RANGELAND SEEDING

--Tip Hudson, WSU Extension rangeland & livestock regional specialist

Goals

Goals for seeding rangeland are diverse. Increased plant diversity, improved forage quantity or quality for livestock, tall grass for structural diversity, plants producing large or abundant seed for wildlife, native forbs (wildflowers) for a beautiful spring view, or easily established, deep-rooting grasses for soil stabilization in disturbed areas are just some of the potential goals for managing a piece of property. Reclamation of burned soils may also dictate a particular plan of action and species mix.

Burn assessment

Areas which are most at risk of soil erosion are those which previously did not have much perennial grass cover. These often include areas where the forest canopy was mostly closed, leaving little herbaceous cover in the understory, such as grasses and forbs. While the roots of shrubs and short trees function well as rebar for soil, the grasses and forbs are really what hold the finer particles together and prevent sediment loss in two primary ways: absorbing the energy of raindrops before the drops impact and dislodge soil; and holding soil particles and aggregates together with their shallow, fibrous roots.

In areas with little grass before the fire or with grasses visibly burned into the ground (crowns and meristematic tissue killed by high temperature) it will be very important to apply seed the fall after the fire.

Fall-planted seed will not germinate until spring, leaving little cover this winter, but these plants will provide long-term protection starting the year after the fire. Where a fire burned hot enough to create hydrophobic soils, more aggressive practices may be necessary to prevent soil erosion and to prepare soil for seeding. Under these hydrophobic conditions, contour felling and other forestry practices recommended by NRCS and DNR are likely the best short-term control measures. Perhaps the biggest factor is whether we receive heavy fall rain before a protective snow layer is present.

Site prep

Timing

October 1 to first snowfall is the ideal window for applying grass seed. This is early enough to catch fall rain, late enough that it won't germinate and frost-kill the seedlings.

Most seedings on non-irrigated land should occur in the fall (October 1-first snowfall). Fall seedings are typically more successful on non-irrigated acreage in the Intermountain West because seedlings are able to take advantage of fall and winter moisture, it is late enough that seedlings won't germinate and frost-

kill, and soils dry out relatively quickly in the spring depending on unpredictable spring precipitation, making spring seedings notoriously unsuccessful.

Weed control

Control weeds and other undesirable vegetation prior to seeding. Consider the timing necessary to accomplish this. Where there is a sufficient remnant population of desirable perennial plants, it may be advantageous to use selective herbicides to kill the undesirables and interseed into the existing plant community. Some herbicides that work by inhibiting germination should usually not be used in combination with a seeding. A good example is cheatgrass control. Imazapic is a germination inhibitor and it is very good at stopping or preventing cheatgrass invasion/dominance. It has little to no effect, at recommended rates, on perennial plants. It does, however, cause a problem for annual and perennial grass seed, so attempting cheatgrass control and fall seeding during the same year is a waste of seed.

Soil conditions

Grass seed must contact the soil to germinate. Usually harrowing or raking will expose enough soil to accomplish this. After a fire mechanical treatment may not be necessary. Once applied, the seed also needs to have ~1/8" soil coverage. A culti-packer or roller works best, but going over the field again with a harrow or drag works as well. On rangeland areas with abundant rocks or shrubs, or on sites with high slope, it may be impossible to conduct any site prep. On these areas, one is limited to a controlled burn before seeding, livestock impact after seeding, or take your chances with whatever litter cover is on site. Where enough slope exists to allow water runoff and soil erosion to occur, and where there is little remaining rooted vegetation to stabilize soil, it may be necessary to artificially create enough surface roughness to generate microsites for germination and physical barriers for water that may try to carry your seed away. If raking, lightly cultivating, or harrowing, travel with the contour of the slope as much as possible to minimize the potential for soil erosion.

Seed application methods

There are two methods for seeding: broadcast and direct/drilled. Broadcast seeding is easier on rough terrain where there are rocks, slopes, uneven ground, other vegetation, but has a lower success rate than drilled seed. If broadcast seeding, consider dragging something like a harrow over the site to scarify the soil surface and provide opportunity for seeds to contact mineral soil. Grain drills generally do not work except in deeper, rock-free soils, but a rangeland drill is designed to work around these obstacles and dramatically increases the success rate (germination and establishment of seeds).

Regardless of site preparation measures, the site conditions ideal for perennial seeds are as follows:

1. Seeds must contact bare mineral soil. If they are sitting on top of dead plant material seeds will either dry out or be consumed by birds and rodents. This can be usually be accomplished by a field entry with a harrow or pasture drag. If this is a pasture that has been plowed, disked, and rolled, the soil should be firm; fluffed soil from excessive tillage won't provide enough stability for the roots and is susceptible to wind and water erosion. Tillage is not recommended for low

rainfall sites. Seeding into unplowed but harrowed or raked soil is preferable to avoid soil erosion and mass germination of weed seeds that are already in the soil seed bank.

2. If tillage is used to prepare the seedbed, Topsoil (first ½-1") should be well-pulverized and mollified. This means loose, not cloddy, but not so powdery loose that crusting takes place. Crusting will prevent seedling emergence. TILLAGE (PLOWING/DISKING) IS NOT USUALLY RECOMMENDED FOR DRYLAND SEEDING.
3. The seed site should be free of invasive plants. The presence of annual weeds or perennials that are competing for the same resources as the seedling is the most common and significant obstacle to establishment. This doesn't mean eliminating all live vegetation on the entire seeding area, as dryland areas typically have spaces between plants, but reseeding is usually done where all or part of the existing vegetation is unwanted and some level and form of vegetation control is beneficial. This is most effectively accomplished using selective herbicides or controlled grazing on annual grasses.
4. The area should be free of the seed of competitive species. This typically means ensuring that the existing undesirable vegetation doesn't produce seed in the growing season prior to planting. If this is a concern, it may be beneficial to summer fallow the site: kill the undesirable vegetation in the fall and/or spring and give the site one full growing season to see what comes up. If you don't want it, kill it, and plant the following fall with a better chance of success.
5. There should be a moderate amount of mulch or plant residue on or in the soil surface. (Don't scrape a site clean with a tractor!) With a fall planting, there is generally a sufficient amount of dead plant material from this year's growing season that is incorporated through the winter. (Adapted from Kingery, 1997)

Aftercare for new plants

If seeding is for pasture forage, do not graze until the following year, and then only if plants cannot be pulled by hand. If you can pull the grass plants out, roots and all, they are not ready for grazing. Weed control may still be necessary, especially in year 1 and 2 post-seeding. Any kind of soil disturbance often stimulates weed seeds which are already in the soil seed bank to germinate and establish. It is not uncommon to have a profusion of weeds you didn't even know were there to show up following a light mechanical treatment. Herbicide recommendations are dependent entirely on the weed species present.

Seed selection

Select seed that is well-suited to your site and your goals. A seed guide from any of the major seed dealers is a good place to start. A seed mix is preferable to a single species because each species has different strengths and weaknesses and a combination of species has much greater biological resiliency to grazing, fire, insects, drought, prolonged cold, excess moisture, etc., than a monoculture.

Dryland grass species descriptions (not for irrigated pasture)

- Bluebunch wheatgrass ($) – an excellent native species adapted to low rainfall areas that is highly palatable; seed is more expensive than introduced species; exercise care in grazing to avoid late spring damage
- Basin wildrye – Very large native plant that once occupied much of the Yakima floodplain; highly salt-tolerant and has an excellent root system; good for wildlife cover as well as livestock
- **Crested wheatgrass (Hycrest or Nordan)– easy to establish, short-lived if not grazed
- **Hard fescue – used in roadcuts to stabilize soil; easy to establish and tremendous root system.
- **Intermediate wheatgrass – a good introduced grass for alkaline soils; relatively unpalatable
- **Siberian wheatgrass (Vavilov) – introduced, short bunchgrass that does well above 7" rainfall zones
- Slender wheatgrass – relatively unpalatable but produces a vigorous root system; good for reclamation
- Thickspike wheatgrass ($) – a very tough grass that is good for shallow, rocky soils; tolerates grazing well; more palatable than crested wheatgrass

Figure 2. Bluebunch wheatgrass plant. Photo by Tip Hudson

***Good choice for value and ease of establishment*
$ Expensive seed

Recommended seed mixes

If you were to order a custom mix for post-fire rehabiliation, NRCS, WSU, and the WSU Plant Materials Center folks would recommend:

Blue Wildrye	6 lbs/ac
Mountain Brome	4 lbs
Slender wheatgrass	4 lbs
Bluebunch wheatgrass	4 lbs

Landmark Seed has this available (http://www.landmarkturfandnativeseed.com/, 509-835-4967); talk to Harold Wood.

If you have areas that are exceptionally steep and burned very hot (enough to kill perennial grasses) you could add winter wheat (annual grass with rapid spring growth).

Functional seed mixes that are on hand locally include:

Old Mill Country Store (Ellensburg) erosion control mix *(good mix, not for pasture)*
Hard fescue - 20 each
Annual ryegrass
Sheep fescue
Creep red fescue
Canada bluegrass

Mid-State Coop, dryland range mix *(good all-purpose mix, very drought-tolerant, not great if grazed range)*
25 Oahe intermediate wheatgrass
24 Hycrest crested wheatgrass
20 Sheep fescue
19 Hard fescue
10 Gulf annual ryegrass

Phil Hess (509) 952-0678 [local forest consultant] custom forest mix (temporarily on hand) *(not ideal for grazing land)*
40% siberian or crested
20% hard fescue
20% sheep fescue
10% sherman big bluegrass
10% sandberg bluegrass

No-till pasture drill available for rent

The South Yakima Conservation District has a no-till pasture drill available at a rate of $2/acre with a $100 refundable deposit. It is a 7' rancher model with a hitch assembly – no trailer required – and requires a ~50-horse tractor. The drill uses a sponge metering system and has one seed bin. Interested customers can contact the SYCD at (509) 837-7911 to schedule usage. Yakima County residents have first priority, so call well in advance of anticipated use. Late summer/early fall are good times to interseed existing grass stands or to establish a new stand in dead turf (irrigated pastures). The drill will also work on rangeland areas without much exposed rock or dense sagebrush. Dryland seedings should be done after plants are dormant, usually after October 15.

Seed dealers
Old Mill Country Store: (509) 925-5397
Midstate Co-op: (509) 925-3378
Arnold's Ranch & Home: 509-925-6181
Cle Elum Farm & Home: 509-674-7104
Kern Company: 509-968-3643
Smith Kem: 509-925-5977

Seed suppliers/dealers
BFI Native Seed (Jerry Benson): (509) 765-6348
Landmark Seed: (http://www.landmarkturfandnativeseed.com/, 509-835-4967
Rainier Seed: (800) 828-8873
Grassland West (grasslandwest.com)

Seed application contractors
BFI Native Seed: (509) 765-6348

Weed Whackerz (Brett Graham): 509-899-1040
Clean Image Services: 509-925-2929