Introduction

Aside from the keystone role they play by grazing in tallgrass prairie ecosystems, it has been questioned whether bison play a role in rock movement and geomorphic processes, specifically at Konza Prairie.

This was answered by an undergraduate research team at Kansas State University. They conducted a study in which rocks on a hillslope where bison freely roam, were measured, recorded, and monitored over a four week period. By the end of their study, they found that bison do in fact have numerous interactions with rocks on the Konza Prairie and are very likely geomorphic agents of the prairie landscape (Barrios et al., 2022).

To expand on their findings, our research team continued to monitor the previous team’s study site for additional time and chose a second study site on a neighboring hillslope with numerous differences. This allowed us to determine to what extent bison-rock interaction and concluded that bison act as geomorphic agents on the Konza Prairie (Barrios et al., 2022).

Methods

Selecting a Second Site: We decided on selecting an area that was away from the fence line and had a different facing slope than the original site.

Setting up the Second Site: We placed randomly selected rocks every 1 m along six different transects. Each transect had 20 rocks and the tops were painted with a red stripe and bottoms were painted green.

Recording Rock Movement: Recorded rock movement based on how much they traveled downslope and upslope, how many degrees did they rotate, and whether or not they flipped over.

Results

Rock Movement on Slopes: Rocks move downslope from stress from many factors including, shape, size, animal activity, gravity, weather, angle of slope, type of soil, and many others.

Previous Work: In a previous study conducted at Konza Prairie, students from Kansas State University chose a hillslope in which bison were able to roam freely and placed marked rocks on 6 transects. They determined a 54% rate of bison-rock interaction and concluded that bison act as geomorphic agents on the Konza Prairie (Barrios et al., 2022).

Activity

Background

The Konza Prairie is mostly made up of chert and flint-bearing limestone layers embedded with shale. The ridges of these hills are flat with shallow, rocky soils which makes them an excellent area to study rock movement on hillslopes. Factors such as wind and water as well as the biodiversity like the tallgrasses and the animals like the bison have impacted Konza’s geomorphology. The rocks littered throughout the Konza create a natural arming for the hillslopes which help contain the topsoil allowing for plant species to grow and for animals to thrive. Erosion of the geologic layers is caused by tributaries of the Kansas River, creating a landscape of dissected hills. The Konza Prairie is also currently home to over 200 bison.

Bison Numbers Compared to Rocks Being Altered

When deciphering through the data we became aware of rocks showing noticeable movement even while bison were not observed. One way that the rocks could have moved are from weather related activity like heavy winds and rain. Another way the rocks could have moved is from the vegetation, the second site had areas of high and low amounts of vegetation which are a factor in how rocks are impacted on hillslopes.

To what extent do bison have an impact on the movement of rocks on the Konza Prairie?

Discussion

Although there was a similar amount of bison activity throughout the duration of this study, there was a lower rate of rock movement when compared to the previous study. This indicates that despite there being evidence that bison do in fact move rocks, the significance of their impact on rock movement at Konza Prairie is not as substantial as previously believed.

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