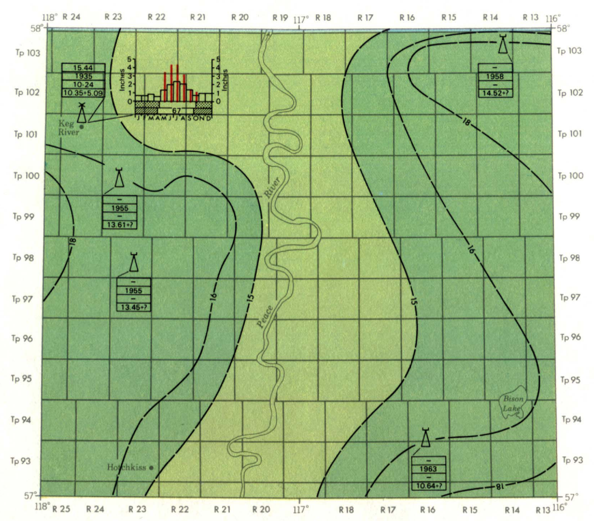
RESEARCH COUNCIL OF ALBERTA

## METEOROLOGY




### LEGEND

Isohyet, mean annual precipitation in inches, approximate

Mean annual precipitation:

- 15-20 inches
- less than 15 inches

Meteorological station

Standard rain gauge only

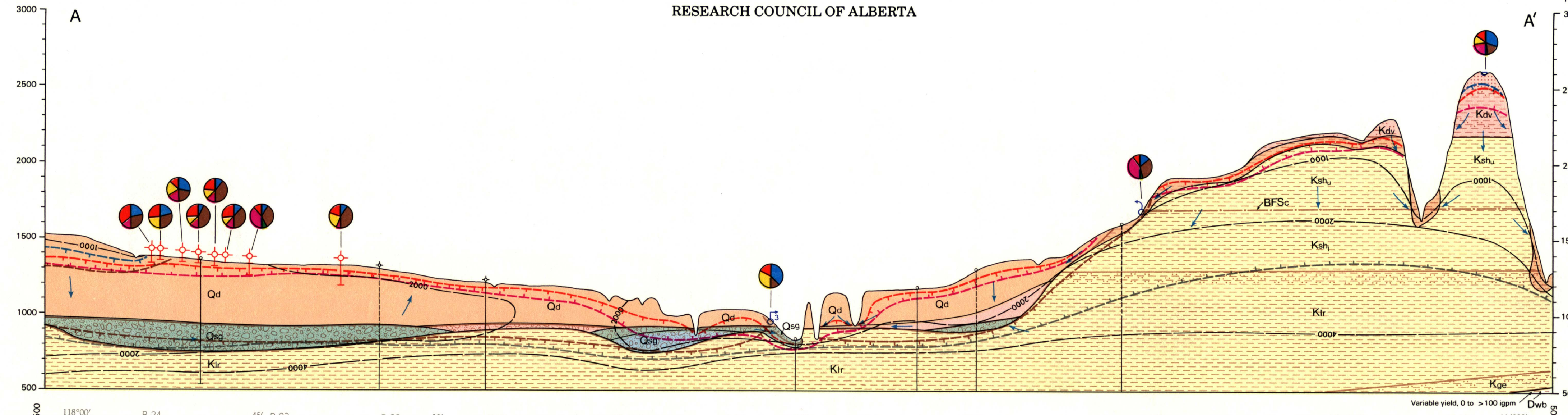
Precipitation data:

- Mean annual precipitation in inches
- Year of commencement of observations
- Number of years of record used to calculate mean annual precipitation (or rainfall)
- Mean annual rainfall plus 1/10th of mean annual snowfall in inches
- Mean monthly potential evapotranspiration*
- Mean monthly precipitation
- Period when surface is usually snow covered
- Period with mean daily temperature below freezing (0°C)
- Figure indicates percentage of mean annual precipitation falling as rain

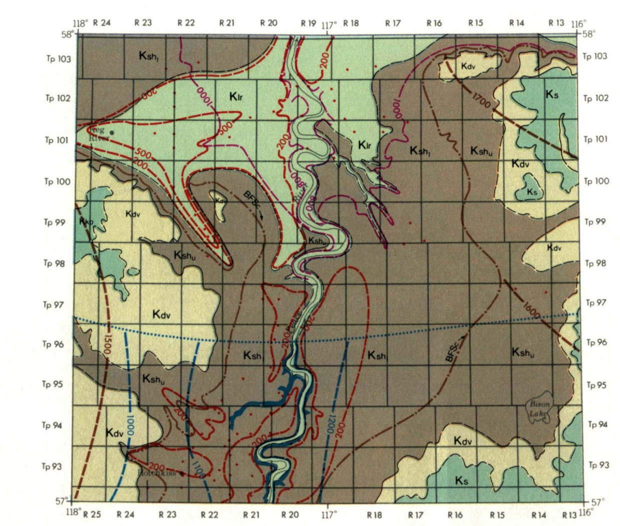
*Evapotranspiration estimates are based on the Provisional Evaporation Maps of Canada.

Sources of data:

Climatic Maps of Alberta (Longley, 1968); Monthly Record of Meteorological Observations (Meteorological Branch, Canada Department of Transport); and Provisional Evaporation Maps of Canada, Department of Transport Circular 4531 (Bruce and Weisman, 1967).




## GEOLOGY




### LEGEND

- Ks — Smoky Group: *shale and silty shale*
- Kkp — Kaskapau Formation: *silty shale, some fine-grained sandstones in lower parts*
- Kdv — Dunvegan Formation: *interbedded fine-grained sandstone, siltstone, silty shale*
- Kshu — Shaftesbury Formation, upper member: *shale and silty shale*
- BFSc — Base of Fish Scale Zone marker
- Kshl — Shaftesbury Formation, lower member: *shale and silty shale, local silty and sandy intervals*
- Klr — Loon River Formation: *silty shale and laminated siltstone*

Rock unit boundary:

- defined
- approximate

Thickness of surficial deposits, approximate, in feet

Control point for approximating thickness of surficial deposits

Approximate north limit of Peace River Formation sandstone facies

Outcrop of Peace River Formation

Structure contour on top of Peace River Formation

Structure contour on Base of Fish Scale Zone marker

Depth to Paleozoic surface

## MAIN MAP LEGEND

**Topography**

Surface contours and elevation in feet (interval 100 feet)

**Geology**

Geological boundary

Thalweg of buried valley:

- defined
- approximate

QUATERNARY

- Qd — Unconsolidated deposits
- Qs — Sand
- Qsg — Sand and gravel

CRETACEOUS

- Ks — Smoky Group
- Kkp — Kaskapau Formation
- Kdv — Dunvegan Formation
- Kshu — Shaftesbury Formation, upper member
- BFSc — Base of Fish Scale Zone marker
- Kshl — Shaftesbury Formation, lower member
- Kpr — Peace River Formation
- Klr — Loon River Formation
- Kge — Gething Formation

DEVONIAN

- Dwb — Wabamun Formation

**Lithology**

- Sand
- Silt and sand
- Sand and gravel
- Shale
- Sandstone
- Siltstone

**Hydrography**

- Stream, intermittent
- Lake or slough
- Marsh, muskeg
- Natural pond (no surface outlet)
- Surface water divide
- Area of noticeable salt precipitates
- Surface water location

**Hydrometry**

Stream gauging station

- Year of commencement of observations — 1960
- Period of year for which discharge is measured — May-Oct.
- Drainage area in square miles — 81000

Source of data:

Surface Water Data Alberta (1965, Inland Waters Branch, Department of Energy, Mines and Resources)

**Hydrogeology**

- Spring, flow rate unknown
- Spring and approximate rate of flow in imperial gallons per minute (measured or approximated in summer or fall, 1967 or 1968)
- Direction of groundwater flow

**Groundwater Probability†**

Range of average expected yield of wells (in imperial gallons per minute)

- Probable: estimated from quantitative information (pump tests, bail tests, etc.)
- Possible: estimated from qualitative information (flow regime, lithology, etc.)

100-500
25-100
5-25
1-5
<1

Yield area boundary

†The indicated average expected yields to wells are predictions based on the best data available at the time of map compilation, due to data shortcomings and special conditions, local discrepancies between predicted and actual yields are inevitable. Multiaquifer completion may be necessary to obtain the yield indicated.

**Wells and Other Artificial Works**

- Water well
- Shallow auger hole
- Water well, 20-year safe yield calculated from apparent transmissivity
- Water well, 20-year safe yield calculated from a good bail test or a short pump test
- Water well, 20-year safe yield calculated from a pump test of sufficient length to reflect regional hydraulic conditions
- Seismic shot hole reported to have flowed

Depth scale

FEET 0, 100, 200, 300, 400 — Depth to water — Depth of well or seismic shot hole

- Spring catchment
- Dugout
- Research Council of Alberta test well — RCA
- Location of test well
- Structure test hole*
- Gas well*
- Abandoned well, drilled for oil or gas*

*Vertical line portion of oil, gas or other exploratory test well symbols used on hydrogeological profiles indicates well depth; dashed portion indicates surface casing interval.

Line of hydrogeological profile — A A′

**Hydrochemistry**

Calcium, Magnesium, Sodium + potassium (Cations) | Carbonate + bicarbonate, Sulfate, Chloride, Nitrate (Anions); 0, 50%, 100%

Note: When the yellow Mg pie sector is absent, Ca + Mg are represented as a unit by the red pie sector.

Total dissolved solids in parts per million, approximate

Isogram along which calcium + magnesium constitute 60 per cent of total cations*; teeth indicate direction of lesser calcium + magnesium content, approximate

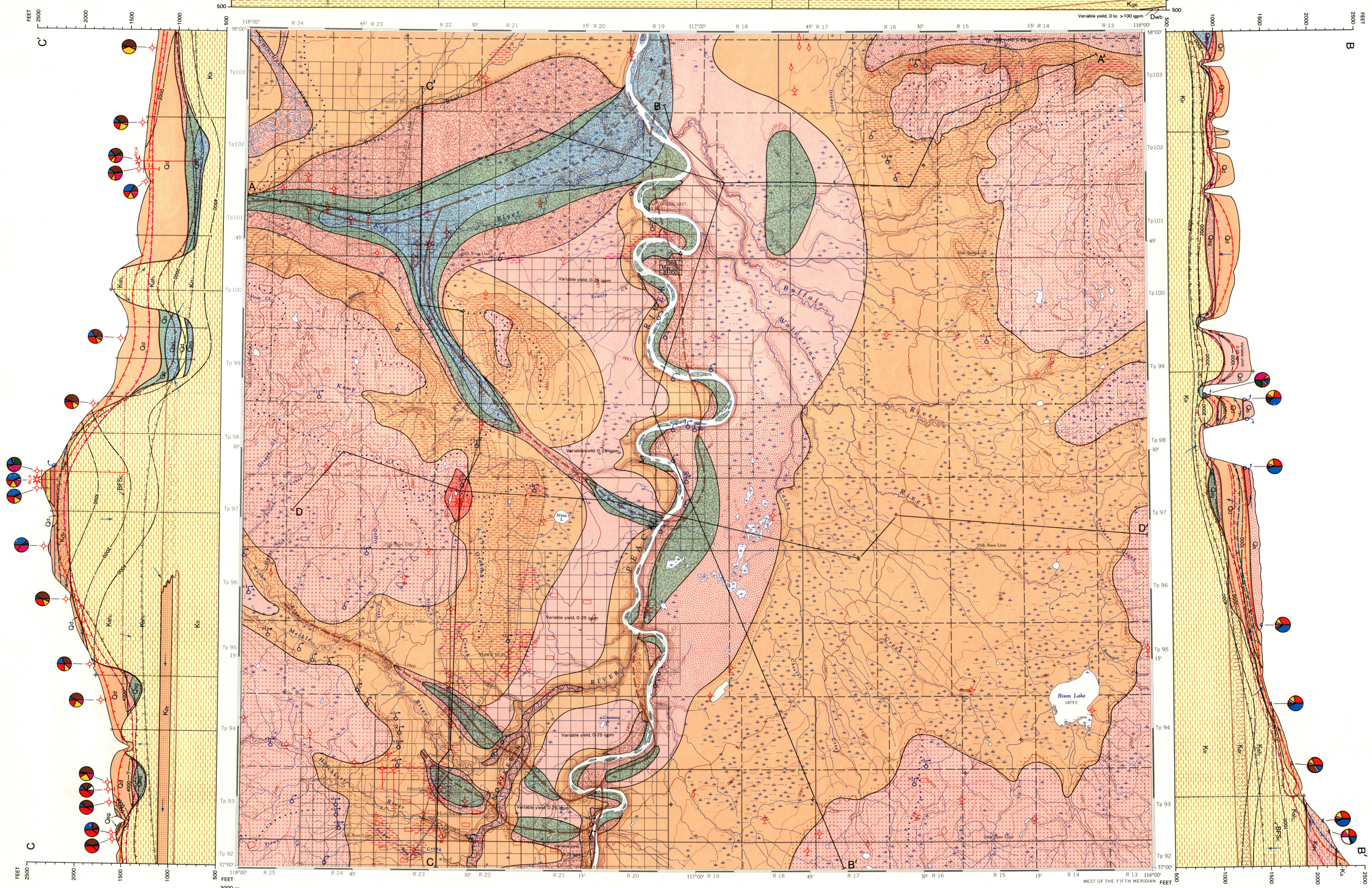
Isogram along which sodium + potassium constitute 60 per cent of total cations*; teeth indicate direction of lesser sodium + potassium content, approximate

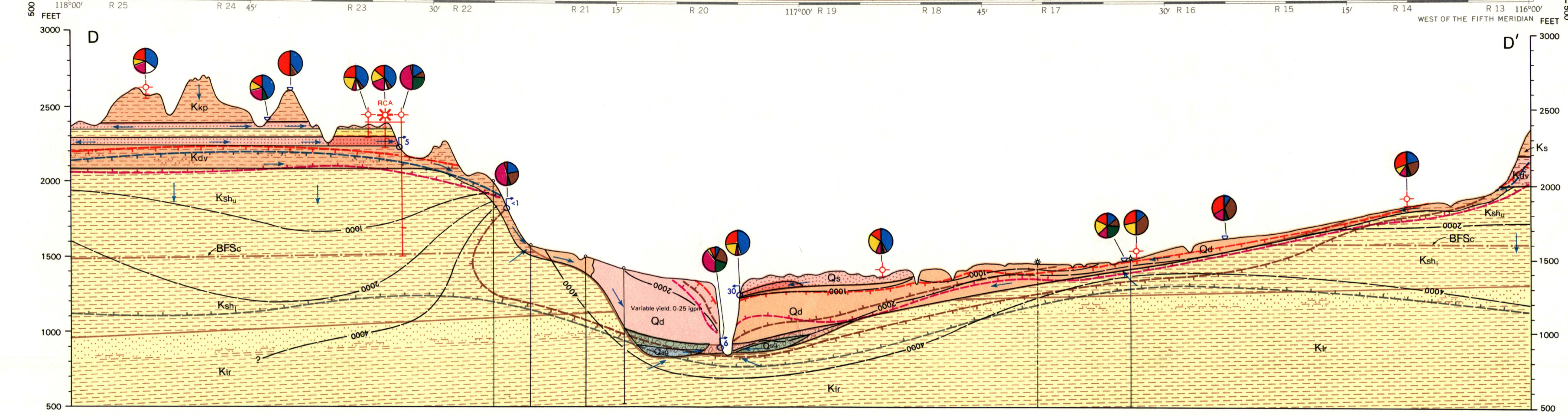
Isogram along which carbonate + bicarbonate constitute 60 per cent of total anions*; teeth indicate direction of lesser carbonate + bicarbonate content, approximate

Isogram along which sulfate constitutes 60 per cent of total anions*; teeth indicate direction of lesser sulfate content, approximate

Isogram along which chloride constitutes 60 per cent of total anions*; teeth indicate direction of lesser chloride content, approximate

*Determined on equivalents per million basis.



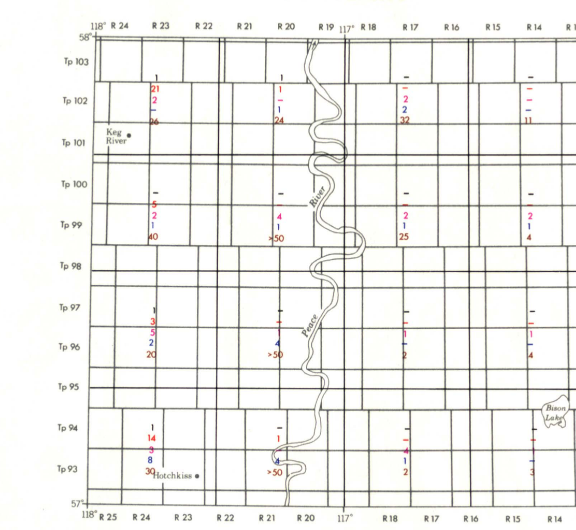




SCALE 1:250,000

Miles 5 0 5 10 15 20 Miles

Kilometers 5 0 5 10 15 20 25 30 Kilometers

## DATA DENSITY

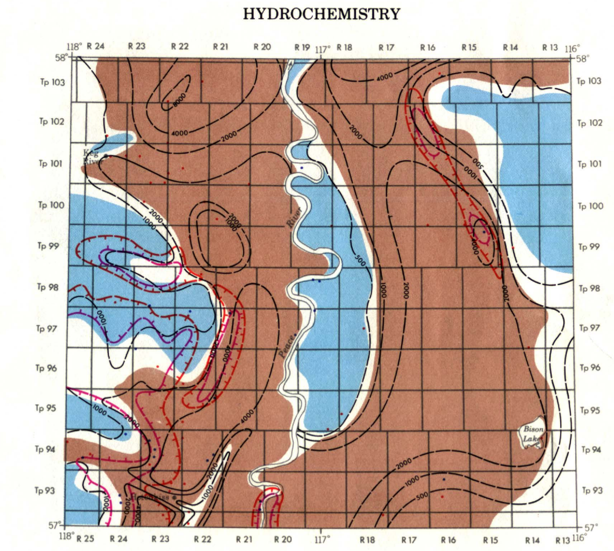



### LEGEND

Figures indicate the number of data control points in each section of the map area used in construction of:

- (a) yield areas on the main map (i.e. production tests) — 1
- (b) hydrochemical map:
  - wells and test holes — 5
  - auger holes — 2
  - springs — 8
- (c) thickness of surficial deposits on geological map — 3

## HYDROCHEMISTRY




### LEGEND

Data control point marking the location of a well or shallow auger hole with a chemical analysis

Data control point marking the location of a spring or surface water feature with a chemical analysis

Total dissolved solids in parts per million:

- defined
- approximate

Bicarbonate + carbonate constituting over 60 per cent of total anions*

Sulfate constituting over 60 per cent of total anions*

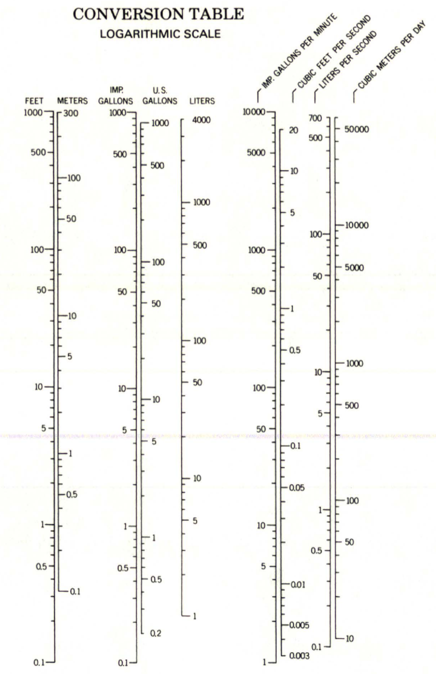
Isogram along which calcium + magnesium constitute 60 per cent of total cations*; teeth indicate direction of lesser calcium + magnesium content

Isogram along which sodium + potassium constitute 60 per cent of total cations*; teeth indicate direction of lesser sodium + potassium content

*Determined on equivalents per million basis.

## CONVERSION TABLE

LOGARITHMIC SCALE




# HYDROGEOLOGICAL MAP
# BISON LAKE
# ALBERTA

NTS 84F

All elevations in feet above mean sea level.

Vertical exaggeration of the hydrogeological profiles is approximately 40X.

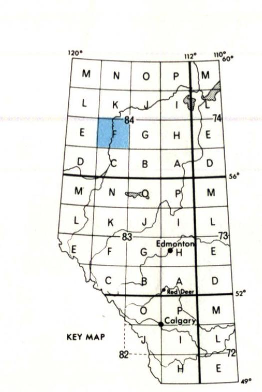
An expanded legend and explanatory notes for use with this hydrogeological map series is available from the Research Council of Alberta, Edmonton, Canada.

Map to accompany Report 72-2

Hydrogeology by O. Tokarsky, 1970, based on data collected in 1967 and 1968

Cartographic editing by A. Badry

Drawn by H. Weiss




Basemap provided by Surveys and Mapping Branch, Department of Energy, Mines and Resources, Ottawa; modified by Surveys Branch, Alberta Department of Highways and Transport, Edmonton.

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