

Response of Range to Burning

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IT is a pleasure to be here today to visit with you and discuss the response of rangelands to burning. As you know, the Bureau of Land Management is responsible for the management of approximately 25 percent of the lands in Oregon. For the past several years we've called all the lands that BLM manages "the National Resource Lands" (NRL's). In Oregon, there are 15.7 million acres of National Resource Lands, located in ten BLM districts; 2,900,000 acres of timbered lands in western Oregon and 12,800,000 acres of rangelands in eastern Oregon. Rangelands in Oregon are primarily in southeastern Oregon.

The Bureau has an extremely varied natural resource program to administer and an equally varied user and interest group to work with, each having its own specific interest. The Bureau's responsibility is to manage the public lands for the highest and best use in the total public interest. In carrying out these responsibilities, lands under BLM administration are managed for:

- 1) Domestic livestock grazing. At the present time, over 1700 families in Oregon are dependent to various degrees on NRL's for livestock forage. Livestock utilized approximately 1,000,000 animal unit months of forage on BLM administered land in Oregon in 1973.

- 2) Fish and wildlife development and utilization. Wildlife attracts millions of hunters and fishermen—and those who believe fish and game are part of our heritage.

- 3) Industrial development.
- 4) Minerals from our National Resource Lands have played an important role in the development of the nation.
- 5) Human occupancy.
- 6) Outdoor recreation.
- 7) Timber production is provided where the land is suited to forest growth. The NRL forests help assure enough trees to meet demands for timber and other forest products.
- 8) Watershed Protection. In a nation where daily use of water is 1,500 gallons for each person, we must protect our precious watersheds. No other resource has more to do with the future of America than water—and the public lands are watersheds from which flow major streams.
- 9) Primitive (Wilderness) area preservation—Wild lands—in their original, natural condition—are increasingly scarce. Demands for saving open space are becoming greater as more and more people seek places where they can “get away from it all.”
- 10) Protection of public values—Law gives BLM authority to “protect public values.” These can include ancient Indian drawings carved on lonely rocks—and wild horses.

All Resource Management programs are being driven by the conditions of our times resulting in high public interest and concern for protection and improving the quality of the environment.

Although grazing by domestic livestock is still the most dominant force affecting vegetation on the NRL's in eastern Oregon, increasing public demands and concern require that full consideration be given all uses made on the land. Here in this “decade of the environment” priority consideration must be given to multiple use values such as soil and watershed protection and environmental quality in the land.

EFFECTS OF FIRE

In Oregon, BLM spends about \$1½ million annually in protecting resources from fire. Fire losses have been serious during the last 2 years. In 1965, we had the fewest fires in a decade and the lowest acreage burned in the Bureau's history (Table 1). In the decade 1964 to 1973, 69 percent of the 2621 fires were lightning-caused, 31 percent man-caused (Table 2).

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TABLE 1. Acres of rangeland burned by wildfire, eastern Oregon 1961—1973

Year	NRL	Other Land	Total
1961	80,369	38,310	118,679
1962	3,501	2,835	6,336
1963	38,261	22,059	60,320
1964	12,841	5,744	18,585
1965	898	583	1,481
1966	4,191	352	4,543
1967	17,155	4,955	22,110
1968	15,112	6,147	21,159
1969	13,388	815	14,203
1970	24,136	2,038	26,174
1971	29,987	—	—
1972	92,730	—	—
1973	110,728	—	—

Average annual acres burned on NRL's: 34,000

TABLE 2. Fire occurrence and causes, eastern Oregon, 1963—1973

Year	No.	Man	Lightning
1963	277	—	—
1964	231	74	157
1965	180	52	128
1966	211	114	97
1967	315	122	193
1968	364	117	247
1969	172	40	132
1970	221	39	182
1971	258	121	137
1972	450	100	350
1973	219	32	187
Total	2621	811 (31%)	1810 (69%)

In a general way, plant communities, common to the rangeland environment can be broken into three groups:

- Grassland
- Shrub-Grassland
- Juniper-Shrub-Grassland.

Species of importance are bitterbrush and big sage.

Natural vegetation in eastern Oregon is dominated by big sagebrush and bunch grass in varying proportions. In many places big sagebrush is associated with rabbitbrush and annual grasses. Occasionally evidence of past fire can be observed by the dominance of rabbitbrush and the remains of sagebrush stumps.

Plant communities which normally pose no fire problems because they lack fuel to carry a fire are: short sagebrush, greasewood, and shadscale.

Man's management of the surface resource becomes a necessity if all the needs of society are to be met. Past abusive use of rangeland has often resulted in serious deterioration and loss of perennial vegetation. When climatic conditions are favorable, invasion of annual weeds becomes a problem.

Whenever plants grow close enough together to carry a fire it becomes a significant component of the environment. The more cheatgrass, the more fire, and the more fire, the more cheatgrass. Often the cheatgrass increases the length of the fire season by 1 to 3 months, depending on annual climatic conditions. In 1965, A. C. Hall reported that a cheatgrass community is from 10 to 500 times more likely to burn and requires five times more men and equipment to control than fire in perennial grass communities.

The effect of burning on plant communities varies according to the species, time of burning, location and weather conditions. Some species are more fire-tolerant than others. Fires of heavy intensity are more injurious to nearly all species than moderate and light burns. Vigor of perennials is reduced when fire occurs early and productivity of perennial grasses the year following an early burn is often less than one-third of normal. Late summer or early fall burns are considered less damaging to forage species, in most situations.

The intensity of the burn and the heat produced can result in significant changes in the character of rangeland, often posing serious management problems. The general effect of fire is often increased fire hazard and a reduction in quality of the watershed cover, forage and wildlife cover.

Fires in a dry year are harmful since they magnify drought stress

on plants often resulting in death. Wildfires usually occur during the active growing season which severely damages many species. Plant moisture content, at the time of burn, is important. Some species, often the introduced species, have a higher moisture content later in the season than native vegetation and will not be seriously damaged and will act as a barrier to fire.

Extensive burned areas distract from the scenic values. Rangeland denuded by fire is not a pretty sight. Wind erosion lifts precious soil high into the air.

Large, fast-spreading fires can kill animals trapped in the fire and destroy the nesting sites of birds. After a fire has exposed the soil, wood ashes washed into streams can kill fish. Destruction of the vegetation and shade along stream banks will cause the water temperatures to rise and make the stream less suitable for trout.

There can be little doubt that natural native plant communities provide the best environment essential for the multiple use management program.

Heat from fire does not readily penetrate soil even from the more intensive fires. The temperature of the soil below 1 inch is usually not raised significantly. Such fire, however, can burn all the litter, thus exposing bare soil. Not only does this increase runoff and soil movement on the slopes, but the storage capacity of the soil itself is lessened. Plants and brush and litter in the range environment buffer the soil from rapid changes in microclimate and from the churning action of falling raindrops. If mineral soil is exposed by extremely hot fire or repeated hot burns for long periods of time, site deterioration will occur followed by increases in the soil erosion.

One year after fire, even with seeding which largely depends upon favorable growing conditions of moisture and temperature, some sites are still subject to accelerated erosion. Vegetation management, such as chemical brush control, contribute to increased fire hazards. The moisture content of perennial vegetation—crested wheatgrass—often restricts the spread of fire.

Fragile soils exposed by fire are subject to the action of wind even before fires are completely out. Some soils are highly erosive when protective vegetation has been removed. Fire often impairs the ability of watershed to absorb rainfall and hold back runoff. When

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bare soil is exposed on slopes, the accelerated runoff will carry suspended soil particles and other material to streams with a corresponding reduction in water quality. Fire is responsible for the vast amount of flood and sediment damage.

Damage to structures and facilities is another costly effect of fire. Wildfires pose many problems in multiple use management programs: here range evaluation studies established to determine vegetative trends were burned-over. The studies were established July 31, 1970 and burned-over August 1, 1973. By August of 1974, the area which was protected for livestock had undergone considerable change.

Another study is being conducted on the Pinto Horse, and changes in soil surface and plant density can be noted in the green rabbit-brush invasion in the dairy pasture fire 1 year after burning. Protection of burned-over areas from livestock grazing is absolutely essential if we are to re-establish watershed cover and site productivity. Eight months after burning with protection and with no protection, differences in the vegetation can be noted.

Failure to protect burned-over lands from grazing can only result in serious accelerated wind erosion and loss of site potential. It is essential that in areas where perennial vegetation will not survive the burn and sufficient density is lacking for effective watershed protection, vegetation be re-established. Failure to seed one area allowed invasion of cheatgrass contributing to higher fire hazard. A properly revegetated site 8 months after burn will have good cover. Failure to take immediate action will result in loss of valuable soil and the invasion of annual vegetation which will contribute to future fire hazards. Establishing fuel breaks with seeded species such as crested wheatgrass often assist in the control of fire. Introduced species normally maintain their moisture further into the fire season than native species.

SUMMARY

Each year wildland fires in the range environment of southeastern Oregon cause major damage to natural resources and property.

In most cases, the adverse effects of fire from the view point of

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our multiple use resource management program are such that it is imperative measures be taken to control and prevent fire and the damaging effects on the resources whenever possible.