

BONAPARTE LAKE FIRE REHABILITATION REPORT SUMMARY

On August 6-8 the Regional Fire Rehabilitation Team was on the Bonaparte Lake Fire on the Okanogan National Forest. At the Forest we had an entrance interview with Jack McIlhenny, Timber, Range and Wildlife, Watershed Staffman; Bob Turner, Forest Engineer; and L. C. Winkle, Administrative Officer. At this meeting, we discussed the fire and some of the plans that the Forest has in mind for rehabilitation of the burned area. Functioning on the rehabilitation team were Bill Pint, Range and Wildlife; Stan Thorn, Engineering; Lewis Nicholson, Timber Management; Gerald Swank, Watershed; Loren Herman, Watershed. On August 8, an exit interview was held with the team and Gearhart Nelson, Forest Supervisor; Bruce McMillan, Tonasket Ranger District; Ed Hill, TMA; Don Sutton, Range Technician; Earle Rother, Soil Scientist, to discuss team recommendations.

The Bonaparte Lake Fire burned approximately 930 acres, of which approximately 150 acres are private land. Most of the area burned hot and completely consumed the litter ground cover vegetation and killing the over-story tree species. The topography ranges from gentle slopes to slopes ranging to 60%. This has left the soil exposed to erosion and runoff. The soils are very erosive when exposed, such as now exist in the burned area. Therefore, it is necessary to provide a protection to the soils as quickly as possible. It is recommended by the rehabilitation team that the entire burn area be seeded to grass this fall before the first rain.

Summary of estimated rehabilitation costs:

Fertilization and application	\$5,550
Temporary protection fence	3,750
Cattle guard for protection	2,000
Seeding and application	<u>5,461</u>
Total --	\$16,761

Soils of the Area. The soils of the area are very uniform and consistent throughout the burned area. They are derived from glacial till and outwash and recent surface volcanic ash. Surface textures are loose, single-grained, fine sandy loam and very fine sandy loam, depths range from very shallow to very deep, the surface stone content is very slight, the thickness of the volcanic ash varies but it is generally 8 to 18 inches over a very coarse textured, very gravelly soil material. Slopes range from flat to 50% and 60%, there are some rock outcrops in the burned area and some very steep rocky scarps. The soils have a low potential for compaction,

have a high potential for erosion, particularly as the slopes increase, water runoff is generally low, infiltration rate is high, water storage is low, fertility is relatively low.

Recommendations

1. Fire lines should be waterbarred, particularly the fire lines on the north perimeter of the fire. These fire lines are steep, in excess of 30%, and need to be waterbarred immediately.
2. All the burned area needs to be seeded to grass.
3. Fertilization requirements and recommendations call for 50 pounds of actual nitrogen on the burned area and 70 pounds of actual nitrogen on the fire lines. Fertilizer recommended to be used is ANS which has 30% nitrogen, 1% phosphorous, 6% sulphur. This is to be applied in the spring as soon as the snow melts and while the moisture is still in the soil. Timing is extremely critical and fertilizer must be applied at the first bare soil condition.

Estimated Cost: FFF

Fertilizing fire lines \$ 850

Application of fertilizer 125

Rehabilitation Funds

Fertilizing burn 4,550

Application of fertilizer 1,000

4. Fire lines should be scarified, seeded and fertilized. Some of the fire lines have been run on with heavy equipment and have been compacted. These need to be broken up by scarification and seeded to grass and fertilized. This should be done this fall.

Grass Seeding and Protection

In view of the relatively hot burn which occurred over most of the area on the fire, apparently destroying root crowns of native grasses to a significant degree, we recommend that the entire area be reseeded to selected grasses on hand on the Okanogan at the earliest possible date. Haste is necessary to realize maximum benefit from the excellent seedbed condition that exists at the present time. Deep ash resulting from total consummation of the duff and litter layers and the dry, friable ash soils on the area will be subjected to considerable movement by wind and natural sluffing. The anticipated seed coverage will

South End of Fire

The following mix is suggested for the steep southerly escarpment comprising an estimated 300 acres on the south end of the fire. Effective precipitation is estimated at 15 - 18 inches on this comparatively drouthy site. Though pinegrass was a component of the understory vegetation, Idaho fescue and bluebunch wheatgrass were also conspicuous on this site. Canyon bottoms and the flat ground in the vicinity of the Boy Scout Camp are capable of supporting more palatable species, but these are intentionally being avoided in this concentration area (livestock).

Pubescent wheatgrass is commonly used on such sites on the Okanogan and it is felt by Forest personnel that this species poses no regeneration problems on the Forest. However, in deference to team member Lew Nicholson's concern about the greater difficulty of site preparation in a stand of rhizomatous grass, should this prove necessary, it is not being included in the mix. It must be conceded that the substituted intermediate wheatgrass can be somewhat rhizomatous, depending upon the seed source and the site.

<u>Species</u>	<u>lbs/acre</u>	<u>cost/lb.</u>	<u>cost/acre</u>
Intermediate wheatgrass	5	.53	2.65
Slender wheatgrass	5	.51	2.55
Hard fescue	1	1.65	1.65
Timothy	1	.48	.48
Dwarf yellow sweet clover	$\frac{1}{2}$.26	.13
Totals -	12 $\frac{1}{2}$		7.46

300 acres x 7.46/acre = \$2,238, cost of fire rehabilitation

Remainder of Burned Area

Above the south facing escarpment there is approximately 530 acres in need of seeding to anchor exposed soils. Palatable species are purposely being used to draw livestock out of the natural concentration area on the south end of the allotment and the burn.

<u>Species</u>	<u>lbs./acre</u>	<u>cost/lb.</u>	<u>cost/acre</u>
Orchardgrass	3	.52	1.56
Timothy	1	.48	.48
Hard fescue	1	1.65	1.65
White Dutch clover	$\frac{1}{2}$	1.00	.50
Totals -	5 $\frac{1}{2}$		4.19

530 acres x 4.19/acre = \$2,221, cost of fire rehabilitation

All areas further disturbed by salvage logging should be promptly reseeded, since seed will likely be buried too deeply on these loose friable soils.

Restoration and Construction of Range Improvements Essential for Burn Rehabilitation

A little more than 2 miles of fence was damaged beyond repair and must be replaced. General damage occurred to the 2-year old wire by the intense heat and live trees used for line posts, where these fell on the fence tangents, were killed. However, the most conspicuous damage was the extreme physical damage resulting from interior fireline construction on fence line rights-of-way, which happened to fall on the most advantageous terrain for fireline construction as well. This damage that resulted as a direct consequence of the fire fighting operation should be replaceable with FFF funds. Approximately one mile of this fence essential for the control of cattle in the Bonaparte Lake area will be constructed at or near its present location. Another $1\frac{1}{2}$ miles, however, can be more strategically relocated approximately $\frac{1}{2}$ mile to the west where it will both serve to protect revegetation and reforestation efforts and to manage the burn as a single pasture when rehabilitation is complete. An additional 2.5 miles of new fence will be necessary on the north and east sides of the fire for the same purpose. It is recommended that the fences be constructed approximately as shown on the attached map.

A cattleguard will be required where the new protection fence on the east side of the burn crosses the main access road to Lost Lake. It is not believed that a gate would be practical or accord the necessary protection for the burn.

Finally, a livestock water development was substantially damaged in fireline construction. Its restoration will be essential for proper management of permitted livestock when grazing of the burned area is resumed.

Following are cost estimates of the above improvement restoration and construction needs, including seed purchase, by activity believed appropriately responsible for financing. The estimated cost of aerial seeding is included.

FFF

1. Remove damaged fence - $2\frac{1}{2}$ miles x \$300/mile = \$675
2. Reconstruct new fence - $2\frac{1}{2}$ miles x \$1,500/mile = \$3,375
3. Repair damaged livestock water facility = \$250
4. Seed firelines, 100 acres x \$9.75/acre = \$975

TOTAL = \$5,275

Fire Rehabilitation

1. Construct new protection fence - $2\frac{1}{2}$ miles x \$1,500/mile = \$3,750
2. Install cattleguard essential for burn protection = \$2,000
3. Seed burned area - 300 acres x \$8.75/acre = \$2,625
4. Seed burned area - 530 acres x \$5.35/acre = \$2,836

TOTAL = \$11,211

Silviculture and Salvage Logging

The Situation

The main tree species are western larch, Douglas-fir, and lodgepole pine. The minor species are Engelmann spruce and ponderosa pine. Mistletoe exists in all species. The overstory is heavily infected.

Only a few of the largest (18" plus) Douglas-fir may survive the fire. The survivors per acre will be less than minimum stocking.

The seed crop is very light and it may not be mature enough to develop on the fire-killed trees. The lodgepole pine and western larch had a light cone crop.

Site and Vegetation Type

The vegetation consists of bearberry, pine grass, snowberry, princess pine, dwarf huckleberry and lupine. The elevation is mostly between 4,000 - 4,500 feet. The site is estimated to be Site 5 for Douglas-fir. The vegetation is classified as a bearberry - pine grass type.

Objectives

The objectives are:

1. Protect the soil
2. Salvage the timber
3. Reforest the area with Douglas-fir and western larch and obtain a mistletoe free stand.

Salvage

The timber should be salvaged and funds collected to do the erosion control measures following logging and reforestation.

Area 2 (see map) should be cable yarded. The slopes are over 35 percent and the soil is loose. There may not be enough volume for a cable operation. Most of the rest of the fire areas are under 35 percent and can be tractor logged.

The fire-killed larch, lodgepole and spruce will check fast and deteriorate rapidly; therefore, the salvage should be done this fall. The funds collected will allow reforestation to start this fall and continue next spring.

Ed Hill, TMA, mentioned leaving seed trees to help in natural stocking. Area 4 is about the only area where there would be any available. This is fine and a publication on leaving larch seed trees has been sent to Mr. Hill.

Reforestation

The species used to reforest this area should be western larch and Douglas-fir.

The reforestation should be by planting; auger where possible. We have no method of rodent control. Past aerial seeding on the forest has relied on chemical rodent control. A clearcut unit just south of the fire was looked at, where the naturals are stocking the unit, but it appeared it has taken approximately 15 years. This should be checked out with the District files. However, it appears waiting for naturals would be longer than 5 years.

It is recommended the reforestation be started with area 1 then proceeding to area 4. The Forest should use their available trees, seed and funds to set the priority for this fire in relationship to their other reforestation and TSI work. The Forest should request an increase in K-V limitation if necessary. The number of trees that could be used in this area is not known, but it is recommended other methods in addition to planting be used to reforest this area this fall and next spring before competition sets in. Other methods which could be used are:

1. Spot seeding with protective screens. This has been done in Region 1 and Region 6
2. Using surplus larch seed or trees from the Colville National Forest
3. Using plug trees, probably as a trial. I have been unable to contact Pete Owston to find out what species could be grown by next spring and how much room he had at Corvallis. This information will be sent as soon as available.

The followup mistletoe work to be done next spring is finish falling any residual live unmerchantable trees.

The sequence of events would be:

1. Prepare salvage sale,
2. Do fire rehabilitation work; grass seeding, waterbarring, etc.,
3. Prepare reforestation plan for the area using available trees and seed,
4. Do fall spot tree seeding and followup erosion control measures following logging,
5. Do spring planting (auger if possible),
6. Do followup mistletoe control work.

Hydrology and Water Quality

Situation

There is only one defined drainage in the burn area and it is at the lower southwest portion of the fire. It is an intermittent stream that does not have a well defined channel, past the Boy Scout Camp. Although the drainage is steeper and more sharply defined toward its upper end, it has a small drainage area and only the northeast side is within the burn. Soils are sparse here and the burn was apparently less intense. The only slopes that appear to be endangered by erosion are those at the lower end where the drainage spreads out into a broad flat area which would serve as a natural catch for water borne soils. There is little timber to salvage on these lower slopes.

If an exceptionally heavy runoff should occur over a relatively short period of time there is a natural collection basin in what was once a small pond which has since filled in, plus there is a shallow pond in the flat at the north end of Bonaparte Lake that would act as a third catch to prevent sediment from being carried into Bonaparte Lake or endangering any life or property.

Rehabilitation Recommendations

1. Physical structures - Because of reasons stated above, no physical structures, (e.g., trash racks, check dams, settling basins, log booms, etc.) are needed. Also, no stream channel

cleaning is needed.

If for some unforeseen reason the Forest does find a need to install physical structures designed to pass water, below are some estimated design criteria specifically for the burn area. (Reference FSM 2513.31, R-6 Supplement No. 18.)

<u>Peak Flows (cfs)</u> ^{1/}		
<u>Drainage Area(acres)</u>	<u>Mean Annual</u>	<u>20 Year Peak</u>
64	0.8	1.5
128	1.5	2.8
320	3.2	6.1
640	6.0	11.4

1/ From Geological Survey Water-Supply Paper 1687
by Bodhaine and Thomas.

2. Structural Erosion Control Measures - Water bars on existing firelines non-system roads, etc., should be done as soon as possible, and at least before fall precipitation occurs. There were very few areas where water bars seemed necessary as natural breaks, topography, and location negate the need for most structures. The areas where most of the structures are needed are on the north and northwest end of the fire.

Water bars where the loose, ashy material overlies heavier, coarser, rocky soil should be constructed in the coarser soil in order to be effective. The spacing of these water bars for various slope classes are shown below. The rainfall intensity shown is for a 30 minute, 5 year reoccurrence interval (from Climatological Handbook, Columbia Basin States, Volume 2), since the water bar is needed primarily through the critical period until vegetation is firmly reestablished--estimated to be about 5 years.

Recommended Water Bar Spacing
(for fine textured soils with a 30-minute
5 year precipitation intensity of 0.6")

<u>Slope (%)</u>	<u>Slope Distance Between Water Bars (ft.)</u>
2	640
5	220
10	100
15	60
20	45
25	35
30	30
35	25
40	20

Because of the high permeability of the soil, water bars on slopes less than 35 percent are normally not needed. Spacing on slopes less than 35 percent are shown on the table above in case the Forest might have exceptions or use of this type of data in other similar areas not in the burn.

3. System Roads

The only permanent, system roads in the fire area are Roads 395, 395A, 395B, 395C and Road 396A. All roads appeared to be in generally good condition following the fire. Some blading and replacement of surfacing may be necessary in areas where heavy fire traffic and/or passage of cats has damaged the running surface.