

A SOIL AND VEGETATION INVENTORY OF A GAME PARK IN SOUTHERN NEW MEXICO

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(Key Words: Pinyon-Juniper, Blue Grama, Range Site Analysis)

A new Class "A" wildlife game park is being established near Hondo, N.M. The ranch will focus most of its research and management efforts towards mule deer management and production within the 3200 acre game park. Before any long term investigations can begin, the baseline soil and vegetation data, such as which plant species, and in what amounts, are growing on which range sites, must be collected. This kind of information is needed to monitor and recognize any soil and vegetation changes resulting from management practices. For this area of New Mexico, very little is known about soil and vegetation relationships and this project will enhance that limited knowledge base.

The objectives for this study are to 1) collect and identify a sample of every plant species within the game park, 2) delineate soils, range sites, and plant communities (vegetation types), 3) locate permanent transects and field plots to measure and record important vegetation attributes, such as cover, density, frequency, and yield of dominant and other important plant species, 4) locate permanent photo points to record vegetative changes, and 5) place permanent utilization cages within the game park to measure current and future use of vegetation. The initial data collection will be completed in 1992.

INFLUENCE OF SOIL MOISTURE ON BROOM SNAKEWEEDS (*Gutierrezia sarothrae* [Pursh] Britt. and Rusby) ABILITY TO PROPAGATE AND SURVIVE

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(Key Words: Snakeweed, Soil Moisture, Seedbank, Survival)

Broom snakeweed (*Gutierrezia sarothrae* [Pursh] Britt. and Rusby) is a short lived perennial half-shrub responsible for large economic losses on rangelands throughout the Southwest. Snakeweed invasions are attributed, in part, to drought and a lack of wildfire and are considered by many to be cyclic. A study was initiated in November 1990 to examine the influence of soil moisture on broom snakeweed propagation and survival.

The first objective of the study was to determine the effect of increased soil moisture on snakeweed seedling propagation and survival. Field studies were conducted on the New Mexico State University Corona Range and Livestock Research Ranch. Study sites were established in two areas in 1990 using a randomized complete block design with five treatments and three replications of 0.2 acre plots (20 m X 26.5 m). Treatments applied included prescribed fires in March and June; application of picloram at 0.42 kg/ha in March; and untreated controls.

Nine permanent meter squared plots were established within each of these snakeweed control plots. Irrigation treatments were applied to these plots at a rate of 50% of the average monthly precipitation at different seasons (winter or summer) and at different frequencies (2 or 4 week interval). Summer burn plots had 67% of the total seedlings that germinated. Season or frequency of irrigation had no effect on the number of seedlings that germinated. Seedling survival was 80% on summer irrigation plots as compared to 38% on control plots.

The second objective of this study was to determine drought stress effects on mature snakeweed plants. At two sites, 60 mature plants were selected, 30 controls and 30 treated. Treated plants were excavated at apr. 10 cm beyond the canopy perimeter to a depth below the roots (apr. 30 cm) in November 1990 and May 1991. The ball of soil was then wrapped in 6 mil plastic to prevent precipitation from recharging soil moisture. Plants containerized in November 1990 steadily declined in soil moisture and increased their leaf water potential. After five or six months containerized plants were dead. All plants containerized in May 1991 were dead the first month after containerization. Data suggest drought stress may be less of a problem during the winter months and more important during early spring growth.

The final objective of this study was to determine the viability of snakeweed seeds found in the soil seed banks following fire, herbicide and control treatments. Laboratory research was conducted in the Range Greenhouse on the New Mexico State University campus. Six soil samples were taken with a 2 cm diameter soil probe to a depth of 5 cm from each treated plot. Samples were mixed by treatment and placed 1 cm deep over sterile sand in 15 cm diameter plastic pots. Pots were arranged in a completely randomized block design with three replications. Soil was watered as needed to maintain field capacity. Over the course of the study no snakeweed seedlings were observed.

FUEL AND ENVIRONMENTAL CHARACTERISTICS RELATED TO FIRE INTENSITY IN THE SHORTGRASS PRAIRIE

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(Key Words: Prescribed Burning, Broom Snakeweed, Herbaceous Response)

This study was initiated to determine important fuel and environmental characteristics that can be used to predict fire intensity in the Shortgrass Prairie of New Mexico. The study was conducted on the NMSU Range and Livestock Research Center near Corona, New Mexico in Lincoln and Torrance Counties. Results from this study will be combined with results from seasonal mortality measurements of broom snakeweed and herbaceous response to develop a burning prescription for management of broom snakeweed infested rangelands.

A total of 26 plots were burned in late March (Spring) and 16 in late June (summer) of 1991 at two locations on the ranch. Plots were divided into 4 fine fuel categories and burned at specific air temperatures for regression analysis. Fine and coarse fuel loads and moisture contents; percent total plant cover, bare ground, and litter; and density of broom snakeweed were measured on each plot. Climatic measurements included air and soil temperature, soil moisture, wind speed and direction, and relative humidity. Fire measurements included