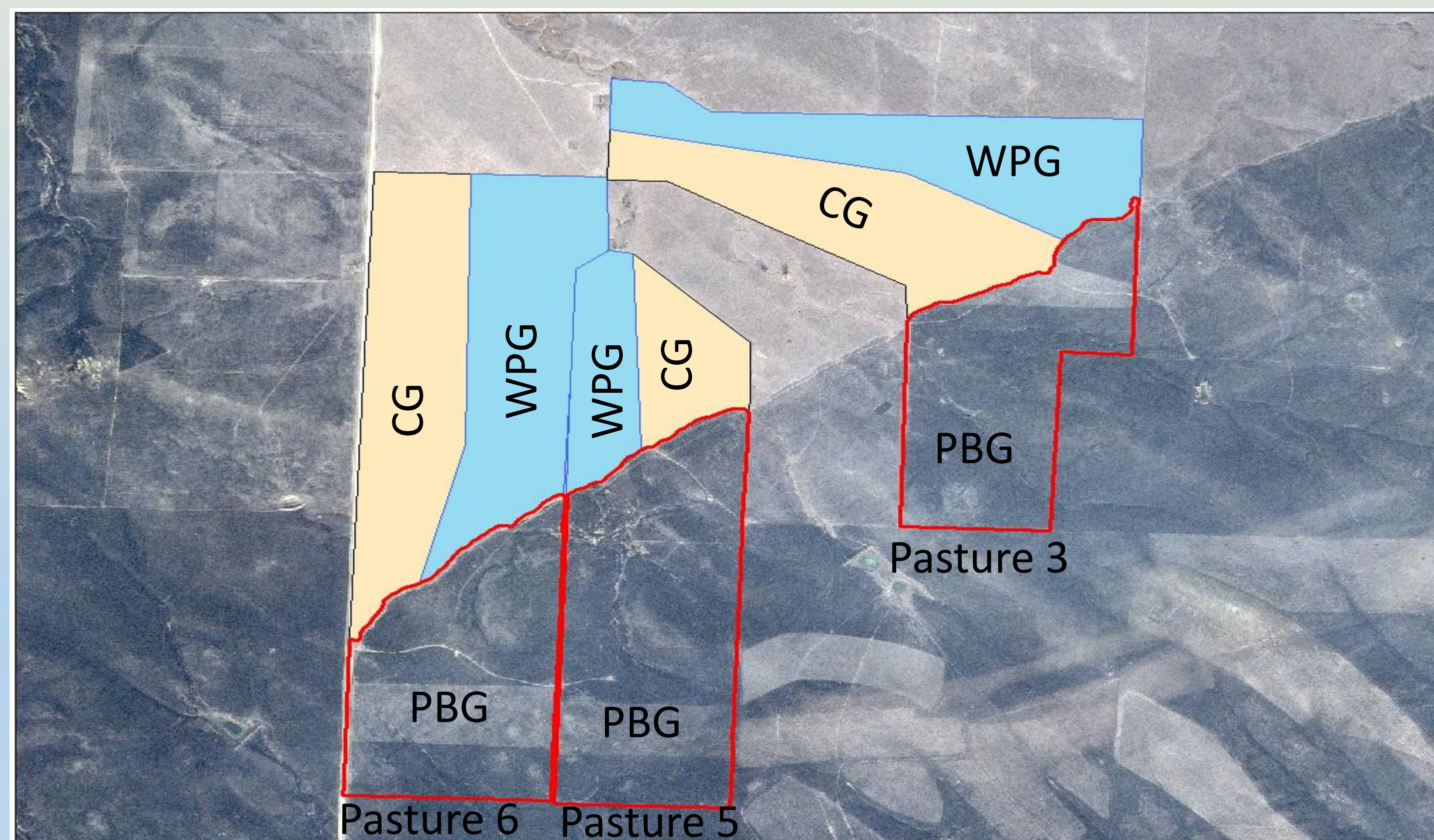
- Northern Great Plains evolved under grazing and fire.
 - Creates mosaic of plant communities and structure
- Patch burn grazing (PBG) is effective in increasing heterogeneity on the landscape.
- Many landowners are averse to fire due to concerns of property and forage loss.
- Intensive Winter-Patch Grazing (WPG) is being studied as an alternative non-pyric management strategy for creating heterogeneity.

Objective

Compare effects of a wildfire burned patch (PBG), a WPG patch, and an untreated control patch (CG) on vegetation structure and livestock use patterns.

Site Description

- Cottonwood Research Station, South Dakota
- Northern mixed-grass prairie
- Wildfire burned portion (PBG) of each pasture Fall 2016
- Other portions of pastures heavily grazed (WPG) in fall-winter 2016 - 2017.
 - Patch intensively grazed by cows to reduce standing dead forage and vegetation structure.



Methods

- Pleiades satellite tasked to image site in May 2017
 - NDVI used to compare "greenness" of treatments
- Live and standing dead vegetation height transects recorded in spring 2017.
- Pastures grazed by yearling steers May-July 2017
 - Subset fitted with GPS collars to track movement
 - Preference Index (PI) calculated for each treatment
 - $PI = \frac{\% \text{ of GPS points in treatment}}{\% \text{ of pasture treatment occupies}}$
 - Data Analyzed in Program R using ANOVA for pasture X treatment effects

Results

Table 1: Treatment effect on spring standing dead and current year growth height. A significant pasture x treatment effect (P<0.001) was observed.

Pasture	Treatment	Mean Standing Dead Height	Mean Current Growth Height
3	CG	21.6 ^B	22.6 ^B
3	WPG	9.6 ^D	17.5 ^C
3	PBG	0 ^F	13.7 ^{DE}
5	CG	24.7 ^A	26.0 ^A
5	WPG	7.9 ^D	13.4 ^{DE}
5	PBG	0 ^F	12.0 ^E
6	CG	16.8 ^C	23.5 ^{AB}
6	WPG	4.9 ^E	16.3 ^{CD}
6	PBG	0 ^F	11.8 ^E

NDVI Density Plot By Pasture and Treatment

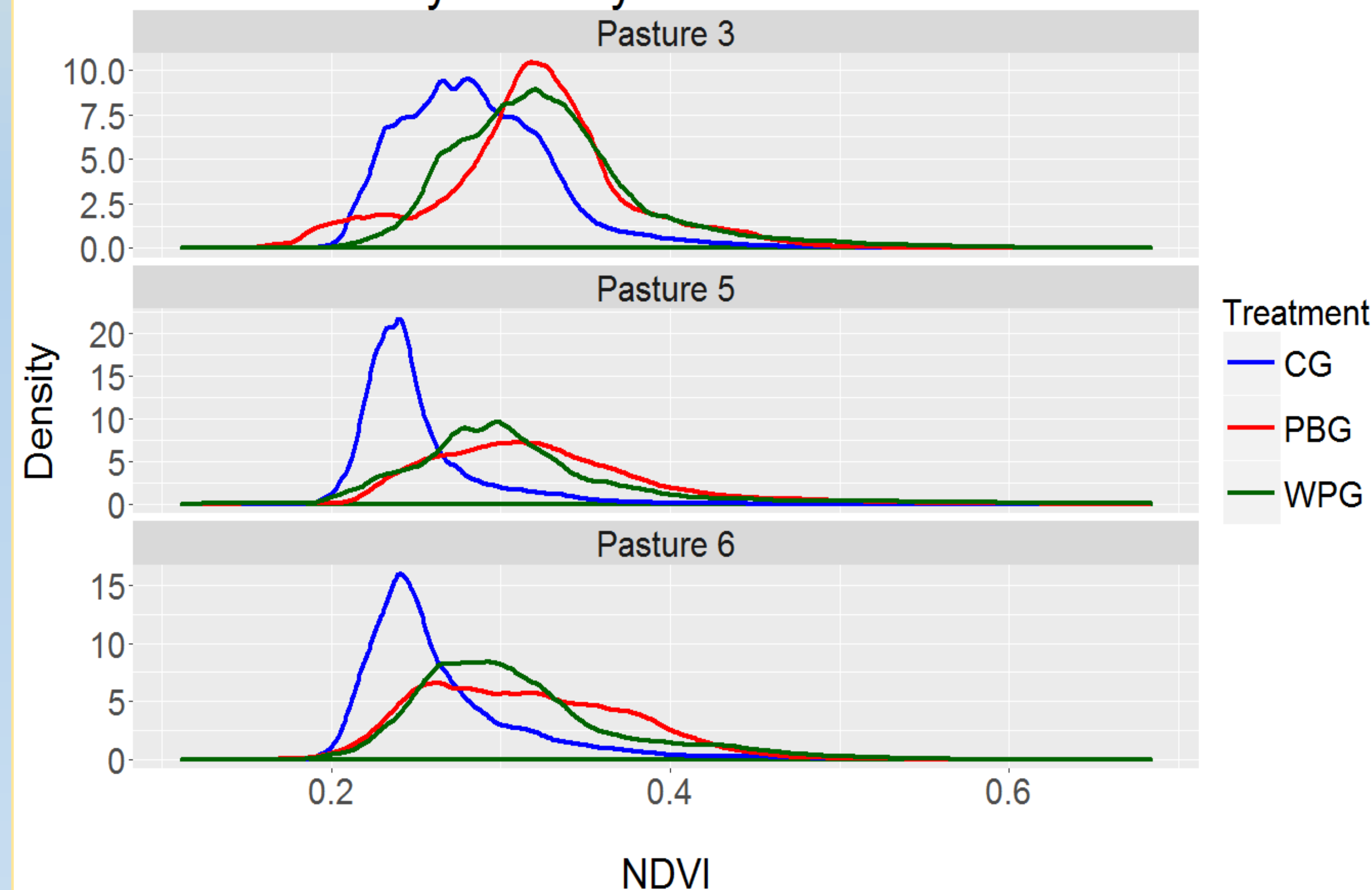


Figure 1: Density plot of NDVI values for each treatment and pasture. Higher NDVI value indicates "greener" vegetation.

Cattle Preference Index

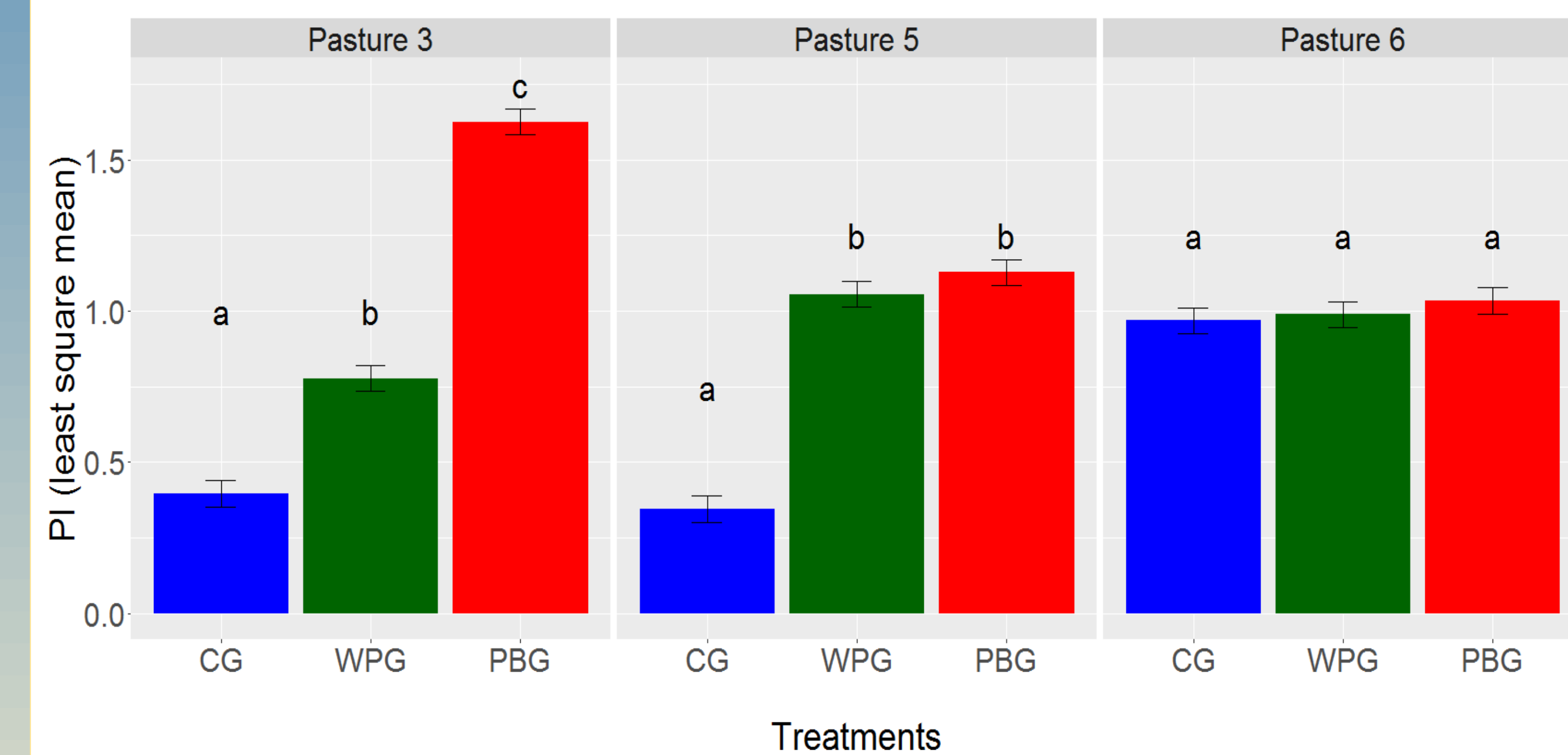


Figure 2: Preference index values for livestock use for each treatment and pasture. A significant pasture x treatment effect was observed (p < 0.001). Letters indicate significant difference between treatments within pastures.

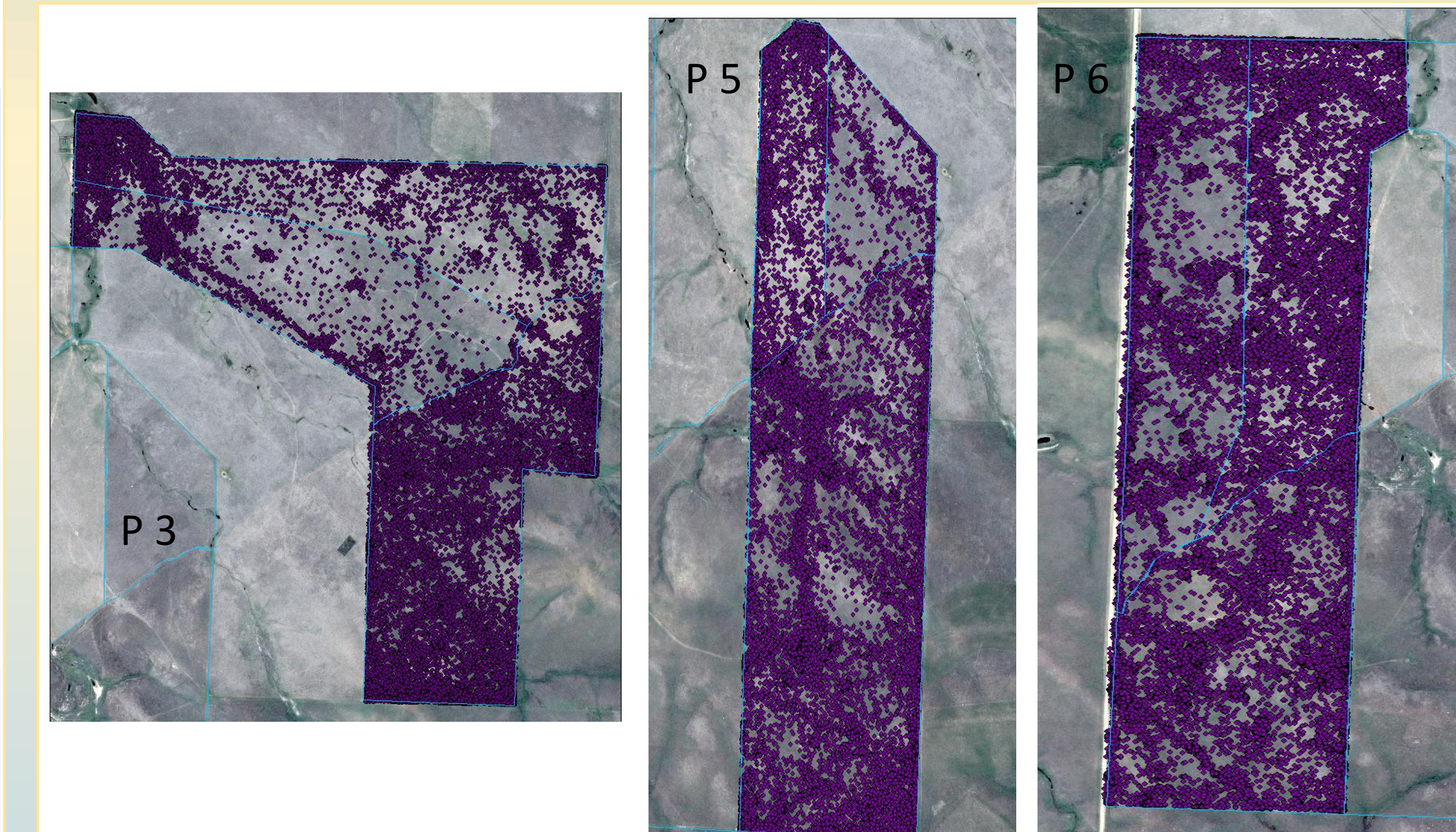


Figure 3: Example of steer GPS locations for each pasture

Conclusions

- WPG treatment significantly reduced standing dead forage compared to the control.
 - Also resulted in reduction in current year's growth
- Both WPG and PBG treatments resulted higher NDVI values compared to control.
 - Increased "greenness" of pastures likely served as an attractant to grazing livestock
- In all pastures cattle had a higher preference for PBG, followed by WPG then CG.
- WPG is an effective management tool to alter vegetation structure and shift livestock movement on the landscape.
- May serve as a more palatable tool than fire for many land managers.

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