

LANDSCAPE CARRYING CAPACITY

History of Grazing on Vermejo

Beginning in the 1880's, European settlers grazed livestock around small communities spread across what is now Vermejo. Under the Bartlett ownership, the Adams Cattle Company ran a cattle operation on the property. Cattle grazing continued through the Vermejo Club, Gourley, and Pennzoil ownerships. Elk, bison and horses also grazed portions of the property. Historically, especially during times of severe or extended drought, many areas were overgrazed.

Landscape Carrying Capacity

The Carrying Capacity of a landscape is the maximum number of animals that a landscape can support before degradation of the ecosystems occurs.

The forage production (how much edible plant grows in a growing season) of a landscape must be balanced with the number of herbivores to maintain healthy ecosystems. Herbivores or grazers on Vermejo include elk, bison, pronghorn antelope, horses, and smaller mammals including jack rabbits, prairie dogs and even marmots.

Overgrazing impacts plant health as animals repeatedly eat new growth of a plant. Not only the leaf portion of the plant is lost but also a portion of the root system. With less 'leaf' the plant cannot generate enough food through photosynthesis to support its root system. With a reduced root system, less water and nutrients can be absorbed from the soil further affecting the health and reproduction of the plant. Often grazers will key on favorite or more nutrient rich plants that can result in a decline in plant species diversity as well as the available nutrients for the animals. Plants, especially riparian species, provide a natural ecosystem function of water filtration during runoff. With less plant mass and root system, erosion increases, and the water carries more sediment and animal waste particulates to nearby streams reducing water quality.

The Vermejo Carrying Capacity Study

Vermejo's scientists identified that overgrazing was still impacting its ecosystems with a primary example being low biodiversity and cover in riparian areas. Small exclosures were built to gage how large herbivores were affecting the riparian areas by being able to measure plant growth without grazing pressure from ungulates (hoofed mammals). Regrowth of willows, alders, rushes, sedges and other riparian plant species within the small exclosures confirmed that the number of ungulates was too high. Vermejo developed a study to determine the number of grazing animals that the landscape could support while maintaining or improving habitat and ecosystems. The project would aid the long-term goal of adjusting the number of ungulates on Vermejo to match the Carrying Capacity while anticipating a more regular occurrence of drought in the southwest.

In 2011-2012, the Vermejo Natural Resources Department completed a Carrying Capacity analysis of the property. Using a Geographic Information System or GIS (computer mapping and analysis), 61 evenly spaced locations across the property were selected as carrying capacity locations. Elevation, slope, aspect, and dominant landcover type (oak shrub, ponderosa forest, alpine tundra, etc.) were documented for each site from map layers. The staff visited the 61 locations recording vegetation survey data in 1/5-acre plots and clipping the available forage in a 29" diameter range hoop at a center point. Forage included grasses, shrub leaves, cactus, moss, ... anything an herbivore might eat. The available forage (food) clipped at each location was dried and weighed allowing staff to calculate the plant production in pounds per acre for the site.

The GIS was also used to calculate total acreage of Vermejo split by landcover type (ponderosa forest, montane meadows, shortgrass prairie, rock scree, etc.). The average plant production in pounds per acre from the field sample sites was assigned to each landcover type and multiplied by the total number of acres of the cover type. Added together, the analysis gave the staff a total vegetative or plant production for the property for a 'normal dry year' - 2011-2012 were below average precipitation years.

The GIS was also used to create a parallel analysis with USDA soil information and the expected range plant production values. This analysis verified the results of the 2-year field study. Vermejo management made the decision to manage for a normal dry year because drought is part of the natural climate cycle in the western United States.

For sustainable soil and plant health, a conservative stocking rate is used at Vermejo. For most years, only 1/3 of the available forage will be utilized by grazing wildlife and bison leaving 2/3 as residual forage. Leaving residual forage increases plant root health, soil moisture, soil stability and plant litter (natural compost) all which increase soil health, maintain soil moisture, improve water and nutrient cycling, and reduce erosion. The residual also will help act as a forage buffer during drought years.

Production numbers were used to calculate how many AU's or Animal Units the ranch could sustainably support. (1 AU is equivalent to a 1000 lb animal, 1 mature bison = 1,000 lbs or 1.0 AU's, 1 mature elk = 600 lbs or 0.6 AU's, 1 horse = 1250 lbs or 1.25 AU, 1 deer = 200 lbs or 0.2 AU.) The current AU goal for VPR is 7,000 AU's.

The AU's and residual forage goal allowed both bison staff, wildlife biologists, and management to determine how many bison, elk, horses, pronghorn and deer should be on the property and to create grazing management goals. Vermejo gradually worked towards adjusting bison and elk populations to align with the Carrying Capacity. The number of bison on the ranch decreased from ~1,500 to the current herd of 971 bison (before summer calving). Vermejo worked with New Mexico Game and Fish to decrease the elk population over 10 years from 12,000 to approximately 7,000-7,500 elk through cow elk hunting. Vermejo also created a drought management plan that can be implemented if precipitation falls below 8.7 inches, which is 60% of the annual median moisture in the geographic area of Vermejo Park (headquarters area).

Continuing & Future Work:

The number of animal units is evaluated annually to maintain a healthy balance both for ecosystem and herd health and genetics. Annual fall elk surveys track population numbers as well as herd composition ratios (number of bulls, cows, and calves) while monitoring of range transects and forage clipping track growing year forage production across the property.

Milestones:

The success of the grazing management plan can be seen in the recovery of grasslands and riparian systems outside of the riparian exclosures. Riparian ecosystem recovery has attracted beavers outside of the riparian exclosures below ranch headquarters and near the Red Bridge below the Rock Creek and Vermejo River confluence. Castle Rock Park and the Pena Flor area have shown significant increases in grassland recovery.

FAQ's:

1. How much grass does a bison eat in a day? It is estimated that an adult bison eats 24 lbs. of forage per day. A herd of roughly 83 adults would eat 2,000 lbs. or 1 ton per day.