The Ranch Plan: Its Development and Application

Don D. Dwyer
Range Science Department
Utah State University
Logan, Utah

INTRODUCTION

In the early development of the range livestock industry in North America, small regard was given to planning in ranch operations. The animals were simply turned out to graze with little notion given either to the animals or the land they grazed. Livestock were gathered on occasion, as necessary, for marketing and for very minimal husbandry practices. Needless to say, under this system the rangelands suffered from inadequate attention and production from livestock was at extremely low levels. Competition for land and demand for meat increased in the early 1900's and more grazing stress was placed on the range. Even with increased pressures on the range livestock industry to improve grazing practices on rangelands, ranch planning of any value did not come about until agencies of the federal government were given responsibilities to better manage range resources.

The real impetus for ranch planning came in the 1930 era in the United States with the formation of the Soil Conservation Service and Bureau of Land Management. The Forest Service also initiated a concentrated effort in development and implementation of ranch management planning during this period. The combination of the drought of the 1930's and recognition of the serious need for conservation of natural resources brought about real efforts to properly plan grazing use on rangelands.

A "plan" is a predetermined course of action and the dynamics of a ranching enterprise require that attention be given to both short and long

range planning. A ranch with no problems does not need a ranch plan; however, these are rather scarce.

A ranch plan must include: 1) a detailed inventory of the physical facilities on the ranch along with an economic evaluation of them, 2) an inventory of the resource base (livestock and range), 3) a problem analysis of the entire ranch operation, 4) activity plans for necessary changes, and 5) a timetable for implementing various components of the plan.

Ranch plans are strategic and operational (Smith, Box, and Stoddart, 1974). Strategic planning includes such things as determining the relative merits of a cow-calf, vs. steer, vs. sheep operation or combinations of them on arid range. Operational planning requires procedures for meeting predetermined objectives. A good plan, then inventories resources, analyzes how these resources are presently used, identifies problems, sets goals, and provides a guide for improving efficiency and thus economic return. One of the prime goals of the ranch plan is economic stability and maximum profits over the long term (Bell, 1972). The limiting factors of production must be identified, isolated, and corrected.

Inventory of Physical Facilities

This inventory includes all "improvements" on the land—buildings, sheds, fences, corrals, working chutes, watering facilities, and general equipment used in the ranch operation. The locations of all facilities are identified on an aerial photograph of the property. Plans for and time estimates as to when additions to the physical facilities are to be made are a part of the inventory. Economic evaluation of the facilities along with depreciation schedules for capital equipment are included.
Inventory of the Resource Base

This portion of the ranch plan is extremely important since in the resource base lies all the hope for improving the ranch.

Land Resource. Amount of range and cultivated land owned and amount leased or rented are determined along with such general information as geographical location, boundaries, elevation, topography, soils and general erosion conditions; and current production of both range and cultivated land.

All range sites should be identified along with the associated soils of each. This generally requires a complete soil survey so that on the aerial photograph of the ranch the various soils and their locations can be shown.

Forage Resource. For each range site identified on the ranch the current range condition in relation to its potential is determined. A complete vegetation analysis is required and provides the current plant species composition for each range site. This, along with soils, litter, and erosion data determines the "range condition class" for each range site. Trend, or direction of change, of the range site is possibly as important as range condition. So, in the determination of range condition for each site, attention must also be given to "trend" of the range sites. Compilation of information on what the "original" vegetative cover was for the various range sites is valuable in adjusting stocking rates to improve trend.

In order to have a close approximation of the current carrying capacity of the ranch, herbage production for each range site must be estimated. These estimates are usually made from clipped samples of
ungrazed herbage taken at the end of the growing season. To achieve a realistic appraisal of herbage production by range site requires many years of sampling. Nevertheless, these estimates are essential if the ranch manager is to have fundamental knowledge of the forage resource. In the United States, the Soil Conservation Service has developed Range Condition Guides which are most useful in determining range sites and condition classes.

The number of animals a ranch can safely support is determined by the amount of edible forage the range can produce. Therefore, one must know, in addition to the amount of herbage produced, the species of plants the livestock will select to graze. Estimates of the amount and kind of herbage produced are recorded for each range site along with the "proper use" or level of utilization to which the range can be safely grazed. This information is used to help the ranch manager determine which improvement practices should be applied, and where.

Animal Resource. Numbers and kinds of livestock are inventoried and their locations by season or period of time identified over the ranch. A forage balance chart can be made which balances forage nutritive value (by season) with livestock requirements (Workman and McPherson, 1973). Any information available regarding animal productivity is included in this inventory, such as: calving percentages, weaning percentages, weaning weights, gain rates, and wool production. If these records are not available, plans should be made to keep them. They are essential to identify problems of low productivity. Records of outstanding sires are kept and plans made to replace those sires low in productivity.
Estimates of numbers and kinds of wildlife on the ranch are helpful in determining competitive relationships between them and domestic livestock. These estimates can generally be attained from local government agencies responsible for wildlife management. Forage requirements must be allocated to wild animals on the range, otherwise the range will deteriorate.

**Water Resources.** All permanent and temporary watering facilities on the range as well as potential sources of water are identified. These facilities are located on the aerial photograph of the ranch. It is generally appropriate to plan development of additional water facilities, first on areas of the ranch where the range condition is best and site potential greatest.

Problem Analysis

This analysis requires an in-depth study of each unit (pasture) of the ranch in an effort to isolate problems which prevent or reduce the ranch from achieving maximum productivity. Perception of problems varies greatly among people. Often a rancher only knows his crop of offspring is lower than he would prefer but he doesn't know why. Nor is he willing to ask for help to determine why. A problem analysis forces him to face his problems and attempts to determine their cause. Some of the questions which must be asked are:

1. What is the condition of the important range sites? Are they near their potential in productivity? Is it a wise goal to manage for improved range condition?
2. Do the various units of the ranch have adequate facilities for proper livestock management? Fences? Corrals? Watering facilities and distribution in the pastures?

3. Is livestock grazing adequately distributed over the range units or are there areas of over use and under use? Are pastures of a size which improves livestock control? Is additional fencing needed?

4. Are there brush infested areas which are reducing the production of forage?

5. Are there poisonous plant problems?

6. Are there predator problems? Rodents? Insects?

7. Are there areas of serious wind or water erosion?

8. Are the livestock species well adapted to the ranges they are grazing?

9. Are male to female breeding ratios adequate? Age of females at first breeding?

10. What is the age of replacement females? Replacement rate? Source of bulls and rams? Source of cows and ewes?

11. Are season and location of lambing or calving appropriate? Supervision?

12. What is the health status of the livestock? Are disease control measures sufficient?

13. Are the marketing practices used best suited to the ranch situation?


16. What is the forage balance of the ranch? Current and potential carrying capacity?

Recognition of these and other problems will aid the ranch manager in determining what changes need to be made in animal management and the improvement practices needed for rangeland; and to set priorities for changes and capital expenditures.

The problem analysis is perhaps the most critical part of the ranch plan. Without it one could hardly expect to make the needed corrections at the right time. Many problems identified can be corrected with little or no capital expenditures.

Implementing Changes and Improvements

Usually the most costly items necessary to increase long term ranch productivity are those related to range improvements, especially control of undesirable weeds and brush and artificial seeding. It must be emphasized that arid ecosystems are delicately balanced and, once disturbed, are slow to improve naturally through secondary succession. Often artificial improvements are not economically feasible due to the inherently low productivity of such lands (Box and Perry, 1971). Almost without exception man around the world historically has overestimated the capacity of arid rangelands to support livestock. Or cultural or market conditions have encouraged increasing livestock numbers at the expense of range condition and productivity. This usually means man at some time or other must pay the cost of his early extravagance.

Range Improvements. To improve range condition in an effort to restore its original productivity usually requires changing the plant species composition from its present status to a combination of plants considered
more productive in terms of ranch goals. There are numerous tools and practices available to do this.

a. Control of Undesirable Plants

Probably the most serious problem of arid rangelands of the world is the past and continuing encroachment of undesirable plants on once productive rangeland. Each region of the world has its own set of particular problem species but the ecological relationships are much the same. That is, the combination of overgrazing and recurring drought has served to favor undesirable species over desirable plants.

Costs of reducing the populations of undesirable plants should be estimated for each range site. Also the productive potential for each site to produce adequate quantities of desirable plants must be assessed so that the manager can determine where to begin first. Usually the greatest and quickest response can be obtained from the better condition, high potential sites with lower populations of undesirable shrubs. This generally goes against man's intuition which inclines him to work on the "worst first". The worst should be saved for last because it generally will not continue to decline in productivity nearly as rapidly as sites in better condition on which shrub numbers are increasing.

Methods and techniques of various brush control practices available must be appraised as to which ones are best suited to the problem species, soil characteristics, topography, and weather conditions. Plans are then made as to where, when, and how brush control is implemented within the economic constraints of the ranch operation.
b. Range Seeding

Seeding range sites with adapted species is a rapid means to improve the quantity and quality of range forage (Cook, et al., 1967). Often arid ranges have deteriorated beyond the point where secondary succession takes place rapidly enough to justify the wait.

All range sites on the ranch that could benefit from reseeding should be determined. If a site is dominated by undesirable plants, with little or no forage species present, brush control and reseeding measures should be planned together.

Methods for artificially seeding arid rangelands are not adequate to insure success, even the majority of the time, much less every time. This is especially true where precipitation is less than 300 mm in hot desert areas. Therefore, contingency measures must go into the planning to handle failures in seeding.

When plans are made to control brush and artificially seed the range, provisions must be made to leave the area ungrazed anywhere from one to three growing seasons. Research indicates adequate time must be allowed for the treated areas to be free from grazing, in order for the treatment to be successful. The plan must consider where the animals will be placed which normally would graze the treated land.

c. Grazing Systems

Research on grazing systems has been recently reviewed (Heady, 1961; Herbel, 1971; and Hickey, 1966). Most data indicate that under a system of grazing which allows vegetation
periodic rest from grazing during the growing season, range condition will improve. There are as many different grazing systems as there are ranch managers, but most all systems have in them some method of rotating animals sequentially throughout a series of pastures.

A decision to install a grazing system on a ranch is a broad commitment to more fences, water development, and, in general, more intensive management.

It is possible to correlate a rotation grazing system with brush control and reseeding, so that pastures not being grazed, or portions of them, can have treatments applied. Care must be taken in planning so that pastures treated can be ungrazed two consecutive growing seasons.

d. Other Range Improvement Practices

Techniques to concentrate or disperse runoff water on arid ranges is often worth consideration in a ranch management plan. Contour furrows, water spreaders, and check dams have been used in the Great Plains of the U.S. with varying degrees of success. Water concentration along with seeding have been used and occasional success stories are published. For the most part these practices require specialized conditions, and, if the conditions exist where estimated benefit will exceed cost, then they should be incorporated in the ranch plan.

A recent range improvement practice that has received limited application so far in the United States is range fertilization (Dwyer, 1971). Should nitrogen be available at a cost that will allow a yield that will at least provide a break even point with
return, its use on a selective basis should be considered. The benefits of nitrogen fertilization of rangeland are discussed by Cook (1965).

Certain range situations may be such that fire can be considered as a tool for reducing populations of undesirable woody plants (Wright, 1973). Use of fire requires planning the grazing of areas to be burned so that the burned area is ungrazed during the early regrowth of the vegetation. Livestock are attracted to regrowth following fire and can do considerable damage by overgrazing the burned area during growth initiation.

Location and species identification of any plant associated with livestock poisoning is a necessity and should be recognized in the ranch plan. If poisonous plants are determined to be a serious problem, plans should be made to reduce their number or change grazing patterns to avoid them.

Livestock Adjustments and Husbandry. To reverse downward trends in range condition it is usually necessary to reduce livestock numbers. Plans should be made for appropriate reductions in a way that overall ranch production is not hurt too badly. Obviously, decreased return will be a necessary evil associated with this management decision, at least for a time. Research results indicate, however, that once livestock numbers and forage production are in or near balance returns begin to exceed their pre-adjustment level. The goal is to have each individual animal producing as near its genetic potential as possible within the constraints of efficiently and economically grazing available forage. This is possible only where each animal has more than its minimum forage needs satisfied at
all times. Usually these adjustments must be made by heavy culling of the
least productive females in the herds or flocks. Depending on the particular
ranch situation it is often better to reduce breeding females over a
period of perhaps three or four years. The impatient manager might prefer
to reduce numbers with a single large cut. However, this is usually not
possible or even appropriate.

Often the problem analysis will identify livestock management
practices which should be changed or new ones implemented. Of particular
interest are those facets of management associated with calving or lambing.
Since number and condition of offspring produced determine ranch income,
it is extremely important to identify problems which keep these lower
than the potential.

Practices related to supplemental feeding should be analyzed and
determinations made regarding amount and kind of feed supplements needed.
Often changes can be made in supplemental feeding that will improve live-
stock distribution, such as relocation of feeding and salting areas.
Nutritional needs of the livestock must be known for all stages in the
animals' life. If there are times during the year when range forage is
deficient, plans must be included to supplement this deficiency.

Proper husbandry implies that the ranch manager is doing all in his
power to have a herd with high genetic potential. This means serious
attention is paid to selection and culling practices and records are
maintained in as much detail as possible. At the minimum this requires some
data on all male breeding animals. Some notion of the potential sires'
growth rate as young animals is absolutely essential as is knowledge of
number and performance of the sires' offspring. Use of bulls or rams
producing crossbred calves or lambs should be considered if it shows that animal products can be increased without increasing pressure on the range.

Other practices that should be considered for cattle herds are pregnancy evaluation and artificial insemination. Each of these needs additional management time. Artificial insemination requires concentration of cattle on a small holding pasture for extended periods. Thus, over-grazing often results and creates a need to rehabilitate the area after insemination is completed.

Application of the Ranch Plan

Proper application of a well conceived ranch plan will lead to increased economic benefits. The plan itself must include resource based economic opportunities. There should be liberal quantities of "horse sense" applied when the ranch plan calls for management decisions. The plan, no matter how detailed, will ever replace the experience and "art" required of ranching. The plan is simply a logical guide to be used in making and applying decisions. It guides deliberate actions and helps determine the future course. Its most significant contribution to ranch management is often nothing more than forcing the manager to look at the whole ranch operation at once; a systems analysis and a program to guide decision making.

A critical element of the ranch plan is recognition that forage quantity and quality, due to variations in annual precipitation, fluctuate vastly. Records from a 23 year clipping study in western Kansas show that forage production commonly varied as much as 85% either side of the longtime mean (Tomanek, 1962). This location in Kansas receives an average of 585 mm of precipitation annually. The amount of forage produced was affected
as much by poor distribution of precipitation as it was by below average amounts. Fundamental to the ranch plan are the measures to counteract below normal forage production in drought years. Hickey (1966), after reviewing some 115 papers dealing with grazing systems, concluded that the maximum number of livestock that can be safely carried on an area of rangeland is that number the range can support during low forage years or drought. This suggests the grazing plan of the ranch should be conservative and one which carries with it a feed reserve for drought years. The balance should always be tipped in favor of additional forage rather than additional livestock, for the forage is the base resource on which the total ranch operation depends. There should be no such thing as a ranch plan with a set stocking rate.

Application of the ranch plan will be affected by interrelated demands on the land. For example, since about half of the land in the western U.S. is publicly owned, the goals of federal land management agencies are often not the same as those of the rancher who leases the land for grazing. The public land manager wants to optimize returns to society as a whole through many avenues—recreation, wildlife, timber, water and mining. The rancher would often prefer to maximize returns to his livestock operation. Fortunately, proper range use by livestock will benefit most all other uses and values. Nevertheless, any ranch plan must take into account land tenure and be ready to compromise on certain aspects of the plan where necessary to accommodate multiple uses.

Application of certain parts of the ranch plan to the land will require capital expenditures and most often the capital must be borrowed. Financial institutions are usually not aware of the special requirements of certain practices such as brush control. Money required for brush control
will usually see no return on the investment for at least two years. It will be necessary for the ranch manager to "educate" the loan officer to the particular needs of the ranch plan. A special loan repayment schedule which allows for a period of non-use is often necessary for most range improvement practices. The very existence of a ranch plan may result in approval of a much needed loan which the operator could otherwise not obtain.

Proper administration of the ranch plan will entail the use of rather detailed maps and overlays. The map base is best when a rather large scale (about 5 cm per kilometer) aerial photograph of the ranch is available. A mosaic of several photographs can be developed. Pasture location and size, range sites and conditions classes, and locations of present and potential waterings and fencing can be superimposed on the aerial photograph.

CONCLUSIONS

The following statements are relevant to the ranch plan:

1. There are problems associated with ranching the manager must accept. A good plan can identify and reduce problems such as overuse around water, certain years or seasons of overutilization, and inadequate livestock distribution patterns, but it cannot eliminate them.

2. Patience is a virtue essential to a good ranch manager. Even with the best plan, nature moves slowly and biological systems, while rational, are not always predictable. To fully implement a ranch plan requires both perserverance and adequate time for
systems to respond. The plan should allow sufficient time for
the impact of change to be thoroughly evaluated.

3. Nothing should be in the plan which is not important to the
specific ranch.

4. Detailed records of activities is an absolute must. Without them
one does not know if he is progressing. A daily diary of the
ranch manager is in order.

5. As well as a product, livestock should be thought of and used as
a tool to achieve certain goals in range improvement and
management.

6. A fundamental need of a good ranch plan is flexibility. It must
be a continuing, open-ended process. All too often a plan is
viewed as being fixed. The manager may try to apply a section
of the plan only to learn it just is not workable. This simply
means the plan needs revision, not discarding.

7. All persons associated with the plan who directly or indirectly
will affect its successful application must understand the
objectives and their own responsibilities as they apply to the plan.

Plans will and must vary with each individual ranch based on many
factors, but the basic goal is common to all -- more and better range
plants for all manner of reasons. Operation of a ranch is one of the most
complex of all business enterprises. Complicating factors affecting the
outcome of ranching are weather, markets, labor, conservation needs of the
resource, interactions of various ecosystem components; even construction
activities and equipment maintenance. The size of the investment is large
productivity of the land is low, and income usually comes from only one or two products. A ranch is a high risk venture and its success depends on careful study and evaluation of alternative actions, and, most importantly, adequate planning. Without proper planning the environment is managing man rather than man managing the environment.
References


