Fire: Friend or Foe?

Fire can be used as a tool for control of noxious and invasive weeds. Prescribed burns take advantage of plant growth stage and future moisture predictions to deter the spread of weeds while encouraging native, desirable forage. Unfortunately, not all fires are prescribed. Effects of fire are complex and highly variable, for weed species especially.

The historical mean fire return interval (MFRI), or the average time period between fires under a normal regime, is determined by several factors, one of which is predominant vegetation species. Rangelands considered in the northern mixed grass prairie contain characteristic species of little bluestem, needle-and-thread, prairie sandreed, silver sagebrush and western wheat grass. The MFRI for this ecosystem is 6-15 years (high frequency). However, desert shrubland comprised of alkali sacaton, greasewood, shadscale, saltbush, and winterfat has a MFRI of 50 to 125 years (low frequency). Plants adapted to a high frequency MFRI recover more quickly than plants in a low frequency MFRI.

Even within a MFRI, individual fires can impact plants differently. The intensity, severity, and timing of a fire will determine how quickly and which types of plants are able to regenerate. Fire intensity is determined by fire temperature, duration, wind speed, amount of fuel and type of fuel. The severity of a fire is largely determined by soil moisture and has the greatest impact on plant survival. Reproductive and structural characteristics will also determine speed of post-fire recovery. For example, perennial weeds such as leafy spurge and Canada thistle have abundant nutrients stored in extensive root systems allowing for quick regeneration from rhizomes and new shoots. Thickspike wheatgrass and blue grama are also rhizomatous beneficial grasses which can recover rapidly after fire. Plants which have large crowns and below-ground growing points will tolerate a more severe fire than annual plants that spread only by seed.

The time of year will impact rangelands differently as cool-season and warm-season plants are in various growth stages throughout the year. A summer fire may be more detrimental to bunchgrasses such as fescues and needle-and-thread but not as damaging to bluebunch and crested wheatgrasses. Sagebrush species usually don’t resprout after a fire and have to recruit seedlings in order to establish on the site again. Wyoming big sagebrush may take 50 to 120 years to fully recover. Some grass and forb species may flourish after a fire which damages shrubs. A study conducted on western wheatgrass and little bluestem saw an increase in grass yields and forage quality due to reduction in competition with shrubs.

Even though certain plant species tolerate fire better than others, it may take several years to return to pre-fire coverage. Controlling weeds is a large part of encouraging rangelands to return to natural state after a fire. Weeds flourish after a fire due to a flush of nutrients, exposed ground surfaces, high light conditions, and low competition. Removal of the litter layer in a severe fire exposes soil to moisture loss and several invasive weed species prefer disturbed sites where soil moisture is not adequate for native plants. Wind and water erosion increase after a fire but typically return to pre-fire stability in two to three years or when ground cover reaches about 40%. Post-fire moisture will be the largest factor in contributing to healthy and quick regeneration of desirable rangeland species.

The most time and cost efficient noxious weed control is to prevent them from establishing in the first place. Monitoring in areas with a known past weed population is crucial as early mechanical, cultural, chemical and/or biological treatments will be most effective. Post-fire grazing effects on regrowth of desirable species and weeds are very site and species specific. Revegetation after a fire is recommended when the canopy cover of desirable vegetation is inadequate (under 30%). A seed mix could include aggressive, quick-establishing grasses and forbs to compete with rapidly regenerating weed species. Recently burned rangelands are especially susceptible to weed invasions from motorized, animal, and human traffic making it a necessity to clean weed seed from any source entering a fire site. For example, if moving animals from a weed-infested area which is seeding, it is best to hold them in a drylot for about five days to allow seeds to pass before moving to weed-free area.

The first two years post-fire are critical to keep an eye on weed invasions of new and old species. For more information, contact your local weed and pest control office or Goshen County Weed and Pest at: (307) 532-3713, gocoweeds@embarqmail.com, or <https://www.facebook.com/gocoweeds>.