

CONSERVATION ACTIVITIES IN WESTERN CANADA

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The paper reviews conservation activities in the three Prairie Provinces of Canada by Provincial Governments and the Prairie Farm Rehabilitation Administration of the Canada Department of Agriculture.

Progress in community pasture development as a measure towards better land use is shown by 532,000 acres under community pasture use in Alberta, 2,450,000 in Saskatchewan and 210,000 in Manitoba, with P.F.R.A. pastures constituting about two-thirds of the total in each province. About fifteen per cent of the occupied lands of the three provinces are administered by the Crown, of which two-thirds are grazing lands. Each province developed significant land use control programs to overcome problems in misuse that became evident during the nineteen thirties but these have slowed down materially since the war.

The administration of water laws has been transferred to the agricultural departments in each province. Irrigation has been the major water development program in Alberta and flood control in Manitoba, with Saskatchewan having lesser problems or opportunities in these fields. Both Alberta and Saskatchewan construct irrigation distribution systems at only nominal cost to the land owner. P.F.R.A. has accomplished a major program of water storage, having developed or assisted in a total of 60,316 projects with a capacity of 1,551,000 acre feet.

Conservation and land use receive major emphasis in the extension program in the three provinces. With the major conservation and land use problems developing on cultivated land, it is considered that programs helping to develop stable, well-operated farm businesses are an integral part of an overall conservation pro-

gram. The provinces use special assistance programs, directed towards tree planting, forage crop production, erosion control, etc., to encourage acceptance of recommended practices.

The author comments that there seems good justification for further assistance to individual farms towards adopting conservation practices, many of which cannot be shown to increase immediate cash returns. Further emphasis and funds could accelerate desirable programs directed towards removing unsuitable land from cultivation. The impact of tremendous summerfallow acreage on conservation is noted with the statement that more research on various agricultural practices and their relation to soil and water losses is needed. The paper is concluded by emphasizing the increased significance of recreation and municipal requirements in terms of water resources and that a national conservation policy is needed.

HYDROLOGIC RESEARCH IN WESTERN CANADA

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The word hydrology would be properly defined as a study of the waters of the earth. This definition includes precipitation, surface and ground water, hydrology of lakes, rivers, and oceans, and the various processes common to each. Such a study, being tremendously broad, involves many fields such as meteorology, geology, and hydraulics. Use has established separate fields within the main grouping such as surface streams, ground water and the study of ice and snow. Unfortunately, a breakdown of this nature is not a practical one. The study of stream flow, for example, is intimately associated with a study of precipitation and geology. Studies within the hydrologic field are more logically grouped into uses of water such as irrigation, hydro-electric power, and urban and industrial water supply. These groups generally carry on their own hydrologic studies to meet their own specific needs. Because of the national aspect of the studies, Government Departments have taken on the major bur-

den of supplying information necessary for the division of the limited water resources.

The study of Agricultural Hydrology must include studies made by groups for purposes other than agricultural and the ultimate objectives of these groups are not always in harmony. The power engineer, for example, requires maximum run-off for maximum power production, the flood control engineer requires steady flow maintenance, and the agricultural engineer prefers maximum retention on the watershed and minimum flow in the stream. Fortunately, the supply of water for agricultural purposes is almost adequate for present needs. This position cannot be maintained for long. An interesting report of the Hydrometric Service for the year 1910 had this to say in connection with a study of the Bow River in Alberta: "A study of the flow of the river indicates that the whole of the normal flow has already been granted for irrigation purposes". Sub-

sequent water development on the river had to rely on storage of flood flow. The need for hydrologic study of river flow and surface run-off is therefore apparent. Further allocation of water rights on this river had to depend on estimates of potential peak flow. This, then, is the main job of the hydrologist, and a more realistic definition of the term might be "the estimation, measurement, and forecasting of the potential water supply."

The need for conservation only becomes apparent when the demand for water exceeds the supply, a fact learned too late in many areas of the world. This progression of events leads inevitably to the measurement and study of existing water supply and its allocation to users, which in turn places demands on research for forecasting techniques when supplies begin to dwindle. Basically, the needs of a sound water program are three-fold:

- (1) An inventory of resources, constantly maintained.