Seeding of Areas Burned by Wildfires

Revised 2017

Range Branch
Ministry of Forests, Lands, and Natural Resource Operations

Seeding of areas burned by wildfires

July 2017

Broad scale seeding of all burned areas is unnecessary, and inappropriate within the context of managing for a natural landscape. However, some areas should be seeded to address weed control, erosion control, and may be seeded for forage replacement, to take advantage of an opportunity to improve livestock distribution and provide forage enhancement. Judicious use of forage seeding will reduce the on-site and off-site effects of fireguards and staging areas. Forage seeding can also take advantage of the seedbed created by the fire to improve livestock distribution and forage production for livestock and wildlife. A balance of values will be achieved if seeding is used to gain specific benefits while allowing most areas to succeed to a natural condition.

Seed Analysis Certificates and Weed Content

From Struthers, 2003[1]:

> Before purchasing a seed mixture it is important to obtain a copy of the seed certificate for each species included in the mix. Under the Canada Seeds Act, all seed that is offered for sale must be graded and labelled before it can be sold, and seed suppliers are required to provide a copy of the seed certificate when requested by a customer. A seed certificate documents two main criteria:
>
> - Purity - The percentage of the actual seed of the species requested in the seed lot. Weed seeds, seeds of other crop types and inert materials are expressed as a percent of the seed lot that is not pure seed.
> - Germination - The percent germination of the seed lot, based on the number of seeds out of 100 that germinate over 4 to 21 days.
>
> When ordering seed, it is important to specify that the individual species in each mix must grade **Common No. 1** or better, and that the blended mixture must meet the grade requirements for **Common No. 1 Forage Mixture**. Accepting seed mixtures with a lower grade specification, such as Common No. 2 forage mixture or Canada No. 1 ground cover, may increase the likelihood of contamination by noxious weeds.
>
> With respect to weed seed content, buyers need to specify weed species they do not want in their seed mixes. Before purchasing it is important to check the certificate of seed analysis of each forage species prior to mixing and verify that no weed seeds contaminate the seed lot.
>
> ***Note:*** Under the Canada Seed Act there is no minimum standard for native seed and no grade designation for mixtures composed of native species. Exercise caution when interpreting seed certificates for native species.

[1] Excerpt from Struthers, D. 2003. Revegetation Guidelines. Southeast Fire Centre.

Use of non-native seed

There is concern about the introduction of non-native plant species through seeding of domestic forage species. Consider site sensitivity, invasiveness of the seeded species, persistence of the seeded species, and availability of native species when making your decisions. Short-lived, non-invasive domestic species will have the least long-term impact on a site while persistent invasive species will have the greatest.

There does not appear to be any native species available that can achieve a weed resistant cover in the short-term needed to control the establishment of invasive weeds. Furthermore, British Columbia cultivars of native grass species are not available.

Annual grasses are an option as long as they can maintain sufficient cover in successive years to resist weeds. In very dry conditions, annual grasses may not set seed and therefore may not maintain the needed cover. Reseeding would then be needed.

Crested wheatgrass and Hard Fescue are persistent but not invasive on very dry sites and appear to be the only options available

On moister sites, that will succeed to forests, very few of the domestic forages will be persistent. However, known invasive species such as smooth brome should be avoided.

When to seed

Plants need sufficient growth prior to freeze-up in order to survive the winter. The best time to seed is immediately after the fire until the end of August. September seeding may be successful (if the grass does not germinate until the following spring) but legumes will likely not survive. Seeding onto snow has the same results. Waiting until snowmelt may be the best option if seeding cannot be done before the end of August.

If an area is scheduled for salvage logging then seeding should be done after the logging (to cover new disturbances), and can be done either before or after site preparation.

Objectives for Seeding:

1. Weed control

Seed all fireguards, staging areas and other mineral soils exposed by fire suppression activities to achieve a weed resistant plant cover within one growing season. The purpose is to ensure that these areas do not become vectors for weed spread.

Seed high severity burned areas (see appendix 1 for a description of fire severity) where native understorey vegetation is killed and the area is at risk to weed invasion (see appendix 2 for risk to weed invasion). The purpose is to achieve a weed resistant cover within one growing season.

2. *Erosion control*

Seed all fireguards, staging areas and other mineral soils exposed by fire suppression activities to achieve an erosion resistant plant cover within one growing season. The purpose is to ensure the areas do not erode.

Seed high severity burned areas where native understorey vegetation is killed and the areas is considered at risk to erosion (see appendix 3 for erosion risk assessment) to achieve an erosion resistant plant cover within one growing season.

3. Livestock distribution

Forage seeding can be used as an attractant to lure livestock from sensitive sites such as riparian zones. Ridge tops and areas far from water having a high severity index and exposed soils are candidates for this treatment, and site selection would be at the discretion of local range staff.

4. Forage replacement

If large areas burned severely enough to kill understorey vegetation, then forage replacement by seeding may be needed. Care must be taken to not attract livestock into sensitive sites with this forage.

Areas that burned hot enough to create a seedbed, but not kill the understorey vegetation, may produce slightly less forage during the spring following the fire because of the reduction in live tillers and the loss of moisture holding mulch. In many cases this reduced production will be compensated by an increase in areas accessible to grazing, and an increase in production due to the removal of forest canopy. Where this compensation is not anticipated, then forage seeding may be required to fill the time-gap until stressed plants fully recover.

Use low seeding rates and non-persistent species to minimize effects on the succession of these sites to a native plant community

Seed mixes and application rates

These mixes deliver approximately the same number of seeds per species:

1. BG, PP and dryer parts of IDF

Erosion and weed control and Sensitive areas where we need to discourage livestock use
10kg/ha

Species	% by weight	Invasiveness	Persistence	Weed resistance
Annual ryegrass,	35	Low	Low (1 yr)	High
Crested wheatgrass	40	Low	High (30 +)	High
Chewings fescue	15	Low	Moderate	High
Hard fescue	10	Low	Moderate	High

Areas where livestock use is appropriate
10kg/ha

Species	% by weight	Invasiveness	Persistence	Weed resistance
Annual ryegrass,	25	Low	Low (1 yr)	High
Crested wheatgrass	30	Low	High (30 +)	High
Chewings fescue	10	Low	Moderate	High
Hard fescue	10	Low	Moderate	High
Alfalfa	25	moderate	High	moderate

Distribution and forage
4kg/ha

Species	% by weight	Invasiveness	Persistence	Weed resistance
Annual ryegrass,	30	Low	Low (1 yr)	High
Crested wheatgrass	40	Low	High (30 +)	High
Alfalfa	30	moderate	High	moderate

Harrowing or dragging something over the seeded area will bury the seed and achieve better establishment of the crested wheatgrass.

2. Wetter parts of the IDF, MS and ESSF

Erosion and weed control and Sensitive areas where we need to discourage livestock use 10kg/ha

Species	% by weight	Invasiveness	Persistence	Weed resistance
Annual ryegrass,	50	Low	Low (1 yr)	High
Chewings fescue	25	Low	Moderate	High
Hard fescue	25	Low	Moderate	High

Areas where livestock use is appropriate

10kg/ha

Species	% by weight	Invasiveness	Persistence	Weed resistance
Annual ryegrass,	55	Low	Low (1 yr)	High
Orchardgrass	30	Low	Moderate	High
White clover	15	Moderate	Moderate	Moderate

Distribution, and
forage 4kg/ha

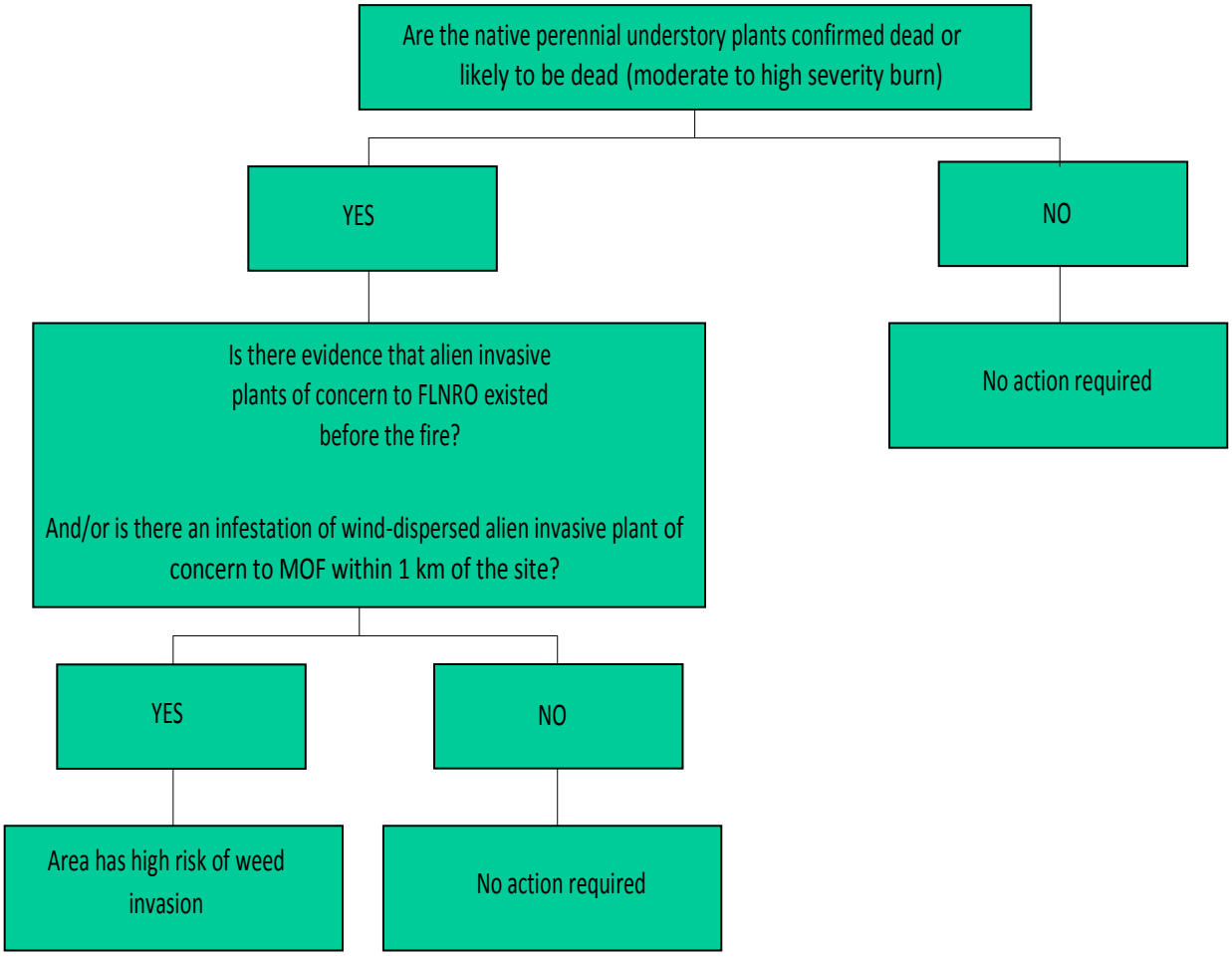
Species	% by weight	Invasiveness	Persistence	Weed resistance
Orchardgrass	70	Low	Moderate	High
White clover	30	Moderate	Moderate	Moderate

Appendix 1 - Burn severity classification

Based on postfire appearances of litter and soil and soil temperature profiles (Hungerford 1996, DeBano et al. 1998). (Adapted from Robichaud et al. 2000).

Soil and Litter Parameter	**Burn Severity**		
	Low	**Moderate**	**High**
Litter	Scorched, Charred, Consumed	Consumed	Consumed
Duff	Intact, Surface Char	Deep Char, Consumed	Consumed
Woody Debris – Small	Partly Consumed, Charred	Consumed	Consumed
Woody Debris – Logs	Charred	Charred	Consumed, Deeply Charred
Ash Colour	Black	Light Coloured	Reddish, Orange
Mineral Soil	Not Changed	Not Changed	Altered Structure,
Soil Temp. at 10 mm	(<50 °C)	(100-200 °C)	(>250 °C)
Soil Organism Lethal Temp.	To 10 mm	To 50 mm	To 160 mm

Appendix 2 - Assessment of Risk to Weed Invasion



Appendix 3 - Soil Erosion Risk

(from: Hazard Assessment Keys For Evaluating Site Sensitivity To Soil Degrading Processes Guidebook, 1999)

Site Factors	**Degree of Contribution of factors**			
	Low	Moderate	High	Very High
Climate Precipitation factor[2] **(points)**	Low **2**	Moderate **4**	High **6**	Very high **8**
Topography Slope gradient (%) **(points)** Length/uniformity **(points)**	Low **2** _____ short broken **1**	Moderate **4** _____ short uniform **2**	High **6** _____ long broken **3**	Very high **8** _____ long uniform **4**
Depth to water restricting layer (cm) **(points)**	>90 **1**	61-90 **2**	30-60 **3**	<30 **4**
Surface soil detachability (0-15cm)[3] **(points)**	SC,C,SiC **1**	SiCL,CL,CCL **2**	SL,L **4**	Si,SiL,fSL,LS,S **8**
Surface coarse fragments (0-15 cm)[2] **(points)**	>60 **1**	31-60 **2**	16-30 **3**	<16 **4**
Subsoil permeability (16-60 cm) Texture **Points)**	S,LS,SL,Fsl **1**	L,SiL,Si **2**	CL,SCL,Si,CL **3**	C,SC,SiC **4**

Soil erosion hazard rating[4] **(point total)**	**Low** **<16**	**Moderate** **16-22**	**High** **23-31**	**Very high** **>31**

[2] See pages 11 to14 of the guidebook for values

[3] If two contrasting textures or coarse fragment contents occur in the depth, use the one with the highest point rating

[4] Gently sloping areas with long, uniform sloes may rate as high soil erosion hazard. The reason is that substantial erosion can occur on these sites given the right conditions