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METALLIC INVESTIGATIONS

SOUTHEAST BRITISH COLUMBIA

TERTIARY STRATIGRAPHY  
IN SOUTH CENTRAL BRITISH COLUMBIA  
(82E)

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Much of the interior of British Columbia is covered by a deeply dissected assemblage of Early Tertiary lavas, associated pyroclastic rocks, and intercalated fluvial and lacustrine sedimentary rocks. These lie in a northwesterly trending belt about 160 kilometres wide extending roughly 800 kilometres from the Republic Mining District in Washington State to the Babine Lake area in central British Columbia. Stratigraphic thicknesses range to more than 2 500 metres and averages of a thousand metres are common. The basal zone is composed, in part, of granite pebble conglomerate, while the upper surface is often coincident with gently rolling uplands. In some areas the succession is capped by a veneer of 'plateau' basalt which is the erosional remnant of once widely distributed Miocene and Pliocene lava flows.

Current investigations of these rocks have been stimulated by recent discoveries of uranium mineralization and renewed interest in lignite deposits. Little information is available on the composition, regional stratigraphy, structure, or history of the Tertiary assemblage and it is the purpose of this present study to provide additional geological data.

The areas of detailed mapping, shown on Figure 1, coincide with a segment of the region covered by the Uranium Reconnaissance Program in 1976. Some of the more interesting results of this geochemical survey were found in the Tertiary outliers near Penticton, Kelowna, and Rock Creek. Approximately 1 200 square kilometres have been mapped at 1:50 000 scale, by way of 83 separate traverses and 1 460 geological stations in 1977.

**STRATIGRAPHY**

Working laterally from the White Lake basin between Keremeos and Penticton, the various Tertiary formations can be followed without much difficulty using the stratigraphic subdivisions proposed by the writer (Church, 1973). A few new sedimentary units have been recognized in the Marron section but these are only locally important. The Springbrook basal conglomerate is largely missing in the northern part of the basin, where these rocks are replaced by rhyolite ash and breccia deposits that appear to have had their source in the Shingle Creek stock. Above this unit and extending to Riddle Creek, west of Penticton, are radioactive mafic phonolites and rhomb porphyry lavas of the Yellow Lake member. The tan trachyte

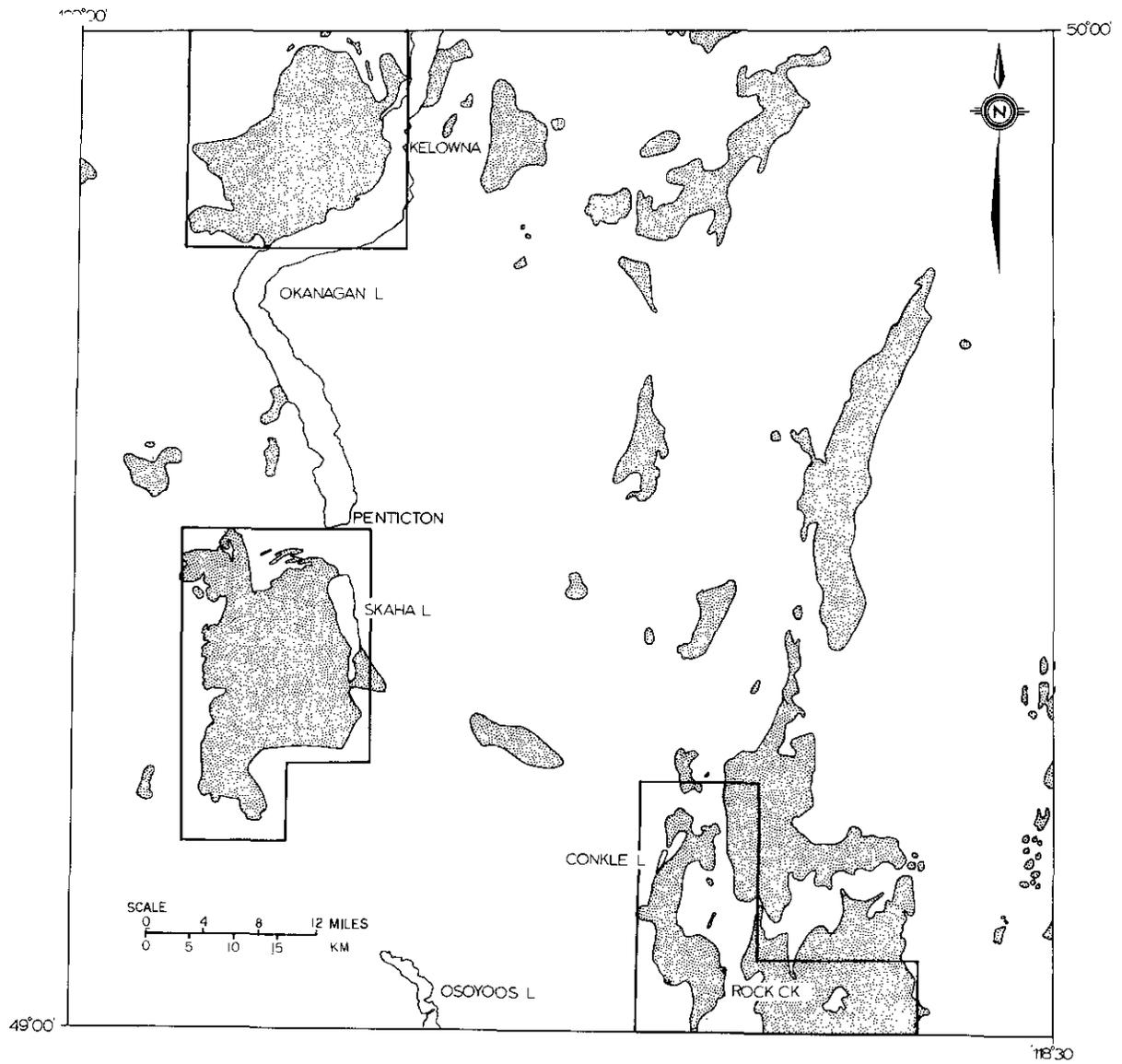


Figure 1. Outliers of Tertiary volcanic and sedimentary rocks in the Okanagan Valley and Kettle River region of south central British Columbia (areas of detailed mapping outlined).



volcanic accumulations. Here, the association of alkaline lavas with rifting is well documented. Structural control of the Tertiary volcanic outliers relates to a herringbone pattern of pronounced conjugate shears of northeast and northwest orientation, important elements in a north-south stress scheme which also produced the many graben and half graben structures.

## MINERALIZATION

Uranium exploration on the west side of the Okanagan Valley has disclosed several interesting radioactive zones. One of the more interesting of these is the *Brinex—Comaplex discovery on the ASH—AGUR claims* 25 kilometres northwest of Penticton. The principal radioactive response here appears to be related to a northwest-trending shear zone which transects basal units of the Marron Formation. The highest scintillometer counts, greater than 1000 cps, are measured over crushed acid volcanic rocks exposed below Marron lavas on Riddle Creek. The full extent of the anomaly, about 3 kilometres, includes most of the rocks of the Tertiary outlier. Rectangular porphyry and rhomb porphyry alkaline lavas belonging to the Yellow Lake member of the Marron Formation are prevalent in this area, displaying average background counts in the range of 200 to 300 cps. Source of these lavas appears to be a Coryell-type stock, also somewhat radioactive, exposed at the southwest margin of the outlier.

The actual presence of uranium was first detected in stream waters and sediments by the Uranium Reconnaissance Program survey. This showed that Aneas Creek, which follows a strong northwest-trending lineament through the Summerland area, was somewhat enriched in uranium as were some adjacent streams and a number of alkali ponds. At the same time, working south of Penticton near Oliver, Brinex exploration, directed by Culbert and Leighton (in press), discovered surprisingly high uranium levels in a cluster of stagnant alkali ponds. Water samples from four of these ponds were submitted by the Ministry for analysis. The results confirmed relatively high concentrations of uranium and showed corresponding high pH values:

Sample	U <i>ppm</i>	pH
1	9.1	8.4
2	17.5	8.6
3	0.6	7.2
4	2.3	8.2

It is speculated that the uranium was derived from the underlying Oliver granite or perhaps leached from scattered glacial deposits containing eroded fragments of Tertiary volcanic rocks exposed to the north. In any case, the ponds are interesting even if not of commercial importance, because they may reflect conditions of current uranium concentration which is evident elsewhere in the Quaternary stratigraphic record of the region.

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