Bison, Fire, Nitsitapii: Utilizing Innii(Bison) and Controlled burns to Maintain Short-Mixed Grass Prairie Biodiversity within the Blackfeet Nation

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Introduction

Blackfeet people have actively managed shortgrass prairie and bison herds through controlled burns and management techniques for hundreds of years. Bison and prescribed burns regenerate the prairie ecological growth succession cycle (EGSC) and enhance biodiversity. Bison are a keystone species to the Blackfeet Reservation's short-mixed grass prairie which resides in the Rocky Mountain Plains Region. Grazing promotes indigenous plants and In addition, bison fur, chips, urine and wallows promote productivity in the landscape-highlighting them as caretakers of the land. Bison graze burned sites which is one way bison and fire favor each other. Controlled burns most beneficial attribute is regenerating the ecological growth succession cycle. Controlled burns reduce the intensity and destructiveness of wild fires, as well as the fuel needed for wild fires to occur. Together bison and controlled burns maintain the short-mixed grass prairie and restore biodiversity within the Blackfeet Nation.

Background

Why are bison important environmentally?

•Bison •Urine •Chips •Wallows •Fur

Bison urine and chips fertilize the soil with high amounts of nitrogen. Bison chips attract dung beetles which are an endangered species in some regions (Fallon, n.d.) (Knapp et al. 1999). Two more components that bison naturally offer the landscape are wallows and seed dispersal from their fur. Wallows are large craters created in the ground from bison rolling or sleeping in an area. Wallows physically change the landscape to promote high biodiversity. Lastly, bison fur and movement act as a seed dispersal mechanism for prairie forb species (Truett, Phillips, and Kunkel 2001).

Table 1.

Site 1	Site 2:
Andropogon Gerardii	Andropogon Gerardii
Schizachyium Scopanium	Schizachyium Scopanium
Bouteioua Curtipendula	Bouteioua Curtipendula
Eragrostis Spectabilis	Eragrostis Spectabilis
Koeleria Macrantha	Koeleria Macrantha
Dichanthelium Oligosanthes	Dichanthelium Oligosanthes
Panicum Virgantum	Poa Pratensis
Poa Pratensis	Sorghastrum Nutans
Sorghastrum Nutans	Carex Meadii
Carex Meadii	Amorpha Canscens
Amorpha Canscens	Asclepias Viridis
Symphyotrichum Ericoides	Baptisia Australis
Baptisia Australis	
Lespedeza Capitata	
Oxalis Stricta	
Solidago Canadensis	

Table 2.

Site 1	Abundance (# of individuals)	Site 1	Abundance (# of individuals)
Andropogon Gerardii	90	Andropogon Gerardii	10
Schizachyium Scopanium	15	Schizachyium Scopanium	11
Bouteioua Curtipendula	2	Bouteioua Curtipendula	9
Eragrostis Spectabilis	1	Eragrostis Spectabilis	10
Koeleria Macrantha	1	Koeleria Macrantha	9
Dichanthelium Oligosanthes	1	Dichanthelium Oligosanthes	8
Panicum Virgantum	1	Poa Pratensis	12
Poa Pratensis	1	Sorghastrum Nutans	10
Sorghastrum Nutans	1	Carex Meadii	9
Carex Meadii	1	Amorpha Canscens	8
Amorpha Canscens	1	Asclepias Viridis	11
Symphyotrichum Ericodes	1	Baptisia Australis	10
Baptisia Australis	1		
Lespedeza Capitata	1		
Oxalis Stricta	1		
Solidago Canadensis	1		

Table 1-2. Comparison of plant biodiversity at two sites.

Table 3.

Land cover type	Overall	Spring	Summer	Fall	Winter
Chaining	1.432	2.734	0.547	1.085	1.681
Aspen Woodlabnd	1.28	0.759	1.605	-2.391	-12.944
Grassland	1.127	1.237	1.468	1.005	0.625
Riparian	1.008	1.217	2.741	0.747	-0.041
Alpinine Meadow	0.617	0.491	1.281	-0.266	-1.622
Shrubland	0.596	0.053	1.152	0.767	0.332
Grass-Shrub Mix	0.526	0.319	1.103	0.66	-0.245
Oakbrush	0.385	1.265	0.463	-0.268	0.248
Coniferous Woodland	0.262	0.927	0.622	-0.059	-1.046
Pinon-Juniper Woodland	0	0	0	0	0
Barren Ground	-0.154	-0.01	0.06	-0.329	-0.227

Table 3. Segregation Coefficients (SC) for habitat selection in season, Gender (all female), and, land cover type. Ranking from highest to lowest. Positive and negative coefficients indicate preferability above or below pinon-juniper woodland. Chaining is the same as burning.

How are controlled burns culturally significant?

•Attract Bison •Health of people •Health of ecosystem •Bison management •Economic •Culture.

Controlled burns by members of the Blackfeet/Blackfoot Confederacy have been practiced since the early twentieth century. They used controlled burns, which was a technique used to draw bison to a specific area. Controlled burns have been a tool that the Blackfeet people systematically used to their advantage in hunting as well as helping to reciprocate a balanced ecosystem and improve the overall health of the land. Today, controlled burns stay an important component to the future management of the Blackfeet Nation.

Why is fire important environmentally?

•Ecological growth succession cycle

Fire is needed to generate the ecological growth succession cycle over (EGSC). The EGSC is needed by plant and insect species who depend on the difference stages within this cycle. Without fire, the tree canopy is allowed to grow without regulation and will dominate an area. Fire manages the tree canopy from drowning grass and smaller plant species away from the sun. Without grassland plant diversity, insect and animal diversity do not survive. Controlled burns demonstrate how fires can be managed to improve the land instead of having destructive and dangerous affects. Utilizing both bison and fire together, the landscape can regenerate at a healthy and productive state (Stewart 2002).

Fig.3 practice of a controlled burns by members of the Blackfeet/Blackfoot Confederacy in early twentieth century

Fig.4 topographical map of Blackfeet Reservation boundaries and Glacier National Park Boundaries.

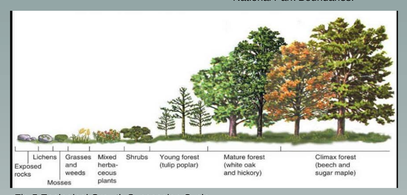


Fig.5 Ecological Growth Succession Cycle

Why are Bison culturally significant to the Blackfeet culture?

•Ceremonies •Songs •Whole Buffalo •Tools •Food •Clothing •Stories

One of the most significant stories that Blackfeet have about bison is when the bison disappeared. This story records how the Blackfeet people were given the inniiskiim rocks (buffalo rocks) and how these inniiskiim rocks brought back the bison to the people. This story is a historical event, lesson, and culture practice. For Blackfeet people who thrive in the very high elevation and cold winters, starvation is one of the worst hardships to overcome. This story acknowledges the importance of having the presence of bison in the landscape. When the bison returned, they gave Blackfeet the inniiskiim rock which is still something of very high value today (Jesse DeRosier 2018). Bison were the main nutrient source in the pre-colonial diet of the Blackfeet. Traditionally, every single part of the bison honored through ceremonies, songs, stories and in everyday life for tools, food and, clothing. Blackfeet people understood bison behavior and would utilize buffalo jumps or sharp cliff faces, to drive bison of the edge

Fig.6 Huckleberry Lookout
Canopy thickness and growth of woody species.
Date: July 30, 1935 (B/W)
Date: July 9, 2009 (Infrared

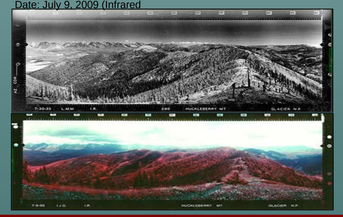
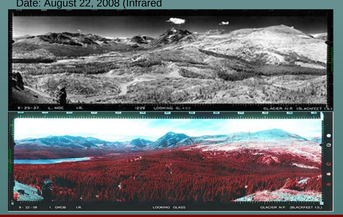


Fig.7 Looking Glass Overlook
Canopy thickness and growth of woody species.
Date: June 25, 1937 (B/W)
Date: August 22, 2008 (Infrared



Analysis

The primary reason wild fires In the Rocky Mountains Plains region are becoming more severe is due to fuel loads not being managed. "According to BLM and Forest Service data, the number of acres burned by wildfire annually are on a long-term upward trend. The fires which do occur are larger and more intense." (Gartner and Sieg 1996, 242). Increased fire frequency is one of the main factors to forage loss, Increased erosion, weed invasion and, most importantly loss of diversity of plants and animals (Gartner and Sieg 1996, 243). "Diminishment of native life at the local level has resulted from Plains-wide extinctions...Animals that have almost or completely disappeared from the Great Plains are the grizzly bear, wolverine, wolf, lynx, elk, and black-footed ferret, black-tailed prairie dog, sharp-tailed grouse, and, lesser prairie chicken" (Truett, Phillips, and Kunkel 2001). Historical accounts of bison grazing prior to the late 1800's was sufficiently intense to maintain shortgrass plains both northern and southern parts of the Great Plains.

Discussion

Controlled burns are used to start the Ecological growth succession cycle over, they are needed to regulate the domination of fuel for wild fires and to slow the process of climate change. Bison are not only keystone species to the North American continent but crucial to the Blackfeet culture and health. They are needed to maintain the unique biodiversity that is within the Blackfeet Reservation and also to restore the biodiversity that only bison can promote. Together, controlled burns and bison restore biodiversity sustainably.

Conclusion

In Conclusion the next step in this process would be to focus on the individual components to this project such as, how invasive species affect the area, glacial melt and, alternatives for livelihoods within the Blackfeet Nation that depend on cattle. Focused studies on these topics will provide concise evidence for why this landscape needs bison presence and controlled burns to continue. Looking at the different components can highlight Blackfeet managing practices as an example for the rest of Montana and ultimately provide opportunity for the tribe to expand the boundaries of the current bison herds managed by the tribe

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