

**Roger Griego
Graduate Student**

**THE EFFECTS OF BISON HORNING AND THRASHING
ON PIÑON AND JUNIPER TREES
AT THE WIND RIVER RANCH
WATROUS, NEW MEXICO**

SIGNIFICANCE:

This proposed research should provide some insight into whether Bison can be used as a restoration management tool in Piñon and Juniper woodlands to slow the spread of encroachment onto grasslands, by damaging the trees regeneration and redistribution capabilities. Why does a bison horn and thrash woody vegetation, such as Piñon and Juniper trees? Does the reintroduction of Bison onto Piñon and Juniper woodlands have significant impacts on Piñon and Juniper trees and does the final result reduce encroachment by damage through horning and thrashing behaviors? This research proposes to investigate the American Bison (*Bison bison*) as a keystone species in the transition zone between the grasslands and woodlands ecosystem. This keystone role is accomplished through horning, rubbing, grazing and trampling effects on Piñon and Juniper. The objectives of this study are to: (1) quantify horning and rubbing activity of bison on Pinion and Juniper trees; (2) characterize the objects being used by the bison during rubbing and horning activities; (3) examine the effects of bison horning and rubbing on Piñon and Juniper trees. In other words do Bison maintain grasslands by removal of encroaching Piñon and Juniper? My research hopes to address this question and explain how these behaviors affect the landscape.

INTERESTING BISON FACTS:

The plains bison (*Bison bison bison*), a keystone species of the North American grasslands, was a central figure for the First Nations and an important and controversial part of the history of the colonization of western North America (Coppedge & Shaw 1997; Knapp et al. 1999; Truett et al. 2001). The grazing habits of the bison, by grazing only on grasses and allowing the forbs to flourish, demonstrate the characteristics of being a Keystone species in tallgrass and shortgrass prairies and can significantly influence biodiversity in these grasslands (Collins et al. 1998). In addition, Bison horning behavior controlled tree encroachment by destroying saplings, and their wallowing behavior created depressions in the otherwise flat prairies, providing critical habitats for other species. “Their grazing patterns influenced the heterogeneity of grasslands, maintained habitat for prairie dogs and birds, and in conjunction with fire, served as a keystone species of grassland ecology” (reviewed in Knapp et al. 1999, Sanderson et al. 2007, and Gates et al. in press).

PIÑON AND JUNIPER FACTS:

Piñon and Juniper have been expanding their territory and are now encroaching onto western grasslands. This encroachment is leading to less plant species diversity, a decline in grasses, an increase in erosion, and reduced infiltration rates. Romme, (2009) states that “the ecological dynamics of Piñon and Juniper stands have changed and have contributed to the unnaturally dense stands and are encroaching onto former grasslands and shrub lands”. Rurik, (2007) conducted a study in the Chihuahua desert and concluded that “the removal of large grazer’s will result in declines in vegetation density and diversity”.

Piñon and Juniper woodlands encompass almost 13 percent of the Southern Rockies (Reading et. Al., 2010). These trees usually grow at elevations ranging from 5,610 ft. and 8,910 ft..

HYPOTHESIS:

HA1: Bison preferentially horn saplings.

HA2: Bison horning kills some junipers.

HA3: Bison horning reduces the live crown ratio greater than 50% on survivors.

HA4: Bison trampling injures/kills seedlings.

HO: Bison grazing activities will have no effect on the re-distribution and decolonization of Piñon and Juniper trees due to thrashing and horning activities.

TIMELINE:

This study will take place over a 2 year period. The following is a breakdown of the timeline:

- Phase 1- Define Ranch Boundaries using GIS software (Completed in October, 2009)
- Phase 2- Define three sampling zones and their boundaries through field observations.
(Completed in April 1st, 2010)
- Phase 3- Sampling of trees (Commence in August, 2010, complete by September, 2010)
- Phase 4- Analyze data (Commence in September, 2010, Complete by May, 2011)
- Phase 5- Present findings (May, 2011)

PREVIOUS BISON STUDY: (Miller 2009)

The Wind River Ranch will be the site for my proposed research study. The Wind River ranch grazes a herd of seventy bison. Preliminary studies at the Wind River Ranch have shown that bison were responsible for damaging 91 out of 100 Piñon and Juniper trees that were sampled, compared to a mean of 8.8 per 100 on five neighboring ranches that graze cattle (Colorado Piñon or *Pinusedulis*). Bison were also responsible for damaging 90 out of 100 yuccas sampled, compared to a mean 6.4 per 100 on five neighboring ranches that graze cattle (mostly Great Plains yucca or *Yucca glauca*). The Wind River Ranch is located about 25 miles north of Las Vegas, and is approximately five miles west of Watrous, New Mexico. The location of the ranch and the fact that cattle have been removed and are not allowed to graze on the property provides us with the opportunity to further study the Bison's horning and thrashing effects in area where the grasslands meet the Rocky Mountains. This area is also known as a transition zone, in that it transitions from grasslands to Piñon and juniper woodlands.