After Wildfire

Section 5

Reestablishing Pastures and Hay Meadows After Wildfire

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Wildfires have been prevalent in the northwestern U.S. during the recent drought, and much money and effort is being spent to recover from fire damage. Occasional fire and frequent drought cycles in the West have been a major historical influence on the types and condition of vegetation in our forests, intermountain meadows and rangelands. Other papers in this series address the restoration of forest and rangeland health after wildfire, maintaining water quality, options for controlling weeds, feeding alternatives and economic considerations. This paper specifically addresses the major considerations for reseeding and re-establishment of desired forage species after fire.

Forage stand condition after burning

Fire has always played a major role in forest and rangleland history. The effects of fire on heavily forested areas may last for centuries. On rangelands and pasture, the effect of fire may range from being beneficial to being equivalent to resulting in severe overgrazing. Extensive forest and prairie fires occurred in the 3rd, 15th, 16th and 18th centuries, and these were caused by humans, lightning and possibly even meteorites. Vast fires were used by Native Americans to haze wildlife to desired hunting areas. The resulting fresh growth of grasses in burned areas attracted game animals and fowl for fall hunts. Fire was widely used by settlers to rid land of timber and brush prior to cultivation. Prescribed burning is still an economical method to control undesirable brush, enhancing carrying capacity and reducing the risk of future, uncontrollable wildfires. In fact, the benefits of annual burning of hayland and pastures were debated into the early 20th century. In irrigated grain or grass seed production, controlled burning remains a major and inexpensive method of residue, disease and weed control. However, this practice is rapidly disappearing due to public pressure.

Burning a pasture or hay field can have several effects. Early in the season, cheatgrass can be controlled in fencerows, roadways or pastures with minimal effect to a pasture. Shallow-rooted forages such as some of the fescue species may survive burning, but must be monitored to insure that overgrazing of the regrowth does not diminish pasture health. Burning in the fall is more critical. Some perennial plants may be killed outright, or predisposed to winterkill. Fire destroys the plant litter, which results in the loss of organic matter and sets the soil up for erosion problems, depending on slope and winter precipitation. Further, burning can reduce stand productivity and competition, resulting in weed encroachment. In short, a recent one-time burning of a hay meadow or pasture may have resulted in a range of consequences – from complete loss of desirable forage vegetation all the way through a beneficial effect. Successful restoration requires prompt action with appropriate tools.

Timing and degree of fire loss

Immediately after a wildfire, several conditions should be assessed. Following “low intensity” burns, the soil color is still normal, debris is only partially burned, ash is dark in color, and water infiltration is not greatly affected. In these conditions, many plant species will recover in the first year. With “high intensity” fires, the upper 4 inches of soil may be discolored and physically crusted (which reduces permeability), debris and thatch is gone, ash is light in color, and plant survival may be limited. Depending on slope and time of year, the burned site may require immediate attention, or reseeding could be postponed until better conditions exist. If erosion is a risk on slopes, it may be necessary to immediately plant a fast-growing annual crop such as wheat, barley or oats, prior to reseeding an entire meadow. A producer should consider the previous vegetation and take steps to improve it. For example, if there were patches of invasive weeds or other undesirable plants, it is advisable to wait for one season and control these with herbicides and other methods before reseeding. During the season follow-

ing a fire, grazing management may need to be adjusted to allow better recovery of the grasses and vegetation. At this point, if the stand and plant community appear to be undesirable, then the producer should take steps to re-seed.

Selecting forage species for reestablishment after fire

There are a number of alternative goals and methods for replanting a burned meadow or pasture. In reseeding projects, producers should review their forage needs, the characteristics of the site and the potential costs and benefits of a reseeding project. In most cases, a reseeding project is a golden opportunity to expand hay acreage or allot more pastures for different uses, such as early or deferred fall pastures. Depending on the objectives and site, there are many possible choices of grass species, cultivars and mixtures. Cool season grasses initiate early spring growth using winter moisture, and produce seed in early summer. A mixture of cool-season grasses with deep-rooted legumes or forbs can provide season-long forage. On many public lands, federal or state agencies are responsible for restoration with **native** species of grasses, forbs and shrubs. On private lands, a producer may elect to renovate using native plants, or monocultures or mixtures of any number of improved forage species. Native plants are generally slow to establish, but are adapted for long-term survival at a specific site. Introduced plants are generally quicker to establish, and can provide earlier productivity and stabilization. Regardless of whether native or introduced species are used, there are several factors to consider in selecting a forage species or cultivars for reseeding after a destructive fire (Table 1).

Table 1. Considerations for renovating pastures or hay meadows after wildfire

Goal	Aesthetics	Return to natural condition.
	Improvement	Carrying capacity and profitability.
Condition	Previous vegetation	What was the previous production? Were invasive weeds already present?
	Severity of burn	Will the preexisting forages recover?
Site	Topography	Will the slope cause erosion? How close to riparian areas and stock water? Will I need immediate cover? Can I plant with a drill?
	Elevation	What is the frost-free-period? What species will survive and produce well?
	Precipitation	What is total and seasonal distribution of precipitation? How deep is the water table?
Soil	Depth, texture, stoniness	How much and how long can the soil hold water?
	pH, salinity	What species will be best adapted and productive here?
Intended use	Hay	How accessible is the site? Strictly hay or will the “stockpiled” forage be fall grazed?
	Early spring	Will this pasture provide “rest” for native range? Is it accessible at this time of year?
	Summer	Is this normally a forage-deficit period? Is livestock water available? Is forage availability and quality adequate?
	Fall or winter deferred	What class of livestock? Is forage availability and quality adequate? How late is the site accessible?
Management	Planting	What equipment is required and available for planting? Which species are “easy” vs. “difficult” to establish? Which species are compatible in a mix?
	During establishment year	Are mowing and spraying necessary for weed control? Is fertilization necessary? When can the stand be grazed?
	Long-term	What is the best grazing strategy? Which species have the best production potential? Which species are long-lived? Can grazing management, fertilizer, weed control, etc. provide for “infinite” stand life?

Species differ in their adaptation, establishment, productivity and persistence, and planting decisions should be made appropriately. Brief descriptions of several forage species are shown in Table 2. *(For detailed information, see L. Holzworth, J. Mosley, D. Cash, D. Koch and K. Crane, 2000, “Dryland Pastures in Montana and Wyoming: Species, Cultivars, Seeding Techniques and Grazing Management,” Montana State University Extension Service EB19).*

Table 2. Forage species used to reseed pastures and hay fields after wildfire

(Note: These seeding rates are for dryland; under irrigation seeding rates are increased by 30%.)

Precipitation*	Species	Native (N) or Introduced (I) /Growth Habit	Other	Seed rate*
<10	Thickspike wheatgrass	(N) Tall, rhizomatous	Easy to establish; spring, summer and fall use; good salt tolerance	5
	Bluebunch wheatgrass	(N) Medium tall bunchgrass	Fairly easy to establish; spring and summer use	7
	Siberian wheatgrass	(I) Short bunchgrass	Easy to establish; spring use	6
	Crested wheatgrass	(I) Medium tall bunchgrass	Easy to establish; spring and fall use	5
	Russian wildrye	(I) Tall bunchgrass	Difficult to establish; all seasons; good salt tolerance	6
	Sweetclover (yellow or white)	(I) Tall legume	Easy to establish; spring and summer use	4
10 to 13	Slender wheatgrass	(N) Tall bunchgrass	Easy to establish; spring and summer use; good salt tolerance	6
	Streambank wheatgrass	(N) Medium tall rhizomatous	Fairly easy to establish; spring, summer or fall use; good salt tolerance	5
	Western wheatgrass	(N) Medium tall rhizomatous	Fairly easy to establish; summer and fall use; good salt tolerance	6
	Basin wildrye	(N) Very tall bunchgrass	Difficult to establish; early spring or winter use	6
	Sheep fescue	(I) Short bunchgrass	Fairly easy to establish; summer use	3
	Tall wheatgrass	(I) Very tall bunchgrass	Easy to establish; spring summer or fall use; excellent salt tolerance	10
	Intermediate or pubescent wheatgrass	(I) Tall rhizomatous	Easy to establish; spring, summer or fall use	7
	'Newhy' hybrid wheatgrass	(I) Tall, semi-rhizomatous	Easy to establish; spring, summer or fall use; excellent salt tolerance	8
	Alfalfa	(I) Tall legume	Easy to establish; spring, summer or fall use	5
	Sainfoin	(I) Tall legume	Easy to establish; spring, summer or fall use; non-bloating	34
14 to 16	Idaho fescue	(N) Short bunchgrass	Difficult to establish; spring, summer or fall use	3
	Canada wildrye	(N) Medium tall bunchgrass	Fairly easy to establish; spring and summer use	7
	Mountain bromegrass	(N) Medium tall bunchgrass	Easy to establish; spring and summer use	10
	Hard fescue	(I) Short bunchgrass	Fairly easy to establish; summer use	3
	Kentucky bluegrass	(I) Short rhizomatous	Easy to establish; spring and summer use	2
	Altai wildrye	(I) Tall rhizomatous	Difficult to establish; any season	12
	Smooth bromegrass	(I) Tall rhizomatous	Easy to establish; spring and summer use	5
	Meadow bromegrass	(I) Weakly rhizomatous	Easy to establish; spring, summer or fall use	8
	Orchardgrass	(I) Tall bunchgrass	Easy to establish; spring, summer or fall use	4
	Red or Alsike clover	(I) Tall legume	Easy to establish; spring and summer use; Alsike clover tolerates wet soils	6
	White clover	(I) Short legume, stoloniferous	Easy to establish; spring and summer use	3
	Cicer milkvetch	(I) Tall, rhizomatous legume	Fairly easy to establish; summer and fall use; non-bloating	7
	Birdsfoot trefoil	(I) Short, decumbent legume	Fairly easy to establish; summer and fall use; non-bloating	5
16 to 18	Tall fescue	(I) Medium tall bunchgrass	Easy to establish; spring, summer and fall use	6
	Timothy	(I) Tall bunchgrass	Easy to establish; spring and summer use	4
>18	Creeping foxtail	(I) Tall rhizomatous	Fairly easy to establish; spring and summer use; tolerates high water table	3
	Reed canarygrass	(I) Tall rhizomatous	Difficult to establish; spring and summer use; tolerates high water table	4

**Minimum annual precipitation (inches)* ***Seed Rate for Pure Stand, Pounds of Seed (PLS)/Acre*

For revegetation after wildfire, a producer may opt to plant an adapted, introduced species – these are generally easier to establish, and have high production potentials with good moisture. In most situations, a single species or a simple mixture is most suitable. A forage mixture (two or more grass species, grass-legume, etc.) may be desired, but in most cases, a native species will not compete in a mixture with introduced species. Further, consider differences in growth habit, season of use, and differences in palatability when choosing a seed mixture. There are innumerable forage mixtures possible—some examples for specific conditions are shown in Table 3.

Complex seed mixtures are often used after wildfire to help prevent weed invasion and provide plant diversity for wildlife. Mixtures including several species of grasses and forbs tend to utilize moisture, light and nutrients throughout the season, providing good weed competition. However, over time, a complex mixture is more difficult to manage in terms of grazing and weed control, and will typically evolve into a simple mixture. The best option for most producers is to have a series of pastures or meadows dedicated to different seasons of use. Many introduced species such as crested wheatgrass and Russian wildrye are very competitive with invasive weeds, and weed management in a pure grass stand is fairly easy.

Grass-legume mixtures are very productive for hay, pasture or hay-stockpile systems. These mixtures generally provide more high quality forage than a grass seeded alone. Some legumes such as alfalfa have long taproots that draw water and nutrients from deep in the soil, enabling the legumes to grow productively during dry periods. Also, legumes increase the level of protein and energy in the forage. A preferred method of seeding grass-legume mixes is to drill alternating rows of each crop. Alfalfa-grass mixtures may require more intensive grazing management, but in most cases, the benefits out-

Table 3. Examples of forages and seed mixtures for specific site conditions for reseeding after wildfire

Site Type	Goal	Mixture/Species	Pounds of Seed (PLS)/Acre*
"Dry, warm" (Open grasslands at low elevations/all aspects or south and west aspects at higher elevations)			
	Quick cover, competition	1 'Covar' sheep fescue	3.0
		'Pryor' slender wheatgrass	2.0
	Maximum cover, good forage potential	2 '759' pubescent wheatgrass	9.0
		'Covar' sheep fescue	1.5
		'Pryor' slender wheatgrass	2.0
"Moderate" (Moist, warm environments found on north or east slopes at low elevations, all aspects at mid-elevations, or south and west slopes at high elevations)			
	Maximum cover, moderate forage potential	3 'Critana' thickspike wheatgrass	5.0
		'Durar' hard fescue	1.5
		'Pryor' slender wheatgrass	2.0
	Maximum cover, good forage potential	4 'Rush' intermediate wheatgrass	9.0
		'Durar' hard fescue	1.5
		'Pryor' slender wheatgrass	2.0
"Good to Excellent" (Old, improved or unimproved hay meadows with known good production potential)			
	Good cover, good pasture potential	5 'Paiute' orchardgrass	3.0
		'Durar' hard fescue	1.5
		'Pryor' slender wheatgrass	1.0
	Rapid cover, very early pasture	6 'Hycrest' crested wheatgrass	5.0
	Grass hay	7 'Climax' timothy	4.0
	Good cover, one cut of hay and stockpiled forage for fall pasture	7 'Ladak 65' alfalfa	4.0
		'Paiute' orchardgrass	2.0
	Tall cover, fall-winter deferred pasture	8 'Prairieland' Altai wildrye	6.0
		'Remont' sainfoin (seeded in alternate rows)	17.0
	Wet, poorly drained soils for pasture or hay	9 'Palaton' reed canarygrass	6.0
		Alsike clover	2.0

Mixtures 1 to 5 adapted from T. Wiersum, Joe Fidel and T. Comfort, 2000, "Revegetating After Wildfires," USDA-NRCS Fact Sheet.
**Authors recommend doubling these seeding rates for severely burned areas*

weigh the potential bloat risk. The bloat hazard can be eliminated by substituting the alfalfa with sainfoin, cicer milkvetch or birdsfoot trefoil.

Cultivars and seed sources of forage seed

After selecting an appropriate species or mixture for a reseeding project, a producer should choose a good cultivar (variety). The Montana Agricultural Experiment Station and the NRCS Plant Materials Center at Bridger, MT conduct extensive forage variety trials for adaptation, forage yield and persistence. Producers should choose cultivars that have performed well at sites similar to their own. Once a cultivar has been chosen, a producer should purchase seed from one of the many reputable seed dealers in Montana.

Federal and state seed laws require that seed is labeled as to origin, purity, species identity, percent germination and content of other crops or weed seed. For most reseeding projects, ***certified*** seed should be used where possible. Certification ensures genetic and mechanical purity, cultivar identity, uniformity, and reduces the risk of weed contamination, particularly noxious weeds.

Uncertified or common seed from Montana and other states can be used for reseeding projects, however the seed should have originated within 300 miles of the intended planting site (to assure adaptation), and should have a tag with recent purity and germination data. For more information on forage varieties and availability, the reader should contact a local MSU Extension Service agent or local NRCS field office.

Planting methods

Planting technique can often influence establishment and performance much more than differences among species. Forage seed requires precise, shallow placement in a firm seedbed that is free of competition from weeds or other plants. Planting forages on cropland, particularly dryland, is often challenging and reseeding meadows after wildfire can also be difficult. Further, the seed cost for some species can exceed $40 per acre, so producers must make every effort to use appropriate equipment and methods to maximize the odds for a successful stand. The concepts for reseeding a hay field or meadow after wildfire are the same as those for farm ground. A burn area may require immediate action, but aside from potential equipment or accessibility limitations, all steps discussed below should be followed.

Seeding rates

Proper seeding rates for forage grasses or legumes specify planting 20 to 50 viable seed per square foot, depending on species. The actual recommended rates vary depending on known differences in seedling vigor, on difficulty in metering very small amounts of seed with conventional equipment, and on dryland vs. irrigated conditions.

Another concept in forage crops is "Pure Live Seed" (PLS). As opposed to large seeded crops, such as grain, beans, etc., seed lots of many forage species may contain dormant, dead or ungerminable seed or other particles. The PLS content of a seed lot is calculated by multiplying the purity percentage by the germination percentage, then dividing by 100 (germination test must be current). For legumes, the percentage of "hard" seeds is added to the germination percentage before calculation.

There is a wide range in seed sizes among the forage species. For example, in the species listed in Table 1, seed size ranges from about 30,000 (sainfoin) to about 2.2 million (Kentucky bluegrass) seeds per pound. For successful forage seeding, producers must properly place the recommended ***number*** of PLS per square foot of soil. For example, in a new seeding of crested wheatgrass with a purity of 98.5% and germination of 84% (PLS = 82.7%) a seeding rate of 6 pounds per acre (Table 1 value of 5 pounds per acre/0.827) would be required. For seed mixtures, the number of pounds of PLS of each species is calculated separately, and then divided by the number of species in the mixture. A great deal of early agronomic work with Montana's forage crops has resulted in appropriate "recommended" PLS seeding rates for both dryland and irrigated conditions, as shown in Table 1. (See your local MSU Extension Service county agent or NRCS field office for more details.)

Site preparation and timing

Forage planting is most successful on a "conventional" seedbed – ground that is firm, mellow, moist and free of weeds, debris and large clods. Rough or fluffy seedbeds result in slow and erratic stand establishment, which delays using the new pasture and presents a higher risk of weed encroachment. Reseeding after wildfire can eliminate many of the obstacles for seedbed preparation. However, in many cases proper equipment and accessibility are limiting.

For dryland seedings, moisture during establishment often dictates the success of a new forage stand. A general guideline for planting forages is that there should be a minimum of 2 feet of soil moisture for successful plant establishment. On dryland, planting should occur very early in the spring to capitalize on late snows and early rains. "Dormant" or "frost" seeding of grasses (but ***not*** legumes) is successful in the late fall or winter, as long as temperatures and moisture remain low enough to prevent germination before the spring. Late summer planting (prior to 15 August) should ***only*** occur if supplemental water is available from irrigation or stored soil moisture. With irrigation, it is possible to plant from the spring until mid-August (allow for emergence 4 to 6 weeks prior to first frost). The soil can be tilled in the fall or early in the spring prior to seeding. On dryland, the field is typically summer-fallowed for one year to accumulate soil moisture, then seeded the following year.

On farm ground, forages are typically planted on land that has been harrowed to bury crop residue, then packed. Depending on irrigation

availability, crops in the rotation, weeds and available equipment, many different implement combinations can be used to plant forages.

Following sod or an old hay field, deep plowing or ripping is typically used in the fall to bury residue and break potential hardpan layers. The field is then tilled with a heavy offset disc harrow to break up the large clods.

Following an annual grain crop, tillage may simply consist of disc harrowing. Prior to seeding a forage, the soil must be pre-packed with a cultipacker or roller. Pre-packing is necessary to assure proper seed depth, to provide good seed-to-soil, and to reduce drying. Seeding can be done using the grass seed attachment on a conventional grain drill, a no-till drill, or a broadcast-packer seeder (for example the Brillion). Double-disc openers with depth bands work best, but double discs without depth bands or hoe openers can be modified to work. The seedbed must again be packed – with the packer wheels on the grain drill, or as a separate operation.

No-till and other interseeding techniques may work in some conditions, but are not currently recommended on dryland.

Reseeding into sub-irrigated meadows is often difficult because high water tables may be present until mid-summer. A wildfire may offer an excellent opportunity to upgrade and improve these meadows, because competing vegetation and much of the debris is removed. One option would be to wait until the year after the fire (to evaluate the need for reseeding), then if necessary, suppress the existing vegetation with a contact herbicide in the early summer. Seeding should then be done prior to mid-August, or by dormant seeding.

Seed placement

Forage seeds are much smaller than small grains, and must be planted at a uniform, shallow depth (< 1/2 inch). Emergence of forage seedlings is often slow, therefore competition from existing crops or weeds can reduce the success of a new stand. Further, many forages have seed dormancy or require cold stratification to germinate. Crested, intermediate or pubescent wheatgrass are among the easiest to establish – under ideal seedbed and growing conditions, good stands are easily attained. In contrast, if planting occurs into dry soil followed by only a small amount of precipitation, a complete stand loss immediately after emergence could occur. Russian and Altai wildrye are generally more difficult to establish, and these may do best if dormant-seeded.

Broadcast planting can be successful. However, tillage, followed by both pre- and post-plant packing, is required. Currently, many fertilizer application units in Montana can accurately apply forage seed, and this has become popular. Broadcast seeding can also be done with a "whirlybird" spreader operated by hand, or mounted on a four-wheeler or tractor. Many inaccessible areas are seeded by aircraft.

For many situations after wildfire, broadcast planting may be the best option for reseeding forages. In this case, the soil may already be in a firm, weed-free condition. It may be necessary to scratch the soil with a pasture drag before broadcasting, followed by seeding, then packing if possible. For all broadcast seedings, the recommended seeding rates should be ***doubled*** to offset seed that are placed too deep or too shallow. (This corresponds to the double seeding rate recommended by the NRCS for revegetation projects following a severe burn; seeding rate should be 2X the rates listed in Table 2). Broadcast seeding immediately prior to heavy snow in the fall is often very successful.

Companion or "nurse" crops

For steep slope or riparian areas that are burned and subject to erosion, it is advisable to establish a quick ground cover immediately after wildfire. Several options that have been recommended in Montana following the 2000 fire season were annual ryegrass (10 pounds per acre) or barley, spring wheat or winter wheat (30 pounds per acre). Again, it is critical to use certified seed, or seed known to be weed-free. These are fast-growing annual crops that establish quickly to reduce erosion, then depending on conditions they make a seed crop and die. Nurse crops are not typically recommended for mixed seedings with forage crops, due to competition. However, after a wildfire, a companion crop may be useful for areas with a mixed slope or other conditions that may limit quick establishment of the perennial forage seeding. If a companion crop is used, then reduce the seeding rate by 50 percent or more (10 to 15 pounds of grain) to reduce competition.

Management during establishment

Stand establishment of forages can be quite variable. When irrigated, emergence and stand success have few risks. However, even with all of the right seeding techniques, conditions in non-irrigated fields can be slow and frustrating. Many of the grasses have seed dormancy, and hard seed in legumes can sometimes provide for the opportunity of emerging later and "filling in."

Regardless of initial stand density, it is likely that weed control will be necessary. Weeds can be controlled by clipping (before seed heads form), or using labeled herbicides. Many hay fields and meadows are deficient in major nutrients necessary for optimum forage production—nitrogen (N), phosphorus (P), potassium (K)—and possibly several minor elements such as sulfur. Recommended annual levels of N, P and K for grass are shown in Table 4. Forage production is very responsive to fertilizer and in most studies an economic response can be shown when the soil is deficient in one or more nutrients. Following a wildfire, it may be advisable to wait until a stand is established, then submit soil samples for laboratory analysis. Based on the soil test, you could then fertilize late in the same summer or the subsequent spring.

Table 4. Recommendations for annual N, P and K fertilization for grass hay or pastures.

Yield Potential (tons/acre)	Fertilizer + Soil Test Level of NO_3-N (pounds/acre)	Soil P test level (parts per million, ppm): 4	8	12	16	*Regardless of Yield Potential:* Soil K test Apply K_{20}, level (ppm): pounds/acre:	
		——Apply P_20_5 pounds/ acre: ——					
1	20	12	10	8	5		
2	40	21	17	12	8	0	80
3	60	29	24	18	11	50	64
4	85	38	31	22	13	100	48
5	115	46	38	26	15	150	24
6	155	55	45	30	17	200	0

(From: J. Lichthardt and J. Jacobsen, 1992, "Fertilizer Guidelines for Montana," Montana State University Extension Service EB104).

New seedings should be protected from grazing until they are well established to ensure their long-term survival and productivity. A guideline for many cool-season grasses is to avoid grazing until most of the field has seed heads. Under non-irrigated or dry conditions, this may require one complete season. With moist conditions, a new pasture of orchardgrass may form seed heads during the first year, but grazing should be postponed until after a hard frost to minimize plant damage. There are also a number of steps for designing grazing systems. After establishment, vigorous, well-maintained pastures and hay fields should have minimal weed problems. Weeds should always be monitored, and an integrated plan that includes good crop culture, proper grazing and recommended herbicides can provide for long-term weed management.

For hay crops, most forages can be cut at any time during the growing season. A critical management step for long-term survival and productivity of many cool-season forages in Montana is to **not** cut or graze in the period from early August (30 to 45 days prior to average first frost) until a "killing" frost (typically mid-October, with several successive days of temperatures around 25 degrees). This allows roots to replenish carbohydrate levels for winter survival and early spring growth.

Summary

Wildfire is a common occurrence in the western US. Although challenging in many respects, wildfires can provide an excellent window of opportunity to reseed hay fields or meadows with improved forage species. Many areas burned by wildfire have difficult accessibility, and producers are often limited in equipment for properly seeding forage crops. Most of the techniques and concepts used for seeding forages on cropland apply to forage reseeding projects after wildfire. A producer should do a thorough site evaluation after a wildfire. Steep areas will likely need immediate attention, but other meadows or hay fields might be observed for a period of the growing season after the burn to assess the need for and steps to proceed with reseeding. Many improved forage species and mixtures can be used for reseeding. These should be chosen based on the site conditions and the particular needs of the producer. Proper seeding and management techniques described in this paper will help optimize the success of a reseeding project after a wildfire.

AFTER WILDFIRE — Information for landowners coping with the aftermath of wildfire

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This book provides information to help landowners cope with the aftermath of future wildfires in Montana and in other states. Each section can be copied and distributed as needed. To obtain a copy of this publication or any of the following sections, please contact your local Montana State University Extension agent or download a PDF file at www.montana.edu/publications.