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BRITISH COLUMBIA

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# SEEDING FOREST RANGELANDS IN BRITISH COLUMBIA

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The forest ranges of British Columbia are multiple-use lands; the harvest includes trees as well as forage. After logging operations and fires, seeding the disturbed areas to grass protects the soil and improves the grazing. The forest zones best adapted to seeding are the Douglas fir, ponderosa pine, and, to some extent, the spruce – subalpine fir, which cover most of the southern interior of the province. These zones can provide grazing for cattle up to 8 months each year. Big game animals and other wildlife also depend on these zones for most of their food. This grazing area is also becoming increasingly important for recreation and as a watershed.



*Figure 1. Newly logged area showing skid road and mill set.*

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These multiple-use lands must be carefully managed to ensure the optimum long-term production of each product. Any practice that is applied to a single use will affect others. For example, removing the timber affects the numbers and kinds of animals, both wild and domestic, that will inhabit the site. Research is being carried out to determine other effects of various practices, but much more is required.



*Figure 2. Logging road 10 years after construction, showing dense growth of lodgepole pine.*

## REASONS FOR SEEDING

The effect of seeding grasses and legumes has been studied for many years. When the existing vegetation is killed by fire, logging, or other means, the soil is left exposed to erosion and weathering. On forest ranges, the dominant forage is generally pine grass, which is less palatable than other grasses and legumes. Logging or light burns stimulate the growth of pine grass. For a few years the pine grass may yield twice as much forage as grows on undisturbed areas and its palatability appears to be improved. However, if the soil is significantly disturbed and the native forage is killed, the yield is greatly reduced and it may take some years to reestablish the area. In the meantime, the soil is open to the growth of useless or harmful weeds. The spread of range weeds is related to the movement of machinery and traffic, which expose the soil surface and carry weed seeds. Seeding of suitable species reduces or prevents the growth of most weeds. The quick establishment of a

ground cover prevents the topsoil from being washed away, improves soil fertility, and reduces erosion. The seeding of road cuts, shoulders, and ditches can reduce road-maintenance costs. A good stand of grass is more attractive than a stand of weeds and is less of a fire hazard.



*Figure 3. Road 3 years after construction, showing dense stand of Canada thistle.*

Where grasses and legumes are seeded to supply forage for livestock, up to three times the amount of forage can be produced. There are a number of additional range benefits from seeding. The seeded grasses and legumes are generally more palatable and nutritious than the native pine grass. The more nutritious and productive forage assists in the distribution of livestock. The native pine grass is a short-season grass; it grows rapidly and is most nutritious during the spring and early summer. Other forage species that can be grown on forest ranges may start growth earlier or continue growth longer and are valuable supplements to the native species.

Some of the benefits of seeding are:

- Increased forage production
- Increased soil fertility
- Decreased erosion
- Prevention of weed invasion
- Reduced road-maintenance costs
- Reduced fire hazard
- Improved appearance of area

- Increased palatability and nutritive value
- Improved distribution of livestock
- Extension of grazing area
- Extension of grazing season.



*Figure 4. Road 3 years after construction and seeding to grass.*

## **WHERE TO SEED**

Seed wherever the soil is exposed. If the soil surface has been disturbed by machinery during logging operations or construction work, seed it. Also seed log landings, skid trails, roadsides, and borrow pits. Fires, either wild or controlled, frequently kill the cover and expose an excellent seedbed. However, if the ground is wet and cold enough so that the fire does not kill the grass crowns or roots, seeding may not be necessary. Seedings generally fail unless the soil surface is sufficiently disturbed to kill vegetation and expose the soil beneath the layer of partly decayed organic matter.

## **WHEN TO SEED**

Summer logging generally results in a greater soil disturbance and a better seedbed than winter logging. Seed as soon as possible in the spring or fall after the

soil has been disturbed to take advantage of the seedbed and to establish preferred species before weeds invade the site. A good seedbed is as important as the season of seeding. Seed may be broadcast successfully on snow, but if the snow is crusted, the seed may be blown along the surface and be unevenly distributed. A second disadvantage is the difficulty of determining if the soil surface is suitable for seeding. A third obvious disadvantage is that of access and the difficulty of maneuvering in snow.

## WHAT TO SEED

The seeding rate varies with the species to be sown and the moisture conditions. A number of grasses and legumes have proved suitable for seeding in the forest zones. Usually a mixture of the best adapted species is preferred. Seed at 5 to 8 pounds per acre depending on the seedbed and moisture conditions. There are wide variations in the number of seeds per pound, which also affects the recommended seeding rates.

Because of the great variations in climate and soils in the forest zones, it is impossible to recommend one seed mixture. After a few seeding trials, range men often find one kind of grass or legume better suited to their land than another. Include one or more legumes to increase the nitrogen content of the soil. Grasses and legumes in a mixture complement each other and provide succulent pasture over a longer season due to variations in seasons of growth. Mixtures are also recommended because of variations in soils and moisture conditions within rather small areas where one grass may be suitable for a south slope and another for a north slope.

The following are a few suggested mixtures that have proved successful.  
Dry Zone (12 to 15 inches precipitation)

In the ponderosa pine zone and dry parts of the Douglas fir zone where the native grasses consist chiefly of bunchgrass, seed the following mix:

<i>Species</i>	<i>Percentage by weight</i>
Crested wheatgrass	60
Brome grass	20
Alfalfa	10
White sweetclover	10
Legume inoculant	

Subhumid Zone (15 to 18 inches precipitation)

In most of the Douglas fir zone and in lodgepole pine areas where pine grass is

native, a greater variety of grasses and legumes can be grown:

<i>Species</i>	<i>Percentage by weight</i>
Orchardgrass	20
Bromegrass	20
Timothy	20
Crested wheatgrass	25
White clover	5
Red clover	10
Legume inoculant	

Kentucky bluegrass (5 to 10 percent) may be added to the mix for seeding along power lines and roads, or on other areas where a close sod is desired to discourage tree reproduction.



*Figure 5. Newly burned area in lodgepole pine. Destruction of ground cover was almost complete because of fuel provided by dead trees on the ground.*

#### Spruce – Subalpine Fir Zone (more than 18 inches precipitation)

In the spruce – subalpine fir zone a good stand of forage can be quickly established wherever the mineral soil is exposed, but the stand is likely to be replaced by trees within 10 years. At subalpine elevations, where the growth of trees is considerably reduced, the forage stand may be maintained over a longer period.



Seed the following mix in the spruce – subalpine fir zone and on the heavier soils in the Douglas fir zone where moisture is adequate:

<i>Species</i>	<i>Percentage by weight</i>
Timothy	30
Orchardgrass	35
Bromegrass	20
White clover	5
Alsike clover	10

Kentucky bluegrass may be added to the mix for seeding along power lines and roads, or on other areas where a close sod is desired to discourage tree reproduction. Creeping red fescue can replace orchardgrass in northern areas where winterkill is a problem.

### **Legume Inoculation**

Before broadcasting the seed, treat the legumes with a freshly prepared mixture of legume inoculant. Because inoculant deteriorates when exposed, treat only enough seed to take care of the immediate seeding requirements. When planning to seed a mixture of legumes and grasses, mix the appropriate inoculant with the legume seed, and then the inoculated legume seed with the grass seed.



*Figure 6. Good stand of seeded grasses on heavily burned area.*

Consult your local district agriculturist for information on legume inoculation and forage varieties adapted to your conditions. Adapted varieties and No. 1 seed should be used where possible.

## HOW TO SEED

Because of trees, it is generally not practical to make extensive use of machinery for seedbed preparation on forest range. However, harrowing or shallow discing of roads and open areas is often practical and pays dividends if the ground has become compacted. Avoid deep cultivation. The soil needs to be disturbed only enough to reduce competition from existing plants and to loosen about 1/2 to 1 inch of the soil surface. Seeding may be done either before or after the soil disturbance, and the operations can sometimes be combined by using a machine such as a rangeland drill.

Seeding is easy. Along roads broadcast the seed from a spreader mounted on the rear of a tractor or truck. On less accessible or rough areas, walk and spread the seed with a hand-operated seeder. Because it is hard to judge the rate of seeding, you will probably overseed at first. The number of seeds per pound (see Appendix) shows that the lower rates allow enough seed for a good stand. For example, 6 pounds of orchardgrass per acre provide 90 seeds per square foot. Hand-operated seeders broadcast a strip of seed 12 to 18 feet wide. Approximately 1 acre is seeded in each half-mile strip. If the recommended seeding rate is 6 pounds per acre, then apply 12 pounds of seed for each mile traveled.

The British Columbia Forest Service has found that aerial seeding by using a fixed-wing aircraft on wheels or floats is sometimes practical and more economical than hand seeding. Large acreages can be seeded quickly by aircraft after burns or clear cutting of timber. The accessibility of the area by vehicle, topography, and aircraft ferrying time are some of the factors to consider in deciding whether an area should be seeded from the ground or air. Seed will be wasted by aerial seeding unless all the area has a suitable seedbed. The cost of seed wasted should be balanced against any saving obtainable from aerial seeding. Ground control of flight patterns and the absence of wind are essential to a successful aerial seeding project.

Poor seedings usually result from improper seeding depth, drought after germination, or competition from established plants. Do not plant small seeds of grasses and legumes deeply, but cover them with a shallow layer of moist soil for rapid, even germination. It is important to broadcast the seed as soon as possible after the soil is disturbed. The success or failure of a seeding on forest range should not be assessed the first year. In the drier zones, it may require 3 years for a seeding to become fully established.

Good range management is essential to the initial establishment and maintenance of a stand of grass. Keep stock off the seeded area immediately after germination occurs and until the soil is firm and the seedlings are well developed, preferably throughout the first growing season. Heavy grazing of competing vegetation may be helpful immediately before and after seeding or until germination begins. Grazing of the range immediately after seeding may assist in the placement of seed in the soil by trampling.

## APPENDIX

### Common Grasses and Legumes Used in Seeding Forest Rangelands, Their Characteristics, and Management Suggestions

Grass or legume	Seeds per lb (thousands)	Adaptation to climate	Adaptation to soil	Growth characteristics	Management
Alfalfa	220	Semidrought resistant Dry zone	Tolerates some salinity	Late spring starter	May cause bloat
Alsike clover	690	Does well under cool, wet conditions Tolerates poor drainage Subhumid and humid zones	Adjusts to a wide range of soils	A short-lived perennial	Not much aftermath Does not stand close grazing May cause bloat in dense stands
Creeping red fescue	615	Not drought-resistant Cold-tolerant Humid zone	Adapted to wide range of soils Well adapted to northern areas	Forms dense sod, which withstands trampling	Stands heavy grazing Best adapted to spring and fall grazing
Crested wheatgrass	190	Very drought-resistant Very cold-resistant Dry and subhumid zones	Grows on poor soil Requires well-drained soil Moderately saline- tolerant	Long-lived bunchgrass Root system extensive Grows early in the spring but dormant in the summer Cures well Establishes slowly	Best for spring and fall grazing Survives close grazing and trampling

## APPENDIX — Cont.

Grass or legume	Seeds per lb (thousands)	Adaptation to climate	Adaptation to soil	Growth characteristics	Management
Kentucky bluegrass	2,200	Cold-tolerant Moderately drought-tolerant Stands moderate flooding Subhumid and humid zones	Adapted to a wide variety of soils Tolerates some salinity Grows wild on many of the grasslands	Long-lived sod former Produces a tight sod that allows few weeds Low growth makes a good bottom grass	Requires ample moisture and high fertility for good production Withstands trampling
Meadow foxtail	575	Stands summer frosts Not drought-resistant Humid zone	Prefers moist, swampy soils Withstands flooding better than most other grasses	Starts growth early Loosely tufted with short rootstocks and underground branches Not a high forage producer	Highly palatable Good early range in wet areas
Orchardgrass	650	Shade-tolerant Not drought-tolerant Suited to cool growing conditions Subhumid and humid zones	Grows on thin, infertile soils but responds to good fertility Not saline-tolerant	Long-lived bunchgrass Produces early spring growth and rapid regrowth after grazing	Easily established Best sown in mixtures
Red clover	260	Humid zone	Prefers fertile, well-drained soils Does not tolerate acidic soils	Generally short-lived perennial	Does not stand spring grazing May cause bloat when growing in dense stands

## APPENDIX—Concluded

Grass or legume	Seeds per lb (thousands)	Adaptation to climate	Adaptation to soil	Growth characteristics	Management
Smooth bromegrass	136	Moderately drought-resistant Cold-tolerant Dry and subhumid zones	Tolerates some salinity Does best on well-drained loams	Leafy, sod-forming, long-lived Good cool-season grass Palatable at all stages	Easily established Sod binds unless fertilized or sown with a legume
Sweet clover	260	Semiresistant to drought Winter-hardy Dry zone	Does not tolerate acidic or wet soils	Short-lived May reseed itself if not overgrazed	Less likely to cause bloat than alfalfa
Timothy	1,230	Cold resistant Withstands moderate flooding Subhumid and humid zones	Tolerates wide range of soils but does best on heavy soils Prefers moist ground	Medium long-lived bunchgrass Palatable at all stages Quick to establish	Replaced by less palatable grasses when heavily grazed
White clover	700	Subhumid and humid zones	Not saline-tolerant	A long-lived creeper Slow to become established	Withstands grazing and trampling

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