

* I. **The Alberta Watershed Research Program -- a model to emulate or to avoid?**
by: Robert H. Swanson

The Alberta Watershed Research Program (AWRP) had its roots in the drought years of the 30's and 40's. Water on the Prairies was in short supply. The relatively small headwaters portion of the Saskatchewan River watershed that yielded 90% of the river's flow presented an opportunity to increase water supply through forest cutting, a commercial activity that would be taking place in any event. Thus the goal of the AWRP was to provide forest management prescriptions to provide a maximum increase in water yield.

The Eastern Rockies Forest Conservation Board (ERFCB) was a joint federal-provincial agency with the mandate to manage the Eastern Slopes forest for maximum water production. At the ERFCB's request, the AWRP was started in 1959, with broad objectives:

1. To describe the hydrology of the Eastern Slopes.
2. To evaluate the effect of current commercial timber harvesting activities on water yield and sediment.
3. To derive and test timber harvesting techniques to optimize water production.

These objectives were to be met by studies and by conducting experimental cutting on Marmot, Deer Creek, and Streeter basins, which were chosen as representatives of the subalpine spruce-fir, lodgepole pine foothills, and aspen-grassland portions of the Eastern Slopes.

The major objectives have been met although not necessarily by the experimental watersheds. We have ascertained that:

1. Where much of the annual yield occurs as rain, clear-cut size is relatively unimportant and yield increases of 20% to 30% can be reliably achieved at no increased cost to timber operators.
2. Where the melt of snow accumulated over the winter is the primary source of annual yield, the clear-cut size and orientation must be carefully controlled to prevent evaporation of the snow. Without such careful control, yield increases could not be reliably obtained, and in very windy situations, decreases in streamflow might occur (decreases have never been experimentally tested for or verified).

The AWRP has had its share of problems. Many of its participants did not and still do not appreciate the long-term nature of watershed experiments. All of the rules that apply to length of data for reliable climatic normals, ranges and averages also apply to experimental watershed results. Secondly, many had unrealistic expectations. A forested watershed is generally usable for testing only one timber-harvest-type hypothesis. And rarely will the results of that test be totally applicable beyond the watershed's boundary. Thus experimental watershed programs are very costly in time and inefficient with respect to number of results versus time and energy expended. Thirdly, there was often divergence between a department's mandated activities and those demanded by the experimental program. Lastly, not all members understood or agreed on the research program's objectives.

I have served as the AWRP's research coordinator since 1968. Its direction and mode of operation were set prior to my arrival on the scene. The AWRP has functioned reasonably well, but I have some suggestions for improvement.

First, one agency with one assigned project leader should be in charge of the program from inception to completion. This would alleviate the problems caused by divergent agency mandates.

Secondly, those proposing the project should spend most of their time discussing expected outcomes and how the results are to be used, and much less time discussing instruments, instrumentation, data collection, and data presentation.

Thirdly, and perhaps most importantly, choose the model that will be used to describe the basin's hydrologic functioning first, collect data second. Insure that the model chosen will be usable to describe the hydrology of the research basin in question and to interpret the effects of any experimental change imposed on the catchment. Make sure that the data collected meets the requirements of the model, not merely the operational demands of some service agency.

Lastly, before starting such a program, select a model or means to extrapolate the experimental results to other areas in question. Research basins are of questionable value if their results cannot be used to improve our capability to manage water resources.



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Associate Committee
on Hydrology

Comité associé
sur l'hydrologie

HYDROLOGICAL EVENTS

VOL. 13, No. 2

1988

ISSN 0382-2656

Canada