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NORTHEASTERN NEVADA WILDFIRES 2006
PART 3 – REHABILITATING FIRE-IMPACTED AREAS

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INTRODUCTION

What can be learned from the conditions leading up to the wildfires that burned approximately one million acres in Elko County, Nevada during 2006? Can large fires be avoided? If not, can the large acreages at least be reduced in the future? What is the role of wildland fire as a "natural" occurrence? More importantly, can society appropriately invest in fuel management strategies to reduce the enormous fire-fighting costs such as have been incurred over the last seven or eight years? Ultimately, can land managers plan and implement landscape-scale management for the production and sustainable use of renewable natural resources? This is the third of three fact sheets that address the 2006 wildfires in northeastern Nevada. The other two deal with wildfire and land-use history (McAdoo et al. 2007a) and use of livestock for wildfire reduction (McAdoo et al. 2007b).

2006 FIRE SEASON OBSERVATIONS

The following characteristics of the 2006 wildland fire season make it unique:

- Precipitation amounts and timing in northeastern Nevada during 2005 - 2006 resulted in two consecutive growing seasons with much higher than average production from grasses, especially in 2005.
- Northeastern Nevada also experienced the build-up of dead and dying sagebrush resulting from an aroga moth (sagebrush defoliator) infestation that killed large tracts of sagebrush during 2004 - 2006. The sagebrush die-off has likely resulted in an increase in native perennial grasses where these species were present and an increase in cheatgrass where the native understory was depleted, increasing the fine fuels in both cases.
- There was a succession of dry-lightning storms accompanied by low humidity, high temperatures, and often very high winds. These storms ignited fires repeatedly in northeastern Nevada for more than two months.
- The majority of the area affected by fire during 2006 was in upper elevation (above 6,000 feet) mountain big sagebrush plant communities with a good understory of native perennial grass species (versus low-lying areas with cheatgrass dominance and/or invasion potential).

TO SEED OR NOT TO SEED

The potential for natural recovery in areas with good understory vegetation (especially perennial grasses) may be excellent. Most typically, these areas are in higher precipitation zones (10 inches or more annually) at elevations above 6,000 feet. Post-fire response of native perennial grasses and forbs, given at least average precipitation, can be exceptional within two years after fire if these species were abundant before the fire and fire intensity was such that grass crowns were not consumed. This type of perennial grass resiliency response was observed on good condition range sites after the 2000 burn on the Cottonwood Ranch in northern Elko County (McAdoo and others 2004), as well as other locations in northern and central Nevada. Shrubs gradually re-establish over a much longer time period.

This pattern strongly suggests that seeding crested wheatgrass and other non-native species on areas where a good understory of native grasses was present before fire may be unnecessary and often unwise. A general rule of thumb used by range managers is as follows: if after a wildland fire a person can step from one perennial grass crown to the next, then seeding is unwarranted. Seeding in areas where native perennial vegetation is expected to rebound is unnecessary in most cases and therefore would be unwise both economically and ecologically. Furthermore, aerial seeding is the only option in much of the higher elevation country where steep and rugged terrain often prohibits the use of a rangeland seed drill. When necessary, these areas can be aerial seeded, but seedling establishment is often poor because the soil-to-seed contact required for seed germination is not typically achieved.

However, in areas where cheatgrass was dominant in the pre-fire understory and/or where perennial grasses were sparse and cheatgrass is anticipated to substantially increase, land management agencies and private landowners alike are well-advised to seed non-native but adapted plant species like varieties of crested wheatgrass. Such areas are typically in lower precipitation zones (less than 10 inches annually) at lower elevations. Crested wheatgrass is adapted to the soil pH and texture of many northern Nevada arid sites. It is also very competitive with cheatgrass and other weeds, less expensive than native species, and much more reliably established with available equipment under average precipitation levels. Introducing and successfully establishing competitive vegetation is essential to managing annual weed infestations and restoring desirable plant communities (Borman and others 1991). For these reasons, the seeding of crested wheatgrass after fire in these cheatgrass-prone areas has been standard practice by the BLM since the 1999 fire season.

The track record of establishing native perennial grasses on arid low-elevation rangelands is poor. When initial seeding attempts fail to establish native grasses, cheatgrass typically establishes and becomes dominant. These cheatgrass-dominated sites are virtually impossible to re-vegetate until the cheatgrass can be effectively controlled, a very difficult and often prohibitively expensive task. But if crested wheatgrass is seeded and established before cheatgrass gains a competitive foothold, it can successfully out-compete cheatgrass. Native species can later be interseeded after proper seedbed preparation. This multi-phased approach, called “assisted plant succession” by scientists (Cox and Anderson 2004) can partially restore plant species diversity to improve wildlife habitat in these areas. Many older (20+ years) crested wheatgrass seedings have had sagebrush re-established naturally over time and now support sagebrush-dependent wildlife species, while providing livestock forage (McAdoo and others 1989). It is certainly much better to have a functional and resilient perennial plant community dominated by non-native crested wheatgrass than a community dominated by cheatgrass and/or other invasive weeds.

ACTIVE VEGETATION MANAGEMENT – KEY TO HEALTHY FUTURE RANGELANDS

Any sagebrush community with a depleted perennial understory and a nearby cheatgrass or invasive weed infestation is just a lightning strike or match away from being irreversibly lost in terms of ecological health and resource productivity. In the sagebrush ecosystem, active management is essential for maintaining current levels of production on healthy rangelands and improving resource potential on sites that have lost their perennial grasses and forbs. Active management by definition means the manipulation of one or more resource attributes. It may involve the use of prescribed fire or fire surrogate (something that has impacts similar to fire), seeding desirable species, and/or management-intensive grazing to ensure landscapes that are resilient after disturbances (including fire) that inevitably occur.

Only through active vegetation management will society have ecologically sustainable rangelands that meet broad needs. Success in establishing a diverse mosaic of perennial plant communities across a sagebrush landscape (as described by Miller and Eddleman 2001) will reduce wildfire and ensure that appropriate vegetation is present for both wildlife habitat diversity and livestock forage, along with the potential for other sustainable rangeland uses as well.

Current ecological thinking suggests that every ecological site can produce several desired and undesired plant communities or “vegetative states,” with each plant community having the potential to transition among several phases within a given state. For example, a healthy sagebrush-bunchgrass community, even when occasionally impacted by fire, bounces back and forth over time from being perennial grass-dominated to sagebrush-dominated. But when this community no longer has the potential to produce perennial herbaceous vegetation, it has crossed a threshold to an undesirable “state,” and typically becomes dominated by invading fire-prone cheatgrass. This “state and transition model” concept (Laycock 1991) suggests that when plant communities cross such an ecological threshold (point of “no return”), they are virtually unrecoverable in terms of both biodiversity and resource production. The sagebrush-bunchgrass community cannot progress back to a desirable/functional “state” through standard management actions. However, areas that are nearing such a threshold can, with appropriate active management, be recovered. Such vegetation management can promote rangeland health and productivity and even reduce wildfire acreage losses, even though fire itself may be part of the management process. Land managers need to recognize and treat plant communities that are approaching these nearly irreversible thresholds and manage them accordingly.

In plant communities that are declining but not close to thresholds, with an understory of desired species but needing more herbaceous cover, livestock grazing management and prescribed fire are potential tools for producing positive change. With appropriate grazing management, areas alternately rested or allowed to re-grow after early grazing, then occasionally burned, could become part of a mosaic landscape simulating pre-settlement plant communities that varied from dominant stands of shrubs to near-grasslands (Miller and Eddleman 2001).

For areas that are teetering near a threshold, direct vegetation management action must be implemented. For example, vegetation manipulation using prescribed fire or a fire surrogate such as herbicide or brush-beating to reduce sagebrush competition and then seeding (if necessary) with desirable herbaceous species may be required. If seeding is necessary, it should always take place in the fall immediately after the burn to reduce chances for occupation by cheatgrass. Passive management such as just removing the livestock would result in little or no timely vegetation response. However, after desired vegetation is established, proper livestock management is absolutely necessary to prevent the undesired situation from re-occurring.

Without such active vegetation management, the next fire would push these communities across thresholds, resulting in large rangeland areas becoming prohibitively expensive to successfully revegetate with the full array of grasses, forbs, and shrubs. For example, after a low-elevation sagebrush-grass community has crossed the ecological threshold to dominance by cheatgrass, the transition is irreversible without a very large investment of time, effort, and money to effect a positive change. Worse yet, these altered plant communities such as cheatgrass monocultures are even more fire-prone and fire-perpetuated, and are more susceptible to invasion by even less desirable species like invasive perennial weeds. Repeated fires in these areas will undoubtedly further reduce the ecological and economic potential for most land uses. An argument could be made that reducing sagebrush and seeding may be as expensive as controlling cheatgrass and seeding. However, the big difference is that the latter typically occurs after the complete loss of sagebrush. In the first situation sagebrush cover is merely reduced so that it remains an important and viable component of the plant community.

HOW DOES ALL THIS RELATE TO “NATURAL” CONDITIONS?

Within the last decade, land management agencies began advocating ecosystem management, but in large part, the approach has been more passive than active. The more knowledge we acquire about bioregional history, the more it is evident that humans have always been involved in landscape and ecosystem management, for better or worse, since their arrival on this continent. To "not manage" is really passive management and has definite repercussions (Perryman and others 2003).

An increasing number of scientists and historians have recently indicated that active vegetation management of landscapes is historically supported and necessary (Pyne 2004). According to Mann (2005, p.326), there is strong evidence that "Native Americans ran the continent as they saw fit. Modern nations must do the same…if there is a lesson, it is that to think like the original inhabitants of these lands we should not set our sights on rebuilding an environment from the past but concentrate on shaping a world for the future."

CONCLUSIONS

Land managers respond to societal demands for clean air and water, recreation, red-meat production, open space, etc. Scientists and land managers also understand, at least in part, the habitat requirements of many wildlife species, from rodents and songbirds to big game species. Although our understanding of ecological relationships is not perfect - and never will be – society must apply the available knowledge as appropriately as possible. Today's buzz-word, "adaptive management," certainly applies here. In a world of accelerated change, society must actively manage ecosystems at the landscape scale. Rangeland vegetation is dynamic and will change with or without human input (Jacobs and others 1998), but only thoughtful implementation of appropriate management actions can increase the probability that these changes will meet society's needs. Land managers face the daunting task of applying the best knowledge available, monitoring the results, and making the necessary adjustments to improve long-term results. This approach should include all aspects of fire management that provide for the healthy and productive rangelands society requires.

Active vegetation management on a landscape-scale is expensive and must be accomplished in stages. Highest priorities should be determined by the risk of crossing an irreversible vegetation threshold and losing the opportunity to apply effective management. Notwithstanding the vagaries of nature, resource managers can exert some control over sustainable production of wildlife habitat, livestock forage, and other rangeland resources. Active vegetation management, taking direct control of landscapes, is mandatory when plant community functionality, landscape diversity, and wildfire impact reduction are at stake.

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