

# Grass Conservation and Land Use

A talk presented to the Annual Meeting of the Saskatchewan Stock Growers, held at Swift Current on June 15th, 1949.

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AS an introduction to this talk on "Grass Conservation and Land Use", I wish to quote the words of a Texas shepherd. He states: "Grass is what counts. It's what saves us all — far as we get saved. Men and towns and such as that don't amount to a particular damn nohow. Grass does. Grass is what holds the earth together". There is no need for me to attempt to prove his statement, because his words are axiomatic. All too often the lack of grass has caused soil losses, movements of people from settled communities and fire sales of investment capital. But whatever the results, the causes — at least insofar as they can be controlled — are improper use of land and insufficient grass, "that stuff which holds the earth together".

The terms "grass conservation" and "land use" have been used by many speakers, and in many cases have been used without proper definitions. I wish to state my interpretation of their meanings. To me, conservation means use and preservation. That is, use the grass but preserve the stand that is desired. On the other hand, the term "land use" has a wider meaning. I interpret it as follows: "The common horse sense of using land based on experience and the results of experimentation, so that the welfare of the people is secure". If the welfare of the agricultural people is secure for this and succeeding generations, the details of good land use are likely being practised. Planned land use based on this meaning is not an impossible goal.

## Land Use in Southwestern Saskatchewan

The planned use of land in Southwestern Saskatchewan started when the first settlers chose their homesteads. Portions of each farm or ranch were selected for cultivation, other portions were reserved for pasture and for other purposes. There was a planned development, although the plan may not have been the best.

Today there is a tremendous amount of information available to guide land use planning. This was realized by the Government of Saskatchewan, which appointed a Land Use Committee in 1945 to assemble information for guidance in developing stable agricultural communities in Southwestern Saskatchewan. Your association has been advised at previous meetings by your President — who was a member of that Committee — of the aims and progress of the work. The study has advanced to a point where today a report has been prepared and published dealing with the use of land in sixteen municipalities surrounding Swift Current.

It is not my intention to relate the details of that report, but rather to take a few important findings and discuss those in relation to grassland farming.

Of the 3,500,000 acres in the study area, some 2,250,000 or 65 per cent are being cultivated. Of this acreage, about 1,500,000 acres are considered to be suitable for permanent cereal production. The other lands being cultivated, some 750,000 acres, are of poorer quality and considerable abandonment can be expected on certain of these lands in the event of

low prices and drought cycles, and where poor management practices are followed. It is necessary to point out that fair to excellent farming practices are being followed to conserve moisture and to prevent wind erosion on these cultivated lands.

The 1,250,000 acres of native grassland are poorly managed except on ranches and on those Community Pastures investigated. It was found that 30 per cent of the pasture area is in an over-utilized condition, while less than 20 per cent of the area shows evidence of under-use. The balance, about 50 per cent or 625,000 acres, is being grazed so that the stand will be preserved. Heaviest utilization and poorest management is associated with dense farm populations and on the best agricultural soils. Good utilization occurs on ranches and in sparsely settled farming communities where the soils are classified as sand, sandy loam, and eroded. As a unit the area did not produce enough grass to provide summer pasturage for the livestock being carried, but certain districts are in a much more depleted state than others. In general, under-use of pasture is associated with difficulties of developing water, no winter feed reserve programs, and complicated land ownership patterns.

A lack of winter feed supplies was another factor that indicated poor land use. It was calculated that the annual feed supply was some 20,000 tons short for an estimated livestock population of about 100,000 animal units. This shortage was overcome to a certain extent by use of winter pasture and by feeding straw, but during longer than average winters even these supplies would not maintain the herds and flocks in a thrifty condition. However, the fact that feed is not maintained in a sufficient reserve is not so great a fault as is the fact that many thousands of acres of land are abandoned and producing perennial weeds. In one municipality less than 300 acres were so classified, while over 13,000 acres of land in a similar condition occurred in another. The total for the sixteen municipalities was over 50,000 acres or about 1½ per cent of the total acreage. Again, complicated land ownership patterns affect the use of these lands as owners are scattered over most of the world. In

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most cases abandoned lands in a municipality occur in a block or on a specific soil type indicating the lack of land use planning during days of early settlement.

Whereas the pasture resource is over-utilized, the run-off water resource is hardly tapped. Less than 15 per cent of the average run-off is stored for use. At the same time some 15,000 acres of good quality low-lying land could be developed to utilize a portion of the water that is lost. Again, the run-off which might be used to advantage is causing soil erosion on a much more extensive scale than a casual survey would indicate.

Thus, the condition of the natural resources within the study area can be summarized as follows:

1. The cultivated land is being used fairly well, although some abandonment can be expected because poor quality lands are being cultivated.
2. The spring run-off is an under-utilized resource.
3. Sufficient winter feed supplies are not being maintained, and
4. There is a shortage of grass for summer and reserve pasture requirements.

Because the results indicate that the feed reserves are one of the weak links in the chain of land use, the report stresses the need for better use of land to increase the forage supply.

I do not wish to leave the impression that the survey or my remarks are overly critical. The conditions as observed are fairly good, but our job and that of the survey is to recommend practices which

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### GRASS CONSERVATION (Continued from Page 13)

are better than average, because average may not be good enough if low prices and drought conditions occur together. Fortunately, there are backlogs of information that can be drawn upon to make good, better. These backlogs are firstly, experience, and secondly, the results of experimentation. These are assets which can be used to improve the average, and which give us leadership for constructive building.

#### Blocks To Build Upon

The most important asset is experience. Over a period of years we have accumulated knowledge about the conditions with which we have to contend. In the history of the early settlements and our own memories, there are records that indicate how we must proceed. Kelly in his book "The Range Men" describes vividly the hungry trek of a herd of 1,000 four-year-old steers which started from near High River, and scattered its bones through the streets of villages between that point and Macleod. Such catastrophes do not occur today because experience has shown the need for the application of the good land use principle of reserve supplies of feed, not only for winter but for the entire year.

Experience has demonstrated also the type of legislation needed to obtain good use of land. It is a long way today from those policies which directed settlement to lands of poor quality. It is a long way from that policy which forced a stockman to graze five cattle per quarter section when there was grass for only two or three. Today, the policies, directed by experience, are not those which exploit the resources of the land and the people, but rather those which direct our endeavor to obtain a better use of the soil.

In addition to many other vital factors, experience has indicated the direction for experimentation and research to follow. The results of those experimental enterprises are the second great asset we have available for better land use planning and development.

As with experience, experimentation started with the first settlers. It was during the Saskatchewan Rebellion in 1885 that the value of summerfallow was observed. The "76" Ranch was testing fibre flax as early as 1896 on its ranch-farms that extended from Regina to Calgary. This same organization also envisioned and planned to use spray irrigation systems that involved pumping water into large tanks and distributing the water through pipes to the growing crops. Thus, farmers and ranchers in either a small or great degree have added to the wealth of knowledge accumulated by experimentation, and their findings have given leads to the organized experimental programs of the Dominion Experimental Farms Service and other experimental organizations. For a short time I wish to discuss some of the recent experimental results that affect the use of grass and land.

#### The Results of Grassland Experiments

Approximately one-third of the land in the sixteen municipalities studied in the Land Use Survey consists of native grasslands. These lands vary greatly in type of cover and in yield of forage. The carrying capacity varies from two to seven and one-half acres per cow per month. In no cases were native pastures

as productive as fields seeded to crested wheatgrass, brome, or grass-legume mixtures wherever conditions were suitable to establish these species. Actual yields from clipping experiments at various sites give an indication of forage yield and its variability on native pastures. These are recorded in Table 1.

Table 1  
Average Yield and Variability of Native Pastures at Points in Southwestern Saskatchewan

| Site                 | Average Yield<br>Lbs./Acres | Yearly Range<br>Lbs./Acres |
|----------------------|-----------------------------|----------------------------|
| Consul, Sask. ....   | 210                         | 75-450                     |
| Cadillac, Sask. .... | 290                         | 75-650                     |
| Swift Current, Sask. | 350                         | 125-600                    |
| Matador, Sask. ....  | 400                         | 200-800                    |
| Cypress Hills, Sask. | 625                         | 390-925                    |

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Growth this year will set a new low yield, and will reduce the average considerably. These yields indicate the relatively low productive power of the rangeland, the variations which may occur, and the need for the development of feed reserves for years of poor grass growth.

The yields of seeded grasses are greater. Crested wheatgrass seeded in 6-inch rows for hay on dryland at Swift Current has averaged around 600 pounds per acre per year, when seeded in 12-inch rows, the yield increased to 900 pounds. When alfalfa was added and seeded in 12-inch rows, the average yield increased to 1,950 pounds per acre. These results are from Swift Current only, but indicate that production can be increased by at least 100 per cent, and if the best mix-



tures are seeded and the best cultural practices followed, yields can be increased by over 400 per cent. The same proportional increases apply to other districts where crested wheatgrass and alfalfa can be grown. Thus, a sound land use practice is seeding land to grass-legume mixtures. If only half of the 50,000 acres of abandoned land producing perennial weeds in the study area could be so treated, our winter feed deficit over the sixteen municipalities as a whole would be met.

Experiments have shown the nature of the growth habit of our grasses. Growth is rapid for a few days after it starts, but it slows from then until near the end of May. After that date it makes a rapid development until seed is formed. After seed sets growth either ceases or is very slow until autumn, when some re-growth may occur. Information which we have available indicates that heavy grazing during that slow growing period in May, leads to reduced yields and starts an over-grazed condition. Relatively heavy use after mid-June apparently has no severe effect on the cover or subsequent yields. Thus, if the best land use principle is to be practised on native grazing lands, it is necessary to give spring protection until early or mid-June. I realize that protection until mid-June is impractical unless there are other sources of feed, but request your patience while I develop my story.

Crested wheatgrass maintains a rate of growth from date of emergence in mid-April until the seed sets in early July providing moisture is available. Unlike the native grasses, including speargrass, bluejoint, blue grama grass, rough fescue, June grass, and others, there is no slowing down in the rate of growth during May. Because of this growth habit, crested wheatgrass can be pastured during the spring without seriously reducing the yields in subsequent years. On the other hand, heavy grazing on fall growth of crested wheatgrass does lead to reduced yields the following spring. The difference in the growth habit of crested wheatgrass and native species is indicated by the yields of these species this spring, whereas native species have produced less than 10 per cent of average growth to date, crested wheatgrass has produced from 25 to 55 per cent of average growth at various sites in the Swift Current area.

To date no rotation tested on native grass pastures has materially increased carrying capacity. The nature of the growth of the grasses is not adapted to pasture rotations, because during the slow growth period of May a pasture may have to carry from two to three times its average capacity. At that time there will seldom be sufficient feed produced to provide the 20 to 25 pounds of forage an animal requires to make average daily gains.

However, a rotation involving crested wheatgrass and native grasses can be established that will more than double the yield of forage over continuous grazing on short grass or mixed-grass prairie pastures. In order to obtain this yield, it is necessary to: (1) Have one acre of crested wheatgrass to each three or four acres of native pasture, and (2) Crested wheatgrass pasture should be grazed until mid-June and the native grasslands from then until the end of the grazing season. It is possible to increase yields to an even greater degree by protecting



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the native grasslands until early July. However, that practice is not recommended, because although the yield of dry matter is greater, the food supply in the forage is actually less. Further, if protection is continued until after July, a great deal of forage is lost, because some leaves dry and fall and certain species dry up and blow away.

There is little more land available for grazing purposes in Southwestern Saskatchewan. To obtain more pasture, it is going to be necessary to utilize the acres available more efficiently. One method to secure better land use is to utilize the growth characteristics of forage plants in planned rotations, so that more equally palatable and nutritious pasture is available. At present the cost of developing native range is high, because a seed bed is required. One section of our range experimental program is the exploration of

seed bed preparation that are less costly than conventional methods used today.

Over-use of native grassland is a poor land use, as well as a costly practice from the viewpoint of the stockman, yet 30 per cent of the pastures studied in the Land Use Survey were in an overgrazed state. Overgrazing is not only a poor practice insofar as the vegetational cover is concerned, but it has dire effects on the soil. Overgrazing reduces the effectiveness of plant food manufacturing elements in the soil and, thus, lowers the food available for plant growth.

In summarizing this presentation there are certain points which were stressed. Because the pasture and reserve forage supplies are important and critical factors limiting the application of good land use practices in our area, this talk has reiterated those basic principles of grass

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and have a jamboree when they hit town. The jamboree lasted as long as the money held out, then back to the hills they went to make another stake.

**July 2nd, 1885.** Calgary, on way to Montana. 5.30 a.m. settled with Bain and Royal Hotel and got traps all ready. Got money from H.B.C. safe and at 7 a.m. left with Bain, order for Murdock \$50.00, and started with stage (Jesse Gillan) for Macleod and Montana. Mr. Kerr of Eau Claire Lumber Co., and friend driving buckboard and I rode with them to Sheep Creek. We led old Mike's cayuse down. Dinner at McMillan's and camped at Trollinger's, Mosquito Creek. Robertson and Mike camping near creek. Passenger on stage coach with me is Mr. Sibbald, pump dealer and windmill man of Regina. Met militia party, 24 teams on way to Calgary. Found Robertson at Mosquito Creek and camped there.

*I. K. Kerr, of the Eau Claire Lumber Co., with Peter Prince pioneered the lumber business in Calgary. The old sawmill on the banks of the Bow, where they sawed logs for fifty years, is a relic of their industry.*

*The militia party would be part of the expedition marching against the rebels of the Northwest Rebellion.*

**July 3rd, 1885.** Mosquito Creek, on way to Montana by stage. Passed Robertson near Oxley, dinner at Oxley and reached Macleod at 6.30 p.m. W. F. Cochrane will wait till tomorrow and take me out to ranche. Got letter of credit from Davis. Offer of Davis' sheep. Ordered fly screens for horses and saw Cotton about Customs arrangement. Called on Mrs. Antrobus, slept at Dawson's.

*Mr. Davis was manager of the I. G. Baker Co. at Macleod. H. Ryder Davis, the present mayor of Macleod, is a son. His Worship Mayor Davis is an authority on the history of Southern Alberta.*

**July 4th, 1885.** Macleod, on way to Montana. A.M. met Sam Bird who has 900 wethers at Coal Banks. Wrote W.D.K. telling him about it and wrote R. Hardisty reporting upon Davis outfit. Got surcingles for horses and had stuff arranged already for Robertson. 9 a.m. with W. F. Cochrane drove Bones and Jury to ranche. Dinner and spent afternoon and evening checking periodicals and packing my things. Slept in my old quarters.

*Coal Banks is now Lethbridge. Frank seems to be pleased to have slept in his old quarters. It was not very often that he slept in the same bed two nights in succession.*

**July 5th, 1885.** Cochrane Ranche, on way to Montana. Finished packing my things and at 10 a.m. Cochrane drove me and Keller to Standoff. Robertson

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and Mike there having come through one day quicker than we expected. Dinner at Armstrong's and told them how to live on one meal per day. Got flour, tomatoes, corn and oats at Fred Pace's, and at 2 p.m. started for Lee's Creek. Mr. Davis, a sheep herder from Pincher, goes to Dupuyer Creek with us. We to use his grey horse 'Doctor' whenever we want him. Reached Lee's Creek about 9 p.m. and camped. Robertson and Mike helped Moreau and his mate out of the Kootenai.

*Someone was for ever having trouble crossing the Kootenai. I must pay particular attention to that river next time I pass that way.*

**July 6th, 1885.** Lee's Creek, on way to Montana. Broke camp and started at 5 a.m., found St. Mary's very high and rode back to Lees and Police camp to enquire if safe, they say No and we ferried our stuff over and let the horses pull the empty wagon. They had all they could do. We nooned and baked bread on St. Mary's river bottom, and reached north branch of Milk River at 7 p.m. Camped alongside of small stream running down into it. Road out of St. Mary's river pretty bad and full of holes, a little swampy up to Gap or Canyon, through Canyon all good except small patch of swamp.

*I think the bread baked at noon must have been of the bannock variety as it did not take long to make it.*

(To Be Continued)

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### GRASS CONSERVATION

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use and feed reserves. The important points are summarized as follows:

1. Land use in the sixteen-municipality area adjacent to Swift Current indicates that:
  - (a) Some 50,000 acres of abandoned land are producing perennial weeds.
  - (b) Feed reserves are not maintained in sufficient quantities to provide for drought years and long winters.
  - (c) Over 30 per cent of the pastures are in an overgrazed condition, and
  - (d) The run-off resource is under-utilized.
2. That increased feed reserves can be produced by growing mixtures of grasses and legumes.
3. The greatest single factor reducing yield of native grasslands other than lack of moisture is heavy utilization prior to mid-June. Native grasses do not have growth characteristics which lend themselves to grazing early in the spring. Lack of spring pasture is a grazing problem on all Western rangelands.
4. Rotations using crested wheatgrass and native grasslands will increase the yield of pasture.

In concluding my remarks, I wish to state that better use of land will not occur overnight. Further, it may require an investment of capital to practise the best land use principles. I am fully aware that there are millions of acres on which the application of capital would be wasted, because the sand dunes are too high, the soil is too saline, the land is too stony or the topography too rough. However, there are thousands of acres of our rangeland where these conditions do not occur and where development is feasible. As stockmen, you have applied capital to develop stockwatering sites and facilities to handle livestock. I wish to suggest that more capital investments should be contemplated to develop greater supplies of grass and feed reserves, because we need more of "that stuff which holds the earth together".