

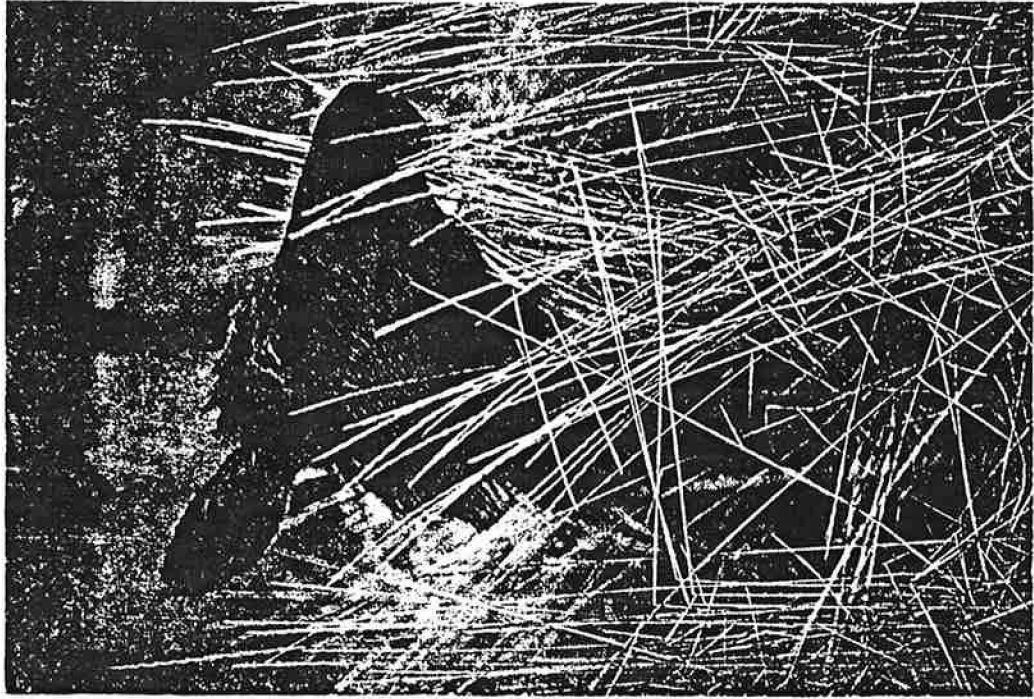
New Mexico Wildlife

Inside:
A Fire for Elk,
Hunting for Snow
Geese and Sandhill Cranes,
Lead Vs. Steel Shot, and more ...



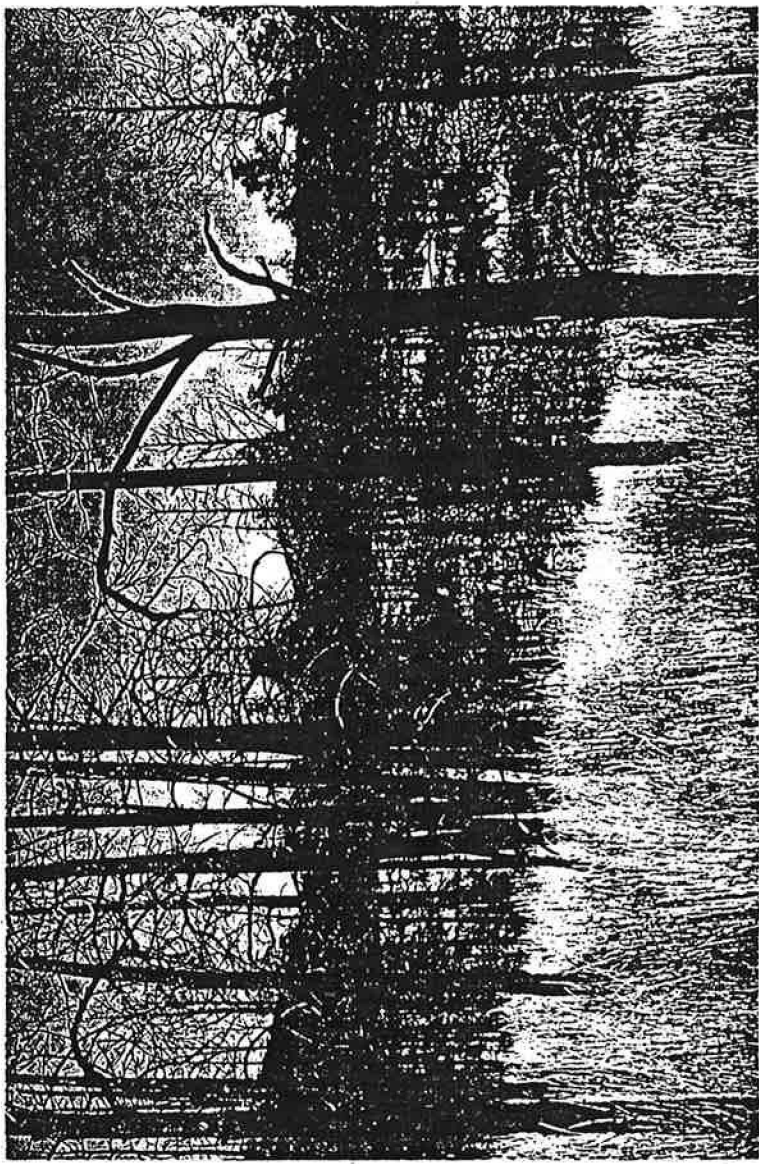
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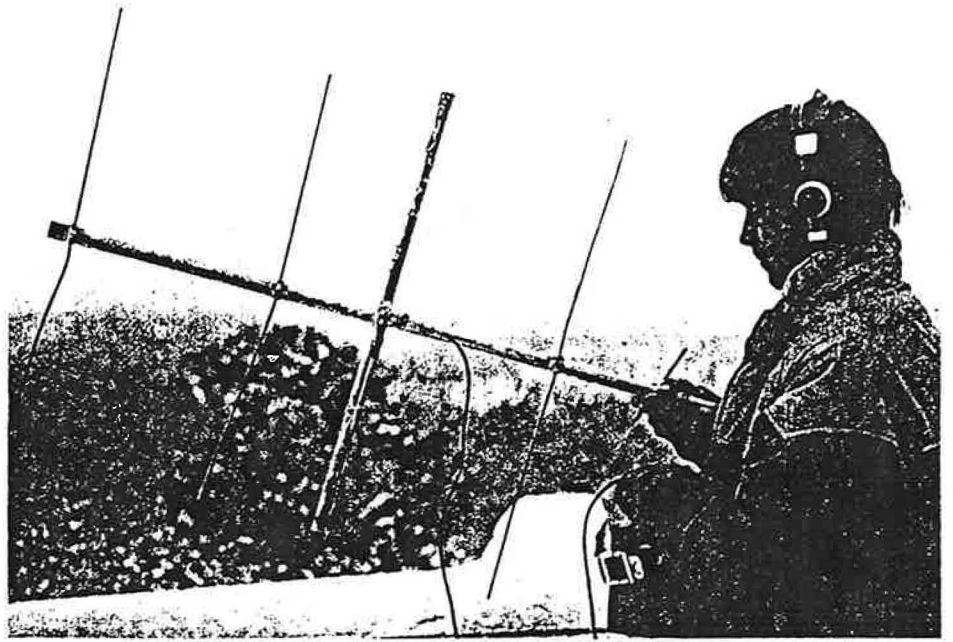


An elk, left, captured and released in the Banderlier area nearly three years after the 1977 fire, is shown amid the high grasses in Banderlier. This diet of grass, much more digestible than shrubs, provided higher levels of energy to elk in Banderlier compared to elk on the other study area, the Valle San Antonio on the Baca. Below, charred trees stand amid the high grass on Banderlier two years after the La Mesa burn.

A Fire



Bruce Weber, right, a graduate student at Utah State University, was in charge of trapping elk to obtain physiological data and placing radio collars on the elk. Telemetry equipment, developed by Bob Hayes at Los Alamos National Laboratory, allowed Weber to determine, without visiting the site, whether a trap's drop-gate had been tripped.



for Winter Elk

*A disastrous 1977 fire in the Jemez Mountains left more than 15,000 acres charred — but the fire was also a boon to one of New Mexico's prized animals, Rocky Mountain elk.
article and photos by
Mary M. Rowland*

In June 1977 a devastating wildfire burned out of control for seven days in the eastern Jemez Mountains of New Mexico. Gusty winds fanned the blaze, and hot, dry air and abundant fuel aggravated the volatile conditions. When the flames subsided, more than 15,000 acres of ponderosa pine lay charred and barren. The "La Mesa fire," as it came to be known, was in many ways disastrous — but it was also a boon to one of New Mexico's prized animals, Rocky Mountain elk.

Elk were not always easily found in New Mexico. Market hunting, poaching, habitat losses and competition with domestic livestock had eliminated them from most of the state by the early 1900s. In 1948, 28 elk were reintroduced in the Jemez Mountains. The earliest releases were in San Pedro Parks, from which the population has gradually expanded eastward. Additional transplants in 1964 and 1965 near Los Alamos boosted the eastern Jemez herd, until elk today range from San Pedro Parks east to Bandelier National Monument. Beginning in 1957, a hunting season was opened on the Jemez elk herd.

Following the La Mesa fire, grass seed was quickly spread to establish an erosion-preventing turf. Because most of the fire burned on Bandelier, National Park Service officials were especially concerned about erosion of the monument's hundreds of archaeological sites. The seeded grasses formed a verdant carpet the following summer — a positive example of ecological resiliency. By the winter of 1978-79, elk began to feed regularly on the La Mesa burn.

This shift in winter range was not surprising. The previous winter, 14 elk had been trapped and radio-collared on an older burn three miles away. Ten of these elk moved to the La Mesa burn in winter 1978-79, indicating that conditions were more attractive on the new burn. The increase in elk on Bandelier and the adjacent Los Alamos National Laboratory (LANL) prompted a study of the potential effects of the wildfire on elk diets and physiological condition.

Why does a burned hillside appeal to elk? First, production of grasses and other herbaceous plants generally in-

creases following fire, and shrubs seem to sprout succulent leaders overnight. Even the nutritional value of plants, such as their protein content, may improve because of the fertilizing action of minerals in ash. Another benefit of fire is earlier green-up of plants in the spring, as the forest canopy no longer blocks sunlight from the understory plants. The specific responses of a plant community to fire depend upon a host of factors, however, such as season, the intensity of the fire and the plant species present.

The physical structure of vegetation is also important to elk. Fire converts patches of forest to earlier successional stages, which contain more forage for elk. These vegetation patterns that develop after a fire are important in maintaining or improving elk habitat, because they provide a mixture of foraging, resting and cover areas.

Although wildlife biologists have long known that ungulate (e.g. moose, deer and elk) herds increase following fires, pinpointing the mechanism of these increases has been difficult. Animals may immigrate into the burn, swelling the local population. Alternatively, reproductive success or survival of resident animals may increase due to better nutrition. Whatever the cause, fires often create a measurable increase in elk herds.

Numerous burns are scattered throughout the ponderosa pine zone in the Jemez, despite more than 50 years of fire suppression. Most are small, though — from 1931 to 1977, for example, only five fires larger than 10 acres were recorded in Bandelier National Monument. Elk are seldom far from these burns in winter. The La Mesa fire, however, was the largest local fire in decades, thus an increase in the local elk population was expected. Winter range is believed to be the limiting factor for this elk population, and 15,000 seeded acres were added to the winter range in 1977 — no small boost.

With the knowledge of fire's effects on elk herds elsewhere, we began a study to assess how the La Mesa burn affected elk, and to predict the consequences of these changes. Our study was designed to compare the elk herd wintering on the La Mesa site with elk wintering in a comparable, but unburned,

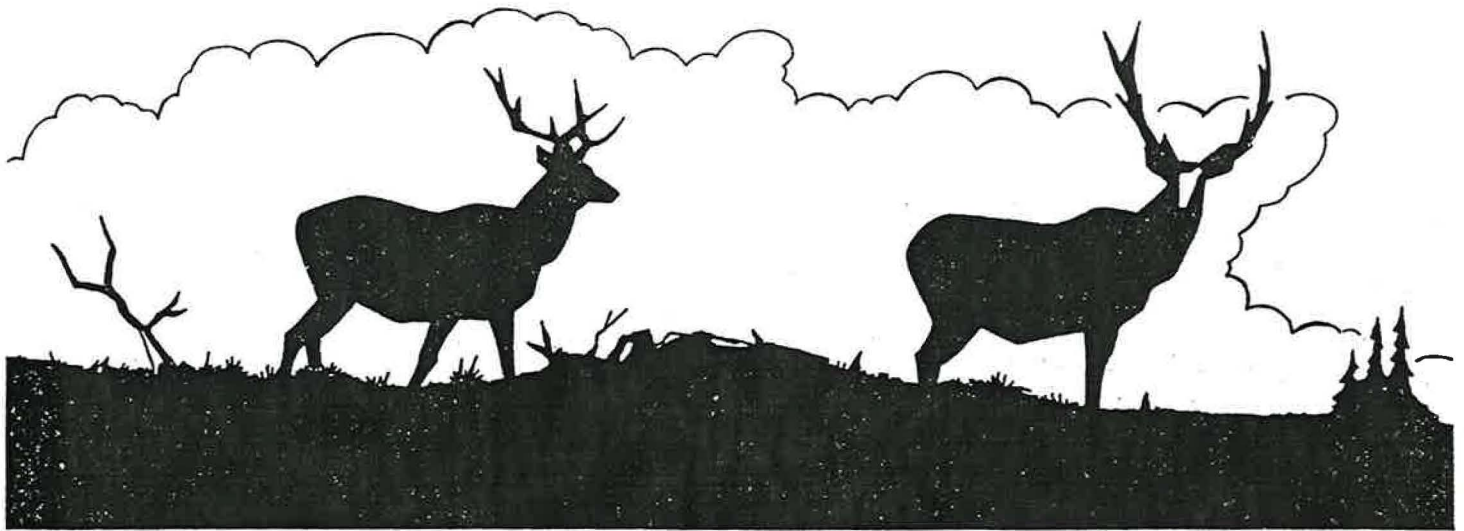
area. A herd meeting our criteria was found in the Valle San Antonio on the Baca Ranch. This second herd was the "control" group. Our study areas were approximately 15 miles apart, a good indicator that the two herds did not mix in winter.

The research was divided into two parts. Elk diets and forage quality were my responsibility, as part of my graduate program at Colorado State University. Bruce Weber, a graduate student at Utah State University, was in charge of trapping elk to obtain physiological data and to place radio collars on the elk. The study was funded by the Department of Energy at LANL, with field assistance provided by New Mexico Department of Game and Fish and National Park Service personnel. Gary White and Tom Hakonson, ecologists at LANL, initiated the study.

Winter field work brought us to the Baca ranch, high in a caldera in the Jemez. The volcanic explosion that created these magnificent valleys and peaks threw boulders and other debris as far away as Kansas. Our work site was in a remote valley 10 miles north of ranch headquarters. Both snowstorms and snowmobiles were unpredictable, making safety a foremost concern. To ensure our well-being, Bruce and I checked in daily with Tom Berry.

Tom, winter caretaker for the Baca Land and Cattle Co., is a colorful, generous New Mexico wrangler who receives more winter care packages from concerned friends than he could possibly eat in a lifetime. We pitched in cheerfully, though, washing down cakes and pies with Tom's strong, hot coffee. In honesty, without Tom's support and watchful eye, and the permission of the late Pat Dunnigan to work on the ranch, our research would have been impossible.

Seven elk traps were set in January 1980, four in the Baca and three in Bandelier. A radio-telemetry device developed by Bob Hayes at LANL allowed Bruce to determine, without actually visiting the site, whether a trap's drop-gate had been tripped. Thus, valuable time was saved in making daily rounds to the traps. A tripped gate didn't always guarantee an elk to add to our sample. Mule deer were sometimes caught on the burn, or the gate was hung up on an empty trap.



Once immobilized with tranquilizers, elk were quickly pulled from the trap and radio-collared. A blood sample was then taken, to be analyzed for several physiological parameters. Females were checked for pregnancy, and fecal samples were collected for later diet analysis. Finally, the groggy wapiti were weighed and released. The elk usually rested quietly for several minutes before ambling into the forest. Not all elk were so cooperative, though. More than once Bruce and his helpers dashed madly for the trap, a charging elk in close pursuit. Trapper becomes trappée.

In addition to fecal samples from captured elk, I collected fresh elk pellets in both areas. At the same time, I clipped samples of the major forage plants in each area. These forage samples were analyzed for protein content and digestibility. By knowing the composition of the diet and the quality of plants that elk were eating, I was able to compare the nutritional value of elk diets in Bandelier and the Baca.

Our field work continued from January through April. During this time, Bruce and Bob mapped the whereabouts of 33 radio-collared elk, both on the ground and from the air. The two herds did remain separate throughout winter and early spring, assuring us that the two winter herds were in fact discrete.

Were elk indeed better off on the burn? An emphatic "yes," according to our results. The diet analyses showed that elk on the burn enjoyed better foraging there. The expected dif-

ference between the two study areas in *quality* of plants did not occur. In other words, grasses on the burn were no more nutritious than those in the Baca. The key factor was how *much* grass versus shrubs was eaten. Elks diets on the burn contained a much higher percentage of grass, averaging 90 percent, compared with 50 percent in the Baca. The grasses seeded on the burn, especially sheep fescue, accounted for most of the grass eaten in Bandelier. This diet of grass, which is much more digestible than shrubs, provided higher levels of energy to elk in Bandelier compared with their counterparts in the Baca. Maintaining adequate energy reserves is extremely important in wintering elk. This difference in energy levels may in turn have caused the physiological differences in the elk that we measured.

Bruce's condition studies revealed what we had suspected, and agreed closely with the diet information. We found that elk weighed more on the burn. For example, cows were, on the average, 19 percent heavier on the burn, and spike bulls weighed 11 percent more. The blood chemistry tests supported these results. Two important blood parameters that indicate dietary energy levels were higher in the Bandelier elk. Other blood components, reflecting dietary protein, were also higher in elk on the burn.

We believe that the differences between herds were due to winter habitat quality. Although the elk remained in distinct herds in winter, they shared calving and summering areas. More im-

portantly, they remained together during the rut, indicating that the differences we measured were not due to genetic variation.

A concern for habitat deterioration caused by too many elk provided the impetus for our study. In the northern Rockies, elk populations peak 20 to 30 years after major fires. A decline follows, as woody plants replace grasses and forbs, and habitats are no longer capable of supporting such large numbers of animals.

Will a similar boom and bust cycle occur in the eastern Jemez elk? The number of elk wintering on the La Mesa burn has increased since 1977. Although we cannot predict with certainty the population dynamics of the herd, it does appear that the La Mesa fire has been beneficial to elk. The fire has enlarged their winter range and possibly improved productivity of the herd, through better nutrition.

Prescribed burning, while useful in many cases, is not the panacea for the shortage of elk winter range. Location is important: Dense clumps of grass buried under six feet of snow are of little value to wintering elk. Other factors to consider are the effects of prescribed fire on other wildlife species, as well as the ability of the site to carry a fire and the likely post-fire plant composition. But, with judicious use, burning may enhance elk winter habitat in otherwise marginal areas by creating an abundant supply of highly digestible food.

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