

\* The notation r indicates that the ratios are calculated from equivalent parts per million

Base-flow index, gallons per minute per square mile of drainage basin (glm, sq. mile) (for method of calculation, see Explanatory Notes) ..... 5

Sampling station (Sources of analyses are listed under descriptive notes) .....

Hydrochemical maps computed and constructed by P. Meyboom from the sources of information listed under the explanatory notes.

**EXPLANATORY NOTES**

This map shows the regional variation in the chemical character of groundwater in bedrock aquifers from 100 to 300 feet below surface. The map has been constructed by superposition of four base-maps, each one showing the geographic variation of one of the following ratios:

$$r \frac{Na}{Ca+Mg}; \quad r \frac{Ca}{Mg}; \quad r \frac{HCO_3}{SO_4}; \quad \text{and} \quad r \frac{Cl}{HCO_3+SO_4}$$

These ratios have been computed from 115 complete groundwater analyses randomly selected from all GSC Water Supply Papers of the Prairie Provinces and from 114 analyses published by Charron (1961, 1964), Greer and Christiansen (1963), Halstead (1959), Parsons (1964) and Thomas (1956, 1957, 1958, 1959).

The small-scale map showing the gross hydrochemical zonation of low-flow waters has been prepared similarly from ratios computed for 50 key sampling-stations from which monthly analyses of river water were available (Thomas 1956, 1957, 1958, 1959).

The base-flow index has been computed for 98 permanent hydrometric stations. It is the ten-year average (1950-1960) of mean monthly minimum stream discharge ( $1/2$  ZMNq), expressed in gallons per minute per square mile of drainage basin (1 g/m. sq. mile equals .036 inches per year over the drainage basin, or .03 litre per second per square kilometre of drainage basin; .03 l/s. km<sup>2</sup>). This index is used as a measure of the amount of natural groundwater discharge from a drainage basin. It is not an absolute value of groundwater discharge, for it excludes under-flow and evapotranspiration.

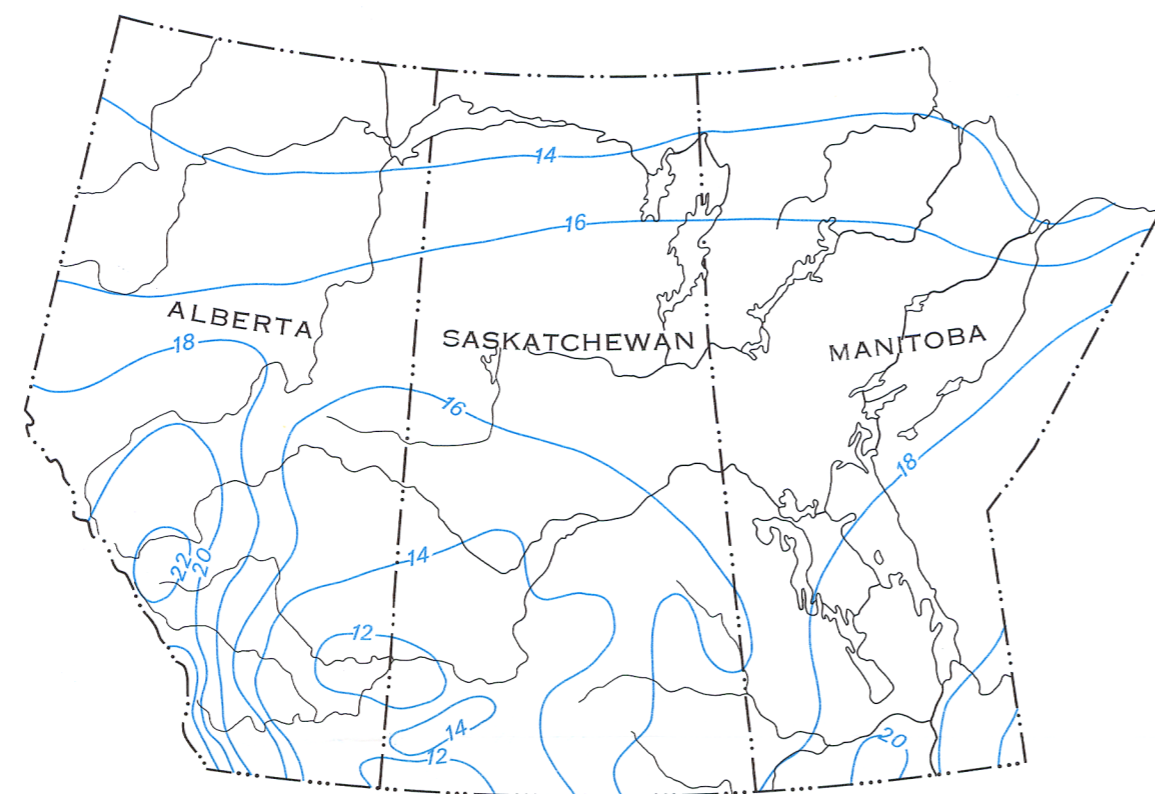
**SOURCES OF INFORMATION**

- Charron, J. E., 1961: Groundwater Resources of Plum Coulee area, Manitoba, GSC Paper 60-22.
- 1964: Groundwater Resources of the Fannystelle area, Manitoba, GSC Bulletin 98
- Geological Survey of Canada, Water Supply Papers 1 - describing groundwater conditions in municipal districts of Southern Saskatchewan, Central Alberta and Southern Manitoba.
- Halstead, E. C., 1959: Groundwater Resources of the Brandon map-area, GSC Memoir 300.
- Parsons, M. L., 1964: Geochemistry of groundwater in the Upper Notukeu Creek area, Southwestern Saskatchewan, Unpublished M. Sc. thesis, U. of Saskatchewan.
- Thomas J. F. J., 1956-1959: Industrial Water Resources of Canada, Water Surveys, Reports 7, 8, 9 and 10. Dept. of Mines and Technical Surveys, Mines Branch.
- Greer J. E. and Christiansen E. A., 1963: Geology and Groundwater Resources of the Wynyard area (72P), Saskatchewan, Sask. Research Council Geology Division, Report No. 3.
- Department of Northern Affairs and Natural Resources: Water Research Branch Surface Water Supply of Canada, Arctic and Western Hudson Bay Drainage and Mississippi drainage in Canada, Water Resources Paper Nos. 113, 117, 122, 125, 127, 132, 135.

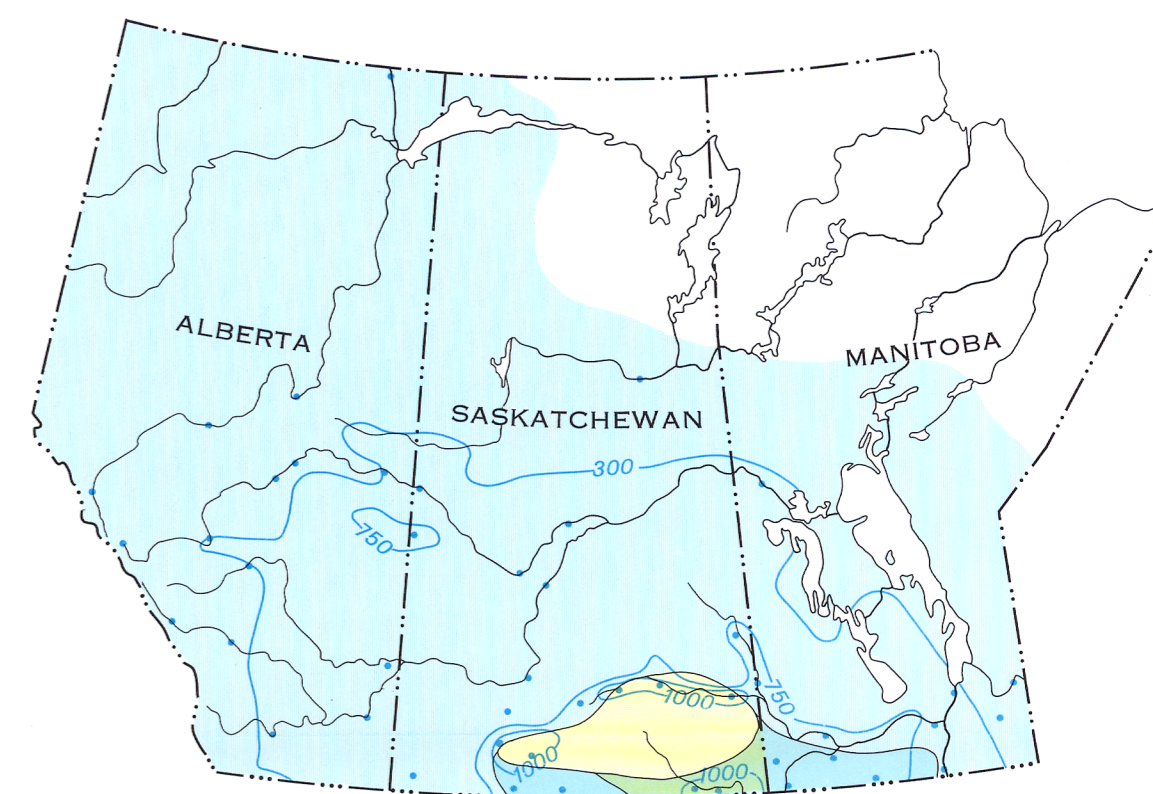
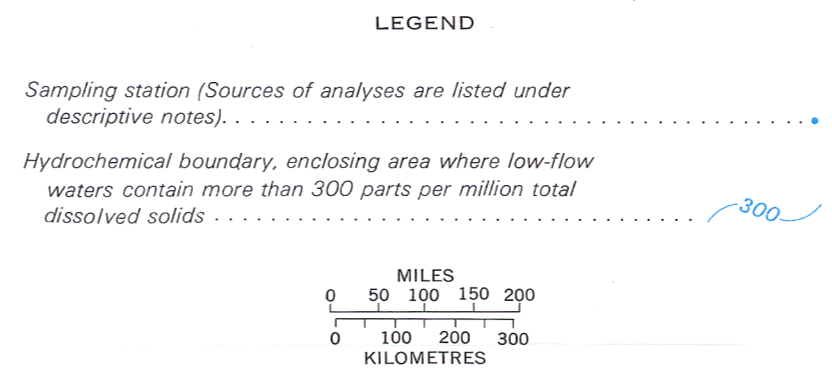
Compiled by P. Meyboom, 1965

To accompany GSC Economic Geology Report No. 24, by I. C. Brown

Cartography by the Geological Survey of Canada, 1967



Mean annual total precipitation in inches (From: Atlas of Canada, Sheet 25)



Gross hydrochemical zonation of low-flow river water on the Canadian Great Plains

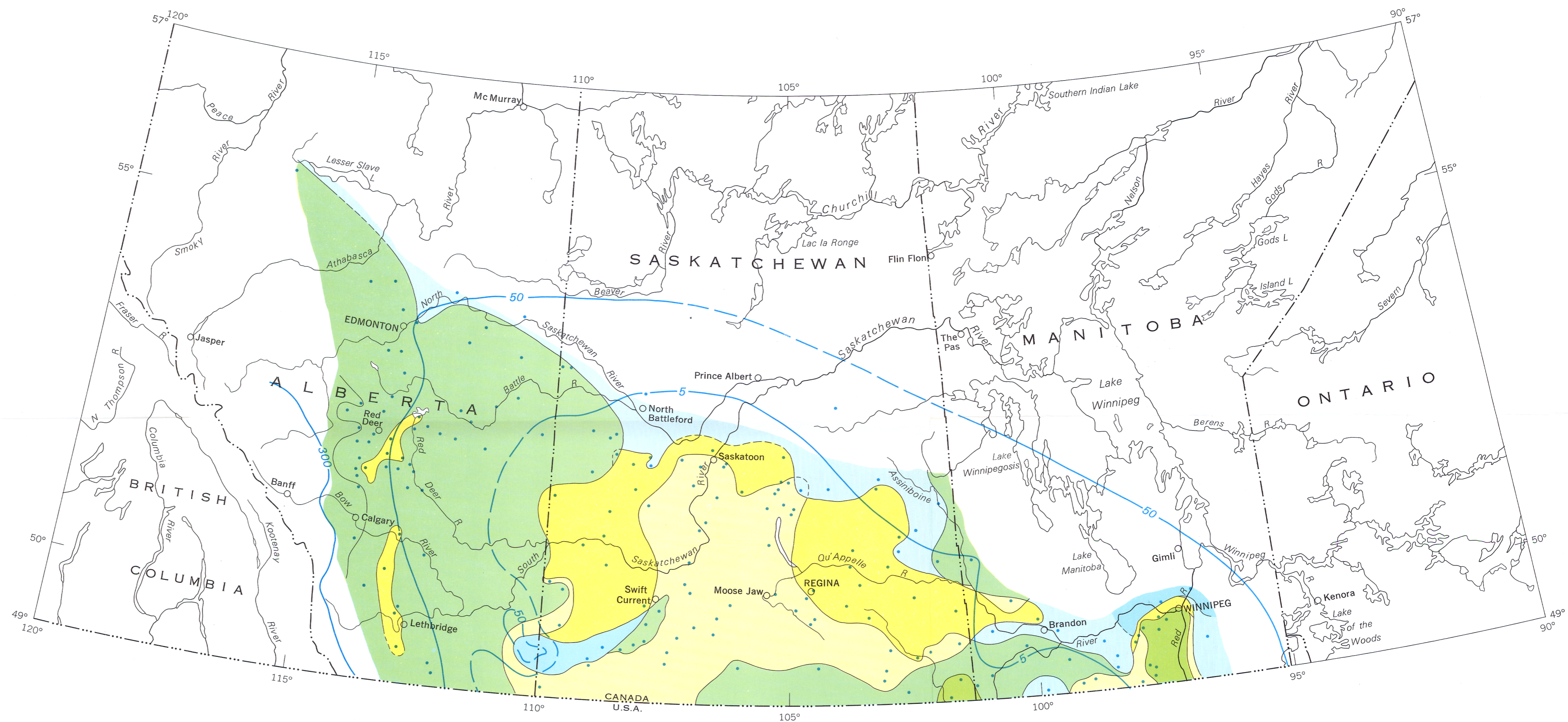


Figure 55. Hydrochemical map of shallow bedrock aquifers in the Interior Plains hydrogeological region.

