MONITORING THE EFFECTS OF POSTFIRE GRASS SEEDING ON THE LOWMAN BURN

(First Year Progress Report)

by

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Introduction

On July 26, 1989, a lightning storm ignited several fires in the South Fork of the Payette River drainage near Lowman, Idaho. Some of these fires burned together forming what became known as the Lowman Complex fire. This fire burned as a high intensity crown fire over much of the area and on one day generated "firestorm" conditions. The fire burned about 47,600 acres before it was controlled on August 29.

Since the early 1930's, these catastrophic stand destroying wildfires, have become a recurring event in the lower elevation forests of central Idaho. These high intensity fires usually jeopardize the soil, water, and other natural resources and rehabilitation projects have become a common practice. Rehabilitation usually includes seeding of exotic grasses across a broad range of site conditions. Much of the Lowman Complex burn was seeded to grasses in the fall of 1989.

Seeded grasses are an excellent resource management tool. The seed is readily available and easily applied. The grasses quickly revegetate exposed soil, and preempt invasion of noxious weeds. They provide forage for big game and livestock and maintain a low cover along roads where visibility is essential.

But in forest ecosystems, seeded grasses also create long-term management problems. Most grasses are highly competitive for soil moisture. They effectively exclude natural regeneration of tree seedlings (Geier-Hayes 1987) and possibly other plant species, and jeopardize survival of planted tree seedlings (Pearson 1942). Some grasses are also allelopathic and may inhibit establishment and growth of native shrubs and forbs. Thus through either competition or inhibition, seeded grasses can retard the successional processes that create natural forest diversity. In addition, these grasses attract large herbivores which can disrupt soil stability, especially on steep terrain. The grasses also produce large amounts of fine fuels which may allow wildfires to burn through areas that might otherwise serve as firebreaks. For example, the Lowman Complex fire burned through the 1977 Kirkham burn which contained seeded and native grasses.

The Lowman burn offers an excellent opportunity to assess the postfire role of seeded grasses across a broad range of forest habitats. Ponderosa pine, Douglas-fir, and subalpine fir habitat types all experienced intense wildfire and received grass seeding.

Objectives

This study is intended to be a five year cooperative effort between the Intermountain Research Station and Boise National Forest/Intermountain Region. The study was initiated in order to clarify the longterm effects of postfire grass seeding in forest ecosystems.

Specific objectives of the study are:

1. Assess efficacy of natural vegetation versus seeded grasses for soil stabilization across a variety of habitat types and burned conditions.

2. Assess effects of natural vegetation and seeded grasses on natural and planted conifer regeneration.

3. Assess the effects of seeded grasses on the establishment and growth of important big game browse species.

4. Develop a guide for identifying burned areas that will need seeded grasses to control erosion and those that will revegetate naturally without erosion.

5. Provide training for field personnel in the recognition of natural recovery capabilities of postfire vegetation and the recognition of areas where seeded grasses are needed to control erosion.

Progress

Prior to the grass seeding operation, 15 paired sample plots were installed across a wide range of habitat types (table 1). Each plot pair consists of one seeded and one unseeded plot. At each plot, four seedtraps were installed to collect grass seed and then retrieved following the grass seeding operation. The seed from each trap was identified and counted (table 2).

Four photo points were initiated at each plot. Both black and white photographs and color slides were taken in the fall of 1989 and the summer of 1990. Individual sprouting shrubs were also photographed, tagged and mapped, for future reference.

Vegetation cover by species was estimated in each plot in the summer of 1990. Diameters of living and dead trees in the transects were also recorded.

Table 1. Distribution of sample plots in the Lowman burn.

Plot	Elev. (ft.)	Aspect (°)	Habitat Type
1S (seeded)	6160	90	ABLA/ACGL
1U (unseeded)	6140	100	
2S	5760	140	PSME/SPBE
2U	5650	150	
3S	5120	210	PSME/SPBE
3U	5120	210	
4S	6400	30	ABLA/CARU
4U	6400	36	
5S	5780	170	PSME/SPBE
5U	5800	170	
6S	5900	210	PSME/BERE
6U	5880	210	
7S	6280	290	PSME/ACGL
7U	6340	280	

Table 1 cont.

8S	6250	10	ABLA/ACGL
8U	6210	10	
9S	6040	50	ABLA/ACGL
9U	6100	40	
10S	5880	250	PSME/PHMA
10U	5820	250	
11S	4450	230	PSME/SPBE
11U	4450	250	
12S	4820	170	PSME/PHMA
12U	4780	160	
13S	4390	100	PIPO/?
13U	4450	100	
14S	4300	140	PIPO/PUTR
14U	4300	130	
15S	4390	120	PIPO/AGSP
15U	4440	120	

Table 2 Average pounds/acre by species, total pounds/acre, and average number of seed/acre collected from seedtraps.

Habitat Type Series	----Average lbs/acre---- Bromus	Agropyron	Dactylis	Lolium	Phleum	total lbs/acre (Average No. seeds/acre)
PIPO (n=3)	0.69	0.95	2.14	0.45	0.03	4.26 (1,535.490)
PSME (n=8)	1.54	2.26	3.23	0.72	0.17	7.97 (2,593,181)
ABLA (n=4)	1.17	1.19	2.08	0.75	0.13	5.32 (1,731,510)
Average	1.13	1.47	2.48	0.64	0.11	5.85* (1,953,394)

*Prescribed seeding rate was 6 lbs to the acre.

Five 1/2 m^2 plots were installed in each large plot to monitor soil displacement. Data were taken from 50 of these plots in the fall of 1989 and all (150) of the plots in the summer of 1990. On August 20, 1990 a high intensity rainstorm caused serious erosion in part of the study area. All 1/2 m^2 plots were then remeasured in order to isolate the effects of this event in the data set.

During the summer of 1990, all plots were permanently marked with angle-iron and rebar stakes. Where trees were available, plot perimeters were marked by painting red or orange bands on the trees.

Discussion

Trends in the data have not yet established to the extent that any conclusions can be derived. We expect that five years of data will be needed.

Field observations show that many of the residual shrub and herb species survived the fire, even in the intensely burned areas. By late September, 1989, many shrub species had resprouted, the most conspicuous being Scouler willow, mountain maple, serviceberry, mountain snowberry, and bittercherry. Of the herb species, geranium, showy aster, pinegrass, and fireweed resprouted within a month of the fire. The new shrub sprouts, particularly willow and maple, were eagerly sought by deer and elk. Being quite succulent, many of the shrub sprouts winter-killed especially on southerly aspects but survived on the northerly aspects where winter snow cover preceded lethal temperatures. Most shrubs with winter-killed sprouts resprouted the following spring. No shrub species was eliminated by the fire although blue huckleberry and, to a lesser extent, ninebark were reduced considerably. In some of the most severely burned areas, shiny-leaf buckbrush and mountain hollyhock have germinated profusely from seed stored in the soil.

The seeded grasses germinated slowly due to dry spring conditions (table 3). Some late spring rains apparently stimulated grass germination so that by mid summer seeded grasses were evident in most areas. However total coverage of seeded grasses was considerably less than the native species in most, but not all, of the sampled areas. By fall many of the seeded grasses, particularly timothy, intermediate wheatgrass, and annual rye had produced seed which appears to be viable. Also the native pinegrass had flowered profusely and produced ample seed. With large areas of seedbed still available, it appears that grass coverages (both native and seeded) will likely increase.

Table 3 Number of seeds/acre, grass germinants/acre, grass seedlings/acre, and percent seeds to seedlings for 15 plots.

Habitat Type Series	Number of seeds/acre Fall 1989	Number of grass germinants/acre Spring 1990	Number of grass seedlings Summer 1990	Seeds to seedlings Summer 1990
PIPO (n=3)	1,535,490	38,115	50,820	3.3%
PSME (n=8)	2,593,181	103,455	73,508	2.8%
ABLA (n=4)	1,731,510	197,381	108,900	6.3%