Colorado GLCI
Technical Note 1 – Addendum A

August 2004

Colorado Grazing Lands Conservation Initiative

Restocking Strategies Following Drought – 2004 and Beyond

Rangelands in Colorado, especially Eastern and Southwestern Colorado have suffered tremendous setbacks in vegetation vigor and/or loss of perennial plants due to drought conditions which in some areas have existed for at least four years. Those who sold livestock as a result of the drought have decisions about restocking to make in the near future. Livestock sales in 2002, according to the IRS code, are scheduled to be replaced in the calendar year of 2004. The questions at hand are: **What makes sense in terms of the number of livestock to restock now?** and **What is the expected time line for rangeland recovery?**

The Current Situation

Eastern and Southern Colorado are in the fourth year of drought in most areas and some are stretching into year five. The calendar year of 2000 was the onset of the drought, in many areas, causing many rangeland areas to have appreciably less forage in that year and stressing perennial plants. The precipitation during 2001 was fair to moderate, depending on the area. However, late 2001 and the winter of 2002 were extraordinarily dry, causing many range plants to greatly reduce the number of new buds for forage material to be produced in 2002. This demonstrates the onset of major plant responses to the drought conditions. The poor plant response has been exacerbated by heavy grazing, especially by season-long heavy grazing. Therefore, some rangelands of Colorado were in the midst of serious drought, even before the summer of 2002. Perennial grasses throughout regions of Eastern and Southern Colorado did not grow at all, in 2002, until fall rains occurred very late in the summer and early fall. These, however, were insufficient to foster plant recovery. The fall and winter of 2003, provided marginal encouragement to range managers. Reasonable to very good spring rains did provide up to a 40-60% forage crop in the growing season of 2003, for those who had adjusted their stocking rates early to match the forage availability. The news was not so good for those who decided to stick it out, with little reduction in their stocking rate. The overall vegetation response in 2003 was much as expected. Many areas had appreciable mortality of perennial grasses, especially warm season grasses. Estimates are that at least 30% of the blue grama died in 2002. Some areas had as much as 80% die. The East Slope average was approximately 35%. The cool season grasses, where they were prevalent, however, seemed to fare better. These grasses did not grow in 2002 and appear to have saved their carbohydrate reserves until a time when growing conditions were better. However, many, if not most, ranges were weedy in 2003. Annual weedy plants responded to the additional moisture in the spring of 2003 and the lack of perennial competition. These plants further reduced the moisture availability for perennial grasses, in particular. The result is that the recovery that might have occurred in 2003 was slowed. This delayed recovery of perennial grasses will carry into the growing season of 2004 and 3-5 years beyond.

Managerial and Ecological Consequences of the Drought

Expect major reductions in the forage available and changes in the plant communities out on the rangeland. The drought has caused a decrease in the production from cool season grasses, such as western wheatgrass, green needlegrass, and needleandthread. On loamy plains ecological sites in Eastern Colorado, 35% or more of the blue grama has been lost. As importantly, the root mass of the grasses has decreased dramatically.

Riparian areas have been pressured by concentrations of grazing animals. This pressure has been dramatically accentuated by the drought conditions. The net result is the loss of a green band of vegetation peripheral to the riparian area and extraordinarily heavy grazing use on the wetland vegetation in the riparian channel. The desirable sedges and rushes have been grazed heavily and repeatedly, resulting in a loss of riparian structure, and in some cases, mortality of these species. The ephemeral moist areas in the draws, common to the plains, have lost most of their taller grasses, and even much of the buffalo grass, increasing bare ground. The result is unhealthy run-in moisture areas that have much reduced capability to absorb moisture and have little capability to dissipate energy from overland flow that occurs during high-intensity, short-duration rainfall events that are common to the plains. The reduction in plant cover and height has left the tributary draws and the primary streams at high risk to extraordinary erosion and down-cutting (gully erosion). These degraded areas decrease the water table over the entire landscape.

Road to Recovery

Our job is to manage the recovery of perennial plant communities in 2004 and beyond. Plant performance will still be below par this year, even if we receive reasonable moisture. The stress encountered by the plants as the result of the cumulative affect of several dry years and the dim prospect of good moisture combines to produce the probability that plant production will be reduced in 2004 and beyond. We now have convalescing plants that need appreciable care to foster recovery.

Signals to Watch For:

1) The first step in vegetation recovery is annual weedy plants mixed with the remaining vegetation. These plants will probably include kochia, Russian thistle, curly cup gumweed, annual sunflowers, woolly plantain, six weeks fescue, cheatgrass, and others.
2) The next step is one where there is a gradual increase in perennial species, overall. However, low successional grasses will be a prominent part of that process. Expect to see red threeawn, squirreltail, false buffalo grass, sand dropseed, witchgrass, and other short-lived perennial grasses show up as major components of the vegetation stands.
3) The short-lived perennials will be transitional to encroaching long-lived perennials. Among the first to increase will probably be western wheatgrass and needleandthread, along with prairie junegrass, and several native bluegrass species. Later, there will be an increase in warm season tall grasses in run-in moisture areas. Note: Blue grama is notably slow to re-establish because the conditions for recolonization are quite specific and occur uncommonly in rangeland events.
4) The fourth stage of recovery will be the recurrence of perennial native, palatable forbs and shrubs, such as purple prairie clover, spiderwort, four-winged saltbush, and winterfat. These species are the slowest to respond because they are generally quite adversely impacted by sustained drought and because they require more soil moisture than many of the other species.
5) The speed of recovery, i.e. moving from each of the delineated steps above, is regulated mostly by management choices that foster recovery of the existing perennial plants and manage water in the system.
6) A sign of significant recovery is an increase in ground cover of perennial plants. We have substantial bare ground now. In order for the rangeland to function appropriately and resist invasion of weedy plants, both annual and perennial, there must be a dominant cover of perennial grasses. It is to our material benefit to foster the perennial plant recovery to the point where they again provide good ground cover. In accomplishing this, we increase water infiltration and decrease overland flow. Not only does this reduce erosion risk but also materially improves the forage growth and extends the green forage season. The time line to accomplish this is a function of several things that interact. Vegetation that was healthy before the drought and used less intensively during the drought will recover far more rapidly than forage that was not afforded those breaks. Those areas that receive more opportunity (i.e. deferment and lower stocking rates) for the plants to grow and recover before they are intensively defoliated will recover more rapidly and produce a full complement of forage far sooner. The difference may be that those rangelands that are managed well may approach 75% capability in 3 years and will be near full capability within 5 years. Those rangelands that continue to be heavily grazed (those that do not have the opportunity to achieve full height during the growing season) will take 10 or more years to recover and will have less than 50% capability in 5 years.

Stock appropriately!

This means stock according to the expected plant availability and to enhance plant maintenance and recovery. Remember, your "real or actual" stocking rate is the forage demand (how many animals eating how much) relative to **the amount of forage on offer.** When you choose an appropriate stocking rate, livestock performance will be improved. There is no reason why, at conservative stocking rates, livestock performance should not be near, at, or above pre-drought levels in this upcoming grazing season. Clearly, the current impacts have reduced vigor and production of forage creating conditions where the stocking rates need to be relatively low to achieve the kind of performance that you would like this year. My guess is that livestock grazing in most shortgrass areas should be no more than a cow month per 4-5 acres. As you progress through the successional steps of recovery, additional demand (cows) can be added to the system, as long as the management is sufficient to assure re-growth and recovery in the areas grazed. A designed rotational grazing program will be materially beneficial to you in managing re-growth and recovery of your forage resource. Contact your local Colorado State University Cooperative Extension Office or USDA Natural Resources Conservation Service Office for help in determining a potential post-drought stocking rate for your rangeland or for assistance in designing an effective rotational grazing program for your ranch.

This publication was developed from a presentation developed by Dr. Roy Roath, Extension Range Specialist, CSU Cooperative Extension. Other contributors include the Colorado Grazing Lands Conservation Initiative Committee, The Renewable Resources Extension Act (Drought Grant), and USDA Natural Resources Conservation Service.