

## **\*\* Factors Influencing Plains Bison Group Stability and Fission Fusion Events**

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Plains bison (*Bison bison bison*), a keystone species in North American grasslands, exhibit fission-fusion dynamics in which they break into smaller groups and coalesce into larger groups over time. However, it is unclear what social and environmental factors drive these dynamics. We utilized movement data from solar-powered GPS ear tags to examine fission and fusion dynamics for three bison herds over multiple years at American Prairie in northcentral Montana. We simultaneously tracked between 25 and 90% of the adult female bison in each herd, allowing us to identify the factors influencing changes in group composition. We classified time steps as either containing a fission or a fusion, characterized by at least two bison leaving or joining a group. Groups were defined based on the percentage overlap of utilization polygons generated with the CTMM package in R. We investigated the impact of environmental and social factors on both the probability that a timestep will contain a fission or fusion event and the duration of a group's stability. Our environmental variables include remotely sensed metrics of forage quality, forage quantity, and landcover. Social variables include group size, composition, and average relatedness. Our results suggest that both social and environmental factors impact fission fusion probability and group size, though different aspects of group dynamics respond to different ecological factors. Since the keystone role of bison is tied to their intensive grazing and collective movements, it is important to understand how the size and composition of groups change over time and environmental characteristics.