



Northern Great Plains Range Problems

LEON C. HURTT

United States Forest Service

VARIOUS SCIENCES should be brought to bear on certain urgent range and related problems of the northern Great Plains. The prevailing land-use situation has had a scrambled development and a wasteful exploitation with blundering disregard of basic ecological relationships. Now that these relationships are better understood, we must harmonize them into a better regional program.

A first step in an analysis of range and related problems is to marshal scattered, but pertinent, economic and ecologic facts and show the significant relationships. From this may be derived a list of regional problems that require research in order to correct existing land-use maladjustments.

REGIONAL CHARACTERISTICS

THE NORTHERN GREAT PLAINS, as considered herein, is a grassland empire including a total of 84 counties—three-fifths of Montana and adjacent portions of northeastern Wyoming and the western parts of both Dakotas. A new era opened on these plains when the first herds of cattle came up from overstocked Texas ranges three-quarters of a century ago. Regional limitations and characteristics dictate that range husbandry should continue as a major activity for this region.

The northern semi-arid climate exerts a major control over soil, vegetation, and land-use practices of these plains. Precipitation varies from 10 to 17 inches, 65–75 per cent of it falling in the April–September growing season; relatively high wind movement hastens evaporation; extremes of temperature from 114° to –49° F. have been recorded. Winters are sometimes surprisingly

mild, yet severe blizzards and ice-covered ranges have repeatedly brought financial ruin to hundreds of ranchers who were not well prepared.

Drought still overshadows all other hazards on these ranges. Forced liquidation up to 80 per cent of all livestock was necessary in many plains counties during the 1934 drought. Severe drought years have occurred on an average of about once in seven years, but at unpredictable intervals. A good regional program must minimize these hazards as far as possible.

This region also struggles under the handicap of high transportation costs to major markets. Raw materials such as meat, wool, and hides are now shipped east to be processed, then returned as finished merchandise, with transportation costs both ways added.

A pioneer type of economy persists in the region, which was one of the last to be settled. Mining, although the Black Hills have produced millions of dollars worth of gold, is less important than in the mountains to the west. Oil production is important only locally in certain Wyoming and Montana counties. Immense coal deposits are mostly lignite of low quality that has not yet justified extensive development. Industrial developments have also been limited, as compared to unprocessed basic commodities. In view of regional limitations the best possible program of land use is the only solution to the problems of the northern Great Plains.

RANGE HUSBANDRY

BECAUSE OF THESE basic characteristics of the region, future development must depend primarily on production from 118 million acres of naturally semi-arid land. Just over 1 million acres, or less than 1 per cent, are now irrigated. In the distant future, when the gigantic development plans for the Missouri River Basin are completed, about 2 million acres more can be irrigated.

In the 1930 census, cropland, including harvested and failure, idle and fallow, reached a peak for the region of 20.6 million acres. Now, under the spur of recent high wheat prices, it is possibly close to the 1930 peak. Even at this peak, nearly 100 million acres remain for range use. This is about 4.7 acres of range land for each acre of cropland (of which over 2 million acres is in hay). Dominance of the livestock industry in the regional economy is indicated by this preponderance of range land and by the fact that an estimated 70 per cent of the agricultural income normally comes from livestock.

Ranch size varies from more than 100,000 acres of owned and leased land to very small holdings of perhaps a quarter section of range land. The trend, however, has been toward the moderate-sized outfit with a band of sheep, or 125 to 250 cattle, and 5000 to 10,000 acres of land. The region has an enviable market reputation for high-grade sheep and cattle.

Some plains ranges are normally snowbound for several months; others have year-long grazing, with hay or other supplemental feed provided during a few weeks of severe weather. Long grazing seasons on relatively cheap range forage help to offset market handicaps, adverse weather, and other hazards of the region.

Drought, overstocking, uneven distribution, and unwise breaking of native sod are important causes of material deterioration on an estimated 25 million to 40 million acres of range land. Evidence of this subnormal condition is widespread in the form of accelerated soil movement; reduced height growth, or density; change in composition from valuable to less desirable species; and excessive erosion and run-off. Better management, including reseeding in cases of extreme depletion, is needed to restore top productivity. Such a program is also necessary for greater economic stability and to counteract the decline of rural population that has been under way on the plains for a quarter of a century or more. Urban population in larger towns has increased, but rural population declined in 45 of the 77 counties in three of these states between 1920 and 1940, and in 60 counties in the 10 years from 1930 to 1940. In one county the loss was 47 per cent, in another 39 per cent. This sharp contrast with the general national population uptrend is in part a reflection of climatic, marketing, and industrial limitations that were not fully recognized by early settlers. Experience combined with research can minimize some of these handicaps through better land-use practices that will support more people and a more stable economy.

REGIONAL OBJECTIVES IN RANGE HUSBANDRY

Harmonize land uses with watershed management.—Conservation and wise use of limited water resources on both range and intermingled cropland is a first essential for a better regional program. Silt load, quality of water, timeliness of delivery for irrigation, power and other beneficial uses are all adversely affected by certain bad land uses commonly practiced; research is lacking that would show how much they are affected.

Halt range and soil depletion; gain higher production.—A crazy-quilt pattern of land use, ownership, and tenure has increased ranch operating costs and accentuated boom and bust hazards. A third major objective, therefore, is to develop sound criteria for judging correct land usage, for determining which lands may properly be in public and which in private ownership, and for carrying forward a program of consolidating private and public holdings for more suitable use and tenure.

Promote human welfare—the ultimate objective.—Educational and social opportunities for modern living, comparable to those of modern city homes, can now be provided in rural homes. These will encourage a fair share of young people of high ability to take permanent root in country life. Good management of semi-arid ranges is also one indispensable step in developing a better social environment on the plains.

REGIONAL RANGE PROBLEMS

A COMPREHENSIVE, sound program of range husbandry should contribute to these over-all objectives, even though other aspects are also involved. Research must keep ahead of practice. Only highlights of the situation and of urgently needed research on various problems can be listed here. Priorities are roughly indicated by the order of listing.

Artificial reseeding of depleted range land.—Up to 5 million acres of plowed range land that proved unsuitable for crop agriculture are now in urgent need of artificial range reseeding to restore full production in any reasonable term of years. This will also retard erosion that is reported by the Soil Conservation Service to be serious on at least 4 million acres and less alarming on 6.4 million acres partly within the northern Great Plains. An expanded research program is needed to find best species and mixtures, and when and how to establish them on the many site conditions of the region. Plant breeding and selection for better varieties of range forage is a virgin field of research that has scarcely been touched.

Proper range stocking and utilization.—Range managers urgently need a dependable measure for judging when grazing use reaches the proper point—neither too heavy for sustained high production nor too light for optimum economic returns. This point is a product of complex ecological factors, not constant for all ranges. Only crude and unsatisfactory rule-of-thumb standards

of utilization have been available, but some research has been started at Miles City, Mandan, and in Canada. More detailed research is urgently needed to show the response of different plains soils, forage types, and animals to varied degrees of range use. Approaching the utilization problem from another angle calls for developing reliable criteria for judging how much the soil or forage of a given range has deteriorated below an optimum level, what the trend is, and what management practices are needed to restore optimum condition.

Balanced utilization.—Insect pests, adverse livestock habits, inadequate water, etc., result in overgrazing on some parts of the range but underutilization on others. More watering places, and better herding and salting practices will help, but research is needed to determine their limitations and to test other approaches or practices.

Class of livestock.—Ranges of the northern plains are in general well adapted to cattle, horses, or sheep. However, more specific criteria should be developed to show which classes and breeds of livestock will give greatest production efficiency or least wear and tear on the range, even though existing knowledge as to the influence of slope, water, and quality of forage, etc., is not yet fully utilized by some operators.

Range and supplemental feed.—What is a justified goal of hay, range forage, and concentrated feed reserves for optimum production and stability under each of several major situations of the northern plains? More specific guides must be developed to minimize unnecessary financial disasters.

Poisonous and noxious range plants.—Specialized machinery and new chemicals recently developed are effective in controlling sagebrush, Klamath or goatweed, and various other noxious or poisonous plants that have increased on many ranges. A comprehensive program of research is urgently needed to prove which methods or materials are cheapest and least damaging to range cover and soil.

Shade and shelter.—Because of lack of shelter, livestock require more winter feed. They suffer from lack of shade in summer. Immense stretches of plains ranges furnish neither. Up to 78 per cent success of shelterbelts planted in the 1930's in more humid portions of six plains states justifies an extensive research program to test methods for developing living shade and shelter primarily for range protection, but also for contributing substantially to better living under plains environment.

Breeding practices for range livestock.—For greater stability and permanent range welfare we need to develop criteria for determining the best time for lambing and calving and the best age classes for marketing cattle.

Utilization practices and nutritional characteristics of range plants.—Range use practices have developed with little or no knowledge of nutritional deficiencies, seasonal variation in nutrients, or of mineral, vitamin, and other obscure characteristics of range plants. Wasteful, inefficient management cannot be corrected until these characteristics are more fully known and used as a basis for supplemental feeding, seasonal grazing, and other range practices.

Range research methodology.—Range lands normally have a dozen or more important plant species; they have greater variability of soils and sites than cultivated fields, but production per unit area is much lower. Specific effects of varied treatments are more difficult to measure experimentally. More rapid and cheaper methodology should be developed suitable for range use that will meet high research standards.

COSTS AND RESULTS

ONLY PROBLEMS of high priority are listed above, but numerous others in management and range economics might be added. Aside from what state research agencies can do, a reasonably adequate federal program of range research would result from doubling the personnel and financial support now available for such work in this area. This would mean about fourteen man years and development of two or three new research centers. Considering the belated start on range research, this is a modest fraction of the values at stake on our northern plains ranges and watersheds.

Research results pay dividends only when widely known and used. At present, a few progressive ranchers learn promptly and use research results effectively. A majority do not, because extension programs are inadequate to do the job. Joint effort by research and extension workers is needed to close the gap between research and application without neglecting primary objectives in either field.

Greater stability for the plains and their maximum contributions to human needs depend to a very substantial degree on such a successful program of research and extension work as outlined above.