

Chapter 1 : Pricklypear Control on Short-Grass Range in the Central Great Plains. - Digital Library

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History[edit] The shortgrass prairie has a long human history. The Kiowa , Comanche , and Arapahoe peoples occupied the land, hunting bison and antelope. Seasonally, these tribes would stage hunts in the adjacent mountains such as the Rocky Mountains. To manage the prairie these tribes and their predecessors likely used fire. They would create fuel breaks, a gap in vegetation or other combustible material that acts as a barrier to slow or stop the progress of a brushfire or wildfire. A firebreak may occur naturally in areas without vegetation or other fuel, such as a river , lake or canyon around their settlements. These fuel breaks would also entice large herbivores to patches of fresh new growth. European explorers, trappers, and fur traders began to settle the shortgrass prairie. They developed an extractive economy that led to the later growth and industrialization of the prairie. In the mid- and late 19th century the railroads expanded transportation channels, helping to increase settlement, predominantly in rural and small towns. While more people began to settle in the prairie, large-scale cattle and sheep ranching increased as well. This later led to the development of gold , silver , and copper mining communities. The success encouraged farmers to buy more efficient farming equipment. With the new equipment, farmers turned up the native land, exposing the soil. By the time the s came around, it was too late to protect the soil with grass. The unprotected soil contributed to the Dust Bowl by being blown around and creating dust storms. This Act also laid the foundation for the dairy herd buyout program. Conservation Reserve Program[edit] Farmers enrolled in the program agree to abolish environmentally destroyed land from agricultural production and cattle grazing to improve and regrow healthy grass and habitats in exchange for a yearly rental payment. However, energy and mining exploration have increased. Over time, there has been a precipitous decline of many species, but inhabitants of the region today are demonstrating that sound land management practices can help sustain the native species, natural communities, and ecosystems. Due to this, the climate varies from North to South, but is essentially the same from East to West. The temperature in the North is significantly colder on average then the temperature in the South. Also, there is more precipitation to the south, and more precipitation to the East. An interesting distinction about the shortgrass prairie compared to the tall and mixed grass prairies is that it has a one to two month summer drought , where the other two do not. This means that it also the driest prairie of the three. Firstly, the population in the region is decreasing, with many of those people moving westward. Additionally, more people are moving to metropolitan areas , and about three quarters of the population in this region live in those metropolitan areas. The human population today is still mainly dependent on agriculture , but fields such as energy exploration and mining have become more popular in the area. Due to the increase in people this has affected the ecosystem of the region and there has been a decrease of amount of species and diversity of those species. The shortgrass prairie has copious amounts for economic potential as it is estimated that only about 50 percent of the shortgrass prairie is still uncultivated. The shortgrass prairie yields for a lot of crop production, and in this specific prairie wheat is the major crop grown. Other major crops grown are maize , soybeans , and cotton. Livestock Production[edit] The dry grasslands of the shortgrass prairie yield for extensive grazing operations. Typically cow-calf operations with the young animal sold for finishing in feedlots. Stocking rates and the economy in this region highly depend on the amount of precipitation, range conditions, and other environmental factors. Art[edit] Parts of the shortgrass prairie are untouched and pastoral. Many artists and photographers travel to this prairie for inspiration and economic opportunities. Paintings and photographs are often sold at high prices for their aesthetic beauty. The Dust Bowl brought a lot of artistic and photographers to this area in seek of fame and economic opportunities. However, it is pretty much impossible to define exact boundaries of the prairie. This is due to the shifting of plant communities over time and space because of the dynamics of grassland vegetation. So, the prairie extends to the eastern part of the Rocky Mountains to the west, up to Canada to the North, as far as Nebraska to the East, and as far as parts of Texas to the South. Those are just the general boundaries of the shortgrass prairie which is everything inside those said boundaries.

Roughly half of the original prairie extent is still present, however conservation in the long run is uncertain. Urban expansion is likely to continue having an impact. Climate change has less of an effect here than in other areas of Colorado due to the lower elevation, but can still be expected to affect the biome. The alliance educates people on the declining populations of prairie dogs and engages with projects likely to destroy prairie dog habitat. The prairie also teemed with large prairie dog colonies, deer and elk, and predators such as gray wolves and grizzly bears. The prairie is home to healthy populations of plains blue grama, a vast array of songbirds and raptors, carpets of buffalo grass and a broad diversity and abundance of wildflowers and butterflies. It was a landscape so teeming with life it has been compared to the South American Pampas. Today the most popular animal on the prairie is domestic cattle. The short grass prairie is used to having animals graze the land, so the pressure of grazing animals does not harm it. Pronghorn and prairie dogs still inhabit the prairie however, in fewer numbers. Top predators have been replaced by coyotes. Today, the shortgrass prairie has suffered the greatest biological destruction of any major biome in North America. The three central processes historically shaping the shortgrass prairie are herbivory, drought, and fire. Through habitat destruction, extermination of native herbivores and predators, proliferation of noxious weeds, and altered fire regimes have negatively been impacted. Most of these animals have adapted to living in such an open area, many having adapted to living under ground or traveling long distances to find shelter. Birds[edit] Grassland birds are part of the fastest decreasing groups of animals in North America. Although the loggerhead shrike and scaled quail birds are among the more common birds to see in the short grass prairie, they are also some of the few who are on the fastest decline. Most of these animals are cold blooded, so in the winter months they live under ground until spring comes. Cattle, pronghorn and white-tailed deer are the most abundant mammals on the short grass prairie today. Domestic cattle were placed in the prairie and have essentially replaced the native species that used to live in the short grass prairie such as bison and elk. In addition, the top predators used to be Gray wolf and Grizzly bear, but today, coyotes have replaced those animals. Prairie dogs[edit] Prairie dogs were once the most abundant animals in the short grass prairie, living in colonies across a range that historically spanned 11 states. Presently, prairie dogs are found in 1 percent of their former range. The decrease has been driven by poisoning campaigns, habitat disruption, and hunting. The decline in prairie dogs has significantly impacted many of the other animals that reside in the short grass prairie, including the black-footed ferret, whose diet relies on prairie dogs. Other animals negatively affected by the decline of prairie dogs are the mountain plover, swift fox, ferruginous hawk and the burrowing owl. Flora[edit] Shortgrass Prairie The short grass prairie consists of different varieties of vegetation. Notably abundant grasses are blue grama, sod-forming grass, and buffalo grass. Less prevalent is galleta grass. These grasses are native to the short grass prairie and therefore are drought and grazing resistant. Not many plant varieties appear in short grass prairies owing to its extreme changes in annual precipitation and temperature from one year to the next. Two of the main plants that are able to thrive are soap weed yucca and plains prickly pear cactus. In the years of greater precipitation, otherwise dormant wildflowers bloom in the spring, quickly diminishing in the hotter and drier summer months.

Chapter 2 : Drought and its relationship to dynamics of primary productivity and production of grazing animals

Prairie dogs were once the most abundant animals in the short grass prairie, living in colonies across a range that historically spanned 11 states. Presently, prairie dogs are found in 1 percent of their former range.

Plant Communities Ecological Dynamics of the Site The natural plant communities that can occur on this site range from a mid and short grass prairie; to a short grass prairie; to a mesquite *Prosopis glandulosa* var. The historic climax plant community is a mid and shortgrass prairie. Sideoats grama *Bouteloua curtipendula* var. Other midgrasses are Arizona cottontop *Digitaria californica* a site indicator plant , vine mesquite *Panicum obtusum* , tall dropseed *Sporobolus asper* var. Shortgrasses include buffalograss *Bouteloua dactyloides* , blue grama *Bouteloua gracilis* , Texas wintergrass *Nassella leucotricha* , Western wheatgrass *Pascopyrum smithii* , purple three-awn *Aristida purpurea* var. Numerous forbs are found on the site. They are heath aster *Aster ericoides* , awnless bushsunflower *Simsia calva* , dotted gayfeather *Liatris punctata* var. There is only a small amount of shrubs and it is composed of condalia *Condalia* sp. In the historic climax plant community, the midgrasses tend to dominate the shortgrasses due to their ability to capture sunlight and shade them. The midgrasses also have deeper root systems that allow them to capture the deep moisture while the early successional shortgrasses have shorter root systems and can capture only the more shallow moisture. Many of the deep-rooted grasses also have more root hairs that allow them to be more efficient at extracting moisture from very dry soil. Due to these differences, midgrasses maintain their dominance over the shortgrasses as they can produce much more food and maintain a higher state of health and vigor even; in times of drought. When European settlers arrived, the area was inhabited by bison, whitetail deer, turkey, quail, dove, many song birds, rabbits, squirrel, prairie dogs, lizards and snakes. Fire was a major factor in maintaining the site in the historic climax state and interacted with the bison. Lightning fires and fires set by Native Americans would burn for days with out stopping. Hundreds of thousands of acres would burn as there was nothing but wide spread rivers or a change in weather to stop them. This repeated burning, which was considered historically to be a 4 – 12 year interval, kept this site in an open prairie state. The fresh green growth of the grass and forbs made this site a sea of lush growth that attracted the grazing animals and provided them highly nutritious forage. There were no fences. The bison were free to roam and migrate from south to north in the summer and north to south as the winter season was nearing. This area provided the winter grazing for the bison herds that had ventured north for the summer. They came by the thousands and grazed the range as they moved around and generally were presumed to follow the most recent burn having a significant short-term impact followed by extended rest periods. Antelope were on the range, and grazed and roamed at their desire, seeking the best nutrition they could find in the forbs and grasses. Prairie dogs lived in groups on the site. They kept the woody shrubs cut down as a means of protection from hawks, eagles, coyotes, bobcats, and cougars. Recent research has shown that they would not let a mesquite stand overnight that emerged in or around their town. The first settlers moved about from ranch to ranch as no one owned land. In , barbed wire was introduced into this area. The land had also come under private ownership. The fencing stopped the open range where livestock had wandered to be guided only by the line riders. Now the forces of contained livestock grazing started to have its toll on the plant communities. The wild fires that once systematically burned over the land were either put out or burned with less intensity due to reduced fine fuel due to the heavier and continuous grazing. Depending on how the rancher managed, the plant communities started to change. If the rancher allowed fire to continue to control the mesquite seedlings, they could manage this site to remain a mid and short grass prairie. If fire was not allowed to maintain the invading brush species, mesquite, prickly pear *Opuntia macrorhiza* and tasajillo *Cylindropuntia leptocaulis* would spread over the site. If the site was burned prior to the mesquite achieving approximately 6 feet in height slick bark stage , fire could be used to manage the mesquite invasion. If the mesquite was allowed to exceed approximately 6 feet, then fire could no longer control the brush and the range entered a new vegetative state that would require more than fire to restore the historic climax plant community. The manager would have to use machinery or herbicide to manage the brush to a desired canopy. Also, the manager would have to apply a well thought out prescribed grazing plan to maintain the vigor and

health of the desired grasses and forbs. As the stocking rate exceeded the carrying capacity of the land and the natural graze-rest cycles were broken by continuous grazing, the palatable and highly selected midgrasses were grazed to the point that they could no longer produce sufficient food in their leaves to maintain their health and vigor. Records of stocking rates show that on much of the land, there was a cow to 2 acres. When the midgrasses were grazed to the point that they had little leaf area left, they stopped supplying the root system with food, as all available food produced was being used to grow more leaf area to enhance the food manufacturing process. If the overgrazing continued, the root system of the overgrazed plants was shrunk as energy consuming respiration continued in the root system. In time, with continued close grazing, the midgrasses would become not a deep rooted healthy plant, but a very shallow rooted, small leaf area, weak plant that was set up for doom during the next drought. This process was magnified due to the natural droughts that occur in the area as well as the natural droughtiness of the soil. These midgrass plants were in a dominant position to the shortgrasses, are in a position of being dominated by the shortgrasses. This led to the demise of the midgrasses and the increase of shortgrasses. At the same time this was occurring with the grasses, the palatable forbs were being overgrazed and killed out of the plant community. If this management continued, the site would change to a dense canopy of tall mesquite, prickly pear, tasajillo, Texas wintergrass, annual cool-season grasses, invading forbs such as annual broomweed *Amphiachyris dracunculoides* and much bare ground; especially during the dryer years. A major characteristic of this ecological site is the droughtiness of the site. In all of the communities production of plant material is very limited to non-existent in drought years. But, it has been demonstrated that with good range management, the site can respond and recover to be very productive following drought. If the management is not designed to allow the plants to recover their health and vigor following drought, the site is very slow to recover. Since the soils of this site are productive and fertile, much of this site has been converted into cropland. In many instances, this land has either been reseeded to native grasses or introduced grasses. After the land was planted to native or introduced grasses and forbs, management of the land to control the invasion of mesquite and pricklypear from neighboring lands is a must if the manager desires to keep the land open. This can be accomplished with prescribed burning or other means of brush management. Also, to maintain the stand of native or introduced grasses planted, a prescribed grazing plan must be designed and applied that meets the needs of the plants, the animals and the managers objectives. State-and-Transition Diagram State 1: Prairie State The Prairie State is predominately a grassland with forbs and occasional low shrubs on the landscape. Within the Historic Climax Plant Community, plant composition is dynamic, responding to drought and short term grazing effects. Drought especially has a profound impact on this site. In dry years, the site produces very little taking on the appearance of bare ground even though the tillers of the mid and shortgrasses are present. If conditions are appropriate for its germination and establishment, common broomweed can be in abundance one year and non-existent the next year. Abundant fall rains favor a broomweed crop the following spring and summer. Fire, bison and prairie dogs were major factors maintaining the area as an open prairie. Without their impacts on the woody component, the site can evolve to a heavy canopy of large mesquite. The dominant midgrass is sideoats grama, composing approximately 25 percent of the total composition. Other important midgrasses are Arizona cottontop, vine-mesquite, tall dropseed, meadow dropseed, sand dropseed, silver bluestem, cane bluestem, white tridens, and plains bristlegrass. Numerous forbs are found on the area with scattered shrubs such as ephedra and condalia. Overgrazing by cattle or other grass eating ruminants can reduce the midgrasses and increase the shortgrasses and cool-season grasses such as Texas wintergrass. The longer the overgrazing the greater the shift to the shorter grasses. However, if Prescribed Grazing is used, along with Prescribed Burning, there is enough of the midgrass species left to return to the 1. Fire may be strategically used to hold woody species at low levels and maintain the prairie plant community. Community Phase Pathway 1.

Chapter 3 : Grasslands Biome

Main Title: Pricklypear Control on Short-Grass Range in the Central Great Plains. Added Title: Prickly pear control on short grass range in the central Great Plains.

A world class legacy cattle and recreational ranch featuring five star improvements, including a nearly 9, square foot luxury home. Featuring 2, deeded acres of high quality Elbert County range-land and irrigated hay ground with ponderosa pine covered hills and West Bijou Creek bottom. Main Home The exquisite owners ranch home boasts 8, square feet overlooking the west Bijou creek and the ranch. Custom, high end finishes throughout and built to entertain! Beautiful stone, stucco and log accent exterior, designer kitchen, grand entry and great room with a beautiful stone fireplace, 4 massive bedrooms, 6 bathrooms, a large office, a large south facing deck. Paved driveway, beautifully landscaped with underground sprinklers, shrubs, flowers and trees. New stone retaining walls. A state of the art automatic backup generator and an underground propane tank. Additional Homes An Historic 1, square foot managers or guest house located at the ranch headquarters built with 3 bedrooms, 2 bathrooms. Automatic backup generator that runs the home and all accessory buildings and wells. A 1, square foot hired help or guest house with a brick exterior built in This home Includes 3 bedrooms and 2 bathrooms and also has an automatic backup generator. Ranch 2, deeded acres in the highly desirable Bijou Valley, east of Elbert, Colorado. Very well sodded and exceptionally taken care of native grasslands. Rolling hills and a terrain that includes ponderosa pine covered hills, West Bijou Creek bottom lands, level hay fields and open rolling pastures. The ranch is fenced and cross fenced for efficiency with mostly new 4 wire barbed wire fencing. Efficiently watered with 6 stock wells piped to several stock tanks and several strategically located stock dams and live water via the West Bijou Creek. Irrigated Hay Fields Appropriated for ac ft per year of irrigation water from a newly cased and reworked gpm alluvial irrigation well. Out Buildings and Improvements Improvements at the main residence include a x80 insulated equipment or storage building with 4 overhead doors that would be ideal for an auto, equipment or wagon collection, a 40x60 shop and a 36x48 horse barn with a tack room, 2 stalls and turnouts. Located at the ranch headquarters are two x48 hay storage sheds, a historic 32x56 barn with a hay loft and an attached 40x24 barn. Additionally there are two feedlot areas with concrete feed bunks. The ranch improvements are tip top and highly maintained. The older buildings have been fully maintained and recently painted. The pride of ownership on this ranch is second to none. The creek runs constant and has several deep holes and ponds throughout. Additionally, there are coyote, fox, and an occasional mountain lion and bobcat. There would be ample opportunity to lease the hunting rights, if desired. Area, Location and History The Bijou Basin area is known for its quality grasses, wildlife, water features and winter protection. Cattle and Equipment The owners cattle some of the very best Red Angus cattle anywhere and equipment may be available to purchase separately by private treaty. Qualified buyers, call Jim Digby to schedule your private showing.

Chapter 4 : Regenerating Kansas Grazing Lands :: Kansas Grazing Lands Coalition

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The principal theme is the relationship of drought to vegetation production and, hence, the productivity of grazing animals. The management ideas and results presented are not to be considered as proposed solutions to the problems arising in Africa from the recent severe drought. On the other hand, the ideas presented are management schemes applied to U. Drought not only causes a loss in abundance of plants, a reduction in ground cover, and a decrease in vigor of plants, but also results in a decrease in forage yield. Furthermore, large fluctuations in forage production from year to year are the norm across rangelands of the world. Therefore, perhaps the first consideration for managing rangelands is to develop the controls in the numbers and distribution of livestock. Secondly, the livestock industry must build flexibility into operations allowing for a decreasing of animal numbers when forage is limited and a building up of numbers when forage is plentiful, in order to survive the effects of a high variability in annual forage production. Introduction Effects of drought upon plant welfare vary from reductions in size and vigor to actual death of plants. Coupland 9 and Albertson et al. Low rainfall is usually the cause of drought, but high temperatures may also be involved. Drought as related to precipitation may be a result of several growing days without precipitation, low seasonal precipitation, or abnormally low annual precipitation for a particular year or even for a period of years. Weather Bureau defines drought as a period when rainfall is but 30 percent of average for 21 days or longer. Other such definitions state that drought occurs when annual precipitation is 75 percent of normal, or monthly precipitation is 60 percent of normal. It is generally understood that drought conditions along with alternate periods of high precipitation appear rather regularly over time throughout the range areas of the world. In a period of 15 to 20 years, range areas would expect a series of high forage producing years and likewise a series of drought years with herbage production far below normal 22. It is acknowledged that many expressions of ecological communities are the result of plant tolerance to environmental extremes such as temperatures wind, and soil moisture. In most range ecosystems of the world, precipitation is indeed limiting. Most dominant species on arid range lands have developed adaptations to cope with intermittent periods of deficient soil water. Plants of arid rangelands of the world have been classified as: There are many drought resisting plants in grasslands of the world that renew growth following dormancy even though there is no apparent soil water available. Some of the xerophytic adaptations of plants are: Some plants are able to control rate of transpiration by control of stomatal aperture and by means of a covering of resins or pubescence. It is sometimes said that xerophytes are plants that are found only on desert areas; however, current thinking is that xerophytes occur on all arid rangelands. At least it can be said that most plants growing on arid ranges are xerophytic in their tolerance to deficient soil water or atmospheric conditions which promote rapid water loss. Anatomical and physiological adaptations common to xerophytes have evolved under many different degrees and kinds of xeric environments. On saline desert sites, the plant growth is further impeded because of the difficulty of absorbing moisture against the osmotic pressure of high salt content in the soil. Since extremes in climatic conditions are to be encountered throughout the range areas of the world, the ability of range ecosystem managers to cope with fluctuating climatic and herbage conditions is indeed difficult, because such alternating cycles are not precisely predictable for management purposes. Research has so far failed to present methods of pre-dieting forage yield from existing or pre-existing soil and climatic factors. However, with the aid of high speed computers and expert analysis it should not be too long before herbage yield in many areas can be determined with a high degree of accuracy by means of past weather features, climatic patterns, and soil water along with other parameters related to plant growth. This may involve form of precipitation, distribution over certain periods, soil water to varying depths at the beginning of the growing season, atmospheric temperatures, and evapo-transpiration-precipitation ratios. Some scientists feel that it is better, for managing and using the forage resource, to predict droughts, rather than simply recognizing average herbage dynamics from season to season as a result of current soil and weather conditions. It would, of course, be of

inestimable value for the range manager if he could forecast drought incidence and intensity at least a season or even a year in advance. Even though this does not appear promising at the moment, it may someday be developed to the degree that it will at least moderate unfavorable rainfall periods. It should be pointed out that extreme drought conditions or droughts of long duration seldom cover more than a particular region of the western U. Therefore, the entire livestock industry of the west never suffers a poor production year, and thus, relief can be received by an interchange of grazing agreements among grazing areas Figure 1. However, the effect of climate upon permanent change in vegetation composition, along with other related factors such as livestock grazing, fire and small herbivores, has been immensely confounded. The frequency and duration of drought are both important in determining the severity of the effect of climate upon botanical composition. It is common knowledge that most plants that inhabit rangelands are subject to stresses of limited precipitation at some time during the annual growth cycle, whether for a period of a few weeks or a few months. This might be a normal climatic rhythm or it might be somewhat subnormal. In addition to droughty periods that commonly appear sometime during the annual life cycle of a plant, there are drought spells that last several years. Thus, intensity and duration of drought may be identified either within months of the year or among years over time infinitum. The species composition and dynamics of the primary producers of the range ecosystem are determined largely by the ability of plant species to survive long periods of deficient soil water. Studies in mixed prairie in northern central plains during the drought of the period showed profound changes in height growth and species composition, but few dominant species completely died in most plant communities 32, 3. In some cases, however, a few species were lost in some plant communities. Hurtt 15 , Lommasson 19 , and Lang 18 found that even some deep-rooted woody plants died and were almost totally absent after the drought in These same authors found that the tall grasses and mixed grasses in the Central Plains states showed marked changes in percent species composition, but the extent of change and reduction in herbage cover was much less than in the short grasses. This is to be expected, since the tall and mixed grasses had more favorable site conditions. However, on the extreme western portion of the mixed grasses between the short and mixed grasses, the tall grass species were completely eliminated from many valley bottoms as a result of drought and dust. In the mixed prairie of the Central Great Plains, the drought in which the precipitation was less than one-half of normal for a period of 6 years caused the vegetation even in protected areas to change markedly. Peak numbers of grasshoppers and rabbits added to this devastation. During an extended drought in the late fifties and another during the early sixties in south Texas, severe damage to the vegetation occurred as a result of deficient moisture and grazing 7. Mortality of range plants was high as a result of subnormal precipitation during these two dry periods. The plant population was not destroyed, however, and recovery was satisfactory, provided ranges were protected from heavy grazing during favorable years. In the semidesert grass-shrub ranges of New Mexico it was found that basal area and species composition changed appreciably during periods of above- and below-average precipitation. It was also found that some species were less sensitive to changes in basal area during drought years than others, and furthermore, that various plant species reacted differently to dry and wet years on different sites. It was found that plant cover was closely related to weather cycles, while herbage yields were more related to growing conditions within years 22. These authors found that basal area of perennial grasses decreased as much as 65 percent during dry years. Many individual plants died during drought, but recovery during favorable years came from regeneration of remaining crown tissue and new seedling establishment. Forest Service since has studied the semidesert grass-shrub range at about 2, feet elevation, with an average rainfall of about 10 inches annually, which varies rather markedly from year to year, about 80 percent of the herbage production is composed of annuals that vary from lbs. The perennial grasses, even though they produce only 20 percent of the grass herbage yield, are more stable and vary less with wet and dry years 22. Individual species of the salt-desert shrub in Utah and Nevada respond differently to drought. Only a sparse amount of annuals make up the botanical composition. Generally the dominants that are decreased most rapidly because of drought likewise respond most rapidly to recovery during favorable years. During even a two-year drought period as much as 30 percent of plants of some dominant species died. In the annual-plant range types in California, Bently and Talbot 5 found that relative amounts of the different species not only varied according to

below-average precipitation, but also because of the distribution of rainfall during a drought year. For this reason there were drought years that caused a reduction in the quantity of some annual grasses, but because of rainfall distribution an actual increase of other annual forbes or grasses was observed. It is generally acknowledged that both soil types and past grazing use affect change in species composition, and this is emphasized during dry years. In arid ranges where severe droughts occur intermittently there is damage to the habitat through severe wind erosion. Large areas are sometimes left bare, and the drifting sands and dust accumulate in obstacles or on the leeward side of depressions. Thus some plant life is actually smothered-and some is left pedestalled. Since drought is characterized by a deficiency of soil water, factors such as mulch, which implement the process of absorption, can ameliorate the severity of subnormal precipitation. A series of dry years can materially reduce the accumulation of mulch on the soil and thus detract from the amount of water entering the soil and furthermore allow greater evaporation from the soil surface. Weaver 29 found that nearly all of the mulch cover disappeared in the prairie after seven years of low precipitation. Drought and forage yield It is acknowledged that most dominant plant species on arid rangelands of the world have developed adaptations to cope with intermittent periods of deficient soil moisture; but all plant life under these conditions displays rather marked fluctuation in herbage yield from year to year and from season to season Table 1. On the semidesert grass-shrub range in southern Arizona, where annual rainfall varied widely about a mean of 10 inches, the forage production varied from as much as pounds per acre during good years to as low as 10 to 15 pounds during bad years. About 80 percent of this herbage yield was composed of annuals, which accounted for most of the variation. The average yield from perennial grasses was about 20 pounds per acre. In an earlier study on the same experimental area the yield of forage on these semidesert ranges varied from about pounds of forage per acre during dry years to about pounds during favorable years. In a desert-grass shrub type in New Mexico, forage production during the best years was four to five times that in the poorest 28, In a semidesert grass-shrub type in New Mexico on the Jornada Experimental Range, during a study period from to , it was found that annual precipitation ranged from Table 1 - Vegetation range type, state, and variation in annual precipitation and forage yield for various studies in the arid rangelands of the western United States Vegetation type.

Chapter 5 : Grassrange, Montana - Last 24 Hours - The Weather Network

Behavior of Hereford Cows and Calves on Short Grass Range R. A. PETERSON AND E. J. WOOLFOLK' Botany Dept., University of Minnesota, Minneapolis, Minne-.

The Pampas Grassland biomes are large, rolling terrains of grasses, flowers and herbs. Latitude, soil and local climates for the most part determine what kinds of plants grow in a particular grassland. A grassland is a region where the average annual precipitation is great enough to support grasses, and in some areas a few trees. The precipitation is so erratic that drought and fire prevent large forests from growing. Grasses can survive fires because they grow from the bottom instead of the top. Their stems can grow again after being burned off. The soil of most grasslands is also too thin and dry for trees to survive. When the settlers of the United States moved westward, they found that the grasslands, or prairies as they called them, were more than just dry, flat areas. The prairies contained more than 80 species of animals and species of birds, and hundreds of species of plants. There are two different types of grasslands; tall-grass, which are humid and very wet, and short-grass, which are dry, with hotter summers and colder winters than the tall-grass prairie. The settlers found both on their journey west. When they crossed the Mississippi River they came into some very tall grass, some as high as 11 feet. Here it rained quite often and it was very humid. As they traveled further west and approached the Rocky Mountains, the grass became shorter. There was less rain in the summer and the winters got colder. These were the short-grass prairies. Grassland biomes can be found in the middle latitudes, in the interiors of continents. They can have either moist continental climates or dry subtropical climates. In Argentina, South America, the grasslands are known as pampas. The climate there is humid and moist. Grasslands in the southern hemisphere tend to get more precipitation than those in the northern hemisphere, and the grass tends to be the tall-grass variety. There is a large area of grassland that stretch from the Ukraine of Russia all the way to Siberia. This is a very cold and dry climate because there is no nearby ocean to get moisture from. These are known as the Russian and Asian steppes. There are two real seasons: The growing season is when there is no frost and plants can grow which lasts from to days. During the dormant not growing season nothing can grow because its too cold. In tropical and subtropical grasslands the length of the growing season is determined by how long the rainy season lasts. But in the temperate grasslands the length of the growing season is determined by temperature. In temperate grasslands the average rainfall per year ranges from inches. Living In The Environment:

Chapter 6 : Golf - Little Mill Country Club

The short-grass range studies, from which the following data were obtained, were started in cooperation with the Colorado State Agricultural College and the Soil Conservation Service on the Central.

Chapter 7 : Tallgrass prairie - Wikipedia

short-grass vegetation to different intensities of herbage removal, when applied by cattle grazing during the warm season (May-Octo- ber) for 10 years or more; (2) measure the response of range cattle.

Chapter 8 : Shortgrass prairie - Wikipedia

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Chapter 9 : Golf Center â€“ Game On Golf Center

DOWNLOAD PDF SHORT GRASS RANGE

'Do: MANY Steers Gain Faster Than Heifers ,,range experiment station on short-grass range in northeastern Colorado indicate that.