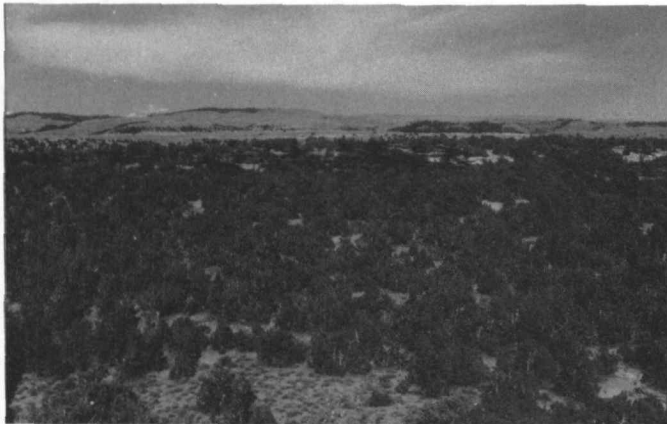


Eight Years of Juniper Control by Burning

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FIRE! A management tool for the control of brush and shrubs? I believe that fire is about the only tool left that we, who are interested in improving the rangelands, have for controlling Rocky Mountain and Utah juniper. (Not all species of juniper can be controlled by fire.)

The country my ranch is in, Paintrock Valley, Big Horn County, Wyoming, on the west slope of the Big Horn Mountains, was first settled in 1879. Thirty years ago juniper invasion to the grasslands was not apparent to me. By 1973 it was very evident. Aging the juniper trees indicated there had been an explosive invasion into the grasslands from 1883 until the present time. Realization of what had taken place and evidence of continued juniper invasion made me aware of the forage production I had lost and would continue to lose if the spreading of juniper was not controlled.



Explosive invasion of juniper into our grasslands occurred from 1883 until the turn of the century and continues to occur, but at a slower rate.

The juniper was there, and the need for control was real; yet, at the time, I lacked the know-how to burn juniper. So, I contacted the Soil Conservation Service (SCS), who in turn coordinated efforts among the State Forester, Wyoming Game and Fish Commission, Bureau of Land Management (BLM), the U.S. Forest Service (USFS), Federal Aviation Agency (FAA), and the Big Horn County Fire Warden. Plans were made to begin a program of controlled burning.

The grazing unit where the burning took place consists of 9 pastures with 3 pastures deferred during the growing season. One of the deferred pastures was selected for the first burn. The site averaged 22% juniper canopy cover. Due to the wide spacing between trees, we hoped that the year's accumulation of grass would carry the fire from tree to tree. It was decided that prior to the burn the SCS would use vegetation transects to determine annual herbage production before and after the burn. Fire lanes were made using natural barriers and burning lanes in adjacent areas. On August 30, 1977, we attempted our first trial burn. We set fire to the grass hoping it would burn hot enough to ignite the trees. Due to unfavorable conditions (high humidity, cool temperature,

and below-average grass production), this did not work. The grass did not carry the fire. We then tried burning individual trees. This didn't work too well. The moisture content of the trees plus the unfavorable burning conditions were too much to overcome. This was mentioned in my article on Land Use Planning in the October 1978 issue of the *Rangeman's Journal*.

Plans were made to begin preparation earlier the next year (1978) hopefully with more favorable burning conditions. The 1978 grass production was about average and approximately 20% more than in 1977. We evaluated the results of the previous year's burn of a few individual trees. Some



Fire is the only method of juniper control that works well for us. Rock outcrops, steep slopes, and high energy cost make other methods uneconomical.

grass, particularly Idaho fescue, was coming back in the burn area. Plans were made to do the second burn on August 22, 1978. However, there was a good rain on the 19th and we decided to wait a week, hoping for less moisture in the juniper leaves. Two areas were to be burned this time: the original area and another area that had a 35 to 40% canopy cover with little or no understory. Merle Hamilton, a neighboring rancher; my nephew, Jerry; and myself, were joined by representatives of the State Forestry Office, the U.S. Forest Service, and the SCS on the morning of August 29, 1978. We had also contacted the BLM, the Wyoming Game and Fish, the County Fire Warden, and the FAA to let them know of our intentions. We started burning control lines on the original burn site at 11:00 a.m. Using the "White Pine County formula" (Bruner and Klebenow 1979), the burning index at this time was 26 where anything below 110 was unsatisfactory. The pasture had been rested and adequate stubble was present but the grass had green basal growth due to the late summer rains. Therefore, the burning was slow and erratic. We started by dragging an old tire casing to start the fire, but this did not work. We switched to diesel/gas drip torches and achieved better results. At 1:00 p.m., burning conditions rated 30, which was still very low. We then began igniting individual trees on the edge of the burn area but the fire was still slow and erratic. An average tree, 8-feet tall with a 7-foot crown diameter, required 5 minutes to burn



Parts of the burned areas were seeded. Mammoth wildrye is the most vigorous and produces the most forage.

completely. We continued down a draw and into thicker juniper stands. At 2:30 p.m. the index was 50 and burning progressed more rapidly. At 3:30 p.m. the rating was 63. The wind increased to 8 mph, and the heat generated by the fire became more intense. Fire was spreading slowly from tree to tree. Using this method, we burned approximately 77 acres by 5:00 p.m. At this time, the rating was 168, which was very high. We decided to move to the second burn site. The fire was ignited at 5:30 p.m. and spread rapidly from tree to tree. Within a few minutes the fire generated its own wind and heat and spread rapidly up the 15-20% slope. The burn became very hot and most of the area was in flames. The fire jumped the line in one of the places that was extremely hot, but was easily controlled with a pumper. Soil temperature 20 minutes after the fire was approximately 130° Fahrenheit. The fire had died down and was cooling well about 1 hour after ignition. The burn removed approximately 60% of the juniper within the planned area. In areas of heavy canopy, the removal was nearly 100%.



Burned areas that are not seeded still respond well and with proper grazing management, production is soon back to an acceptable level.

A few days after the burn, the area received a good rain and a check of the area showed that some grass was beginning to come back on the first area. Even on the shallow sites, results looked promising. Approximately 2 weeks after the burn, the second area was broadcast seeded to a mixture of Critana

thickspike wheatgrass, Sodar streambank wheatgrass, Indian ricegrass, Wytana fourwing saltbush, and mammoth wildrye. The seed used was provided by the Bridger Plant Materials Center. A few days after seeding the area, it received another good rain. A check of the area in the middle of October showed no germination. Shortly after that, the area was covered with snow and remained covered until the spring snow melt during April of the next year.

By 1982, four years later, we could see that the vigorous stands of Critana thickspike and Sodar streambank wheatgrasses were providing good erosion control and good forage production. The Indian ricegrass had good vigor and good forage production with more wildlife use than on either of the two wheatgrasses. The Wytana fourwing saltbush failed but the mammoth wildrye had excellent plant vigor and forage production.

King spikefescue, green needlegrass, Indian ricegrass, and basin wildrye were not identified in the area prior to the juniper burns. All of these species plus other desirable grasses and forbs are now found in unseeded areas and in some places are very lush. In some parts of the burn areas seedheads of basin wildrye are as high as your head when riding a horse.

Wildlife congregate on these areas, especially in the spring. Elk came down the mountain to within a quarter mile of the headquarters for the first time in my life, just to catch the new green growth after the burn.

We couldn't burn in 1979 because there was too much fall moisture. In 1980, 40 acres were burned with almost 100% control of the juniper. In 1981 a 400-acre area was burned. Conditions were good for burning and the result was 60% juniper removal.

To date we have burned about 1,630 acres and the BLM has burned about 720 additional acres. Our cost has ranged from 68¢ to \$5.71 per acre. Before the burn program we achieved a 143% increase in carrying capacity across the 9 pastures from water development, sagebrush control, and grazing systems but we were using all 9 pastures. In 1984 we had to take a 37% reduction on our Forest Service allotment but thanks to our burning we were able to absorb all of the stock on our private land and weren't forced to sell any livestock. In addition we are now resting 3 of the 9 pastures each summer. Our burn program has allowed us to use several highly flexible grazing systems. These systems, along with good water development have resulted in 97 to 99% conception rate without pregnancy testing or artificial insemination.

Prescribed burning is an excellent tool that works well for us. We will continue our plan through a Great Plains Conservation Program contract with SCS and good coordinated planning with the Bureau of Land Management and the Forest Service. We intend to combine burning with improved grazing management until junipers occupy those areas where they were originally and grasses and forbs are growing in the areas where my grandfather found them back in 1879.

Literature Cited

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