WAPITI SYNCLINE PHOSPHATE POTENTIAL (93J/10, 7)

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INTRODUCTION

The Wapiti syncline area, which is located 70 kilometres south-southeast of Tumbler Ridge, extends for 10 kilometres between Wapiti Lake and Red Deer Creek (Fig. 21-1). Access is by helicopter or by four-wheel drive along the Red Deer Creek trail which leads to the back of the ridge at the south end of the syncline; the ridge must then be climbed. Floatplanes also may land at Wapiti Lake to the north; from there the syncline is reached by foot along the valley bottom.

The writers spent eight field days sampling and tracing Triassic and Permian phosphate units along the limbs of the Wapiti syncline from a base camp at Two-Lake Cirque (Fig. 21-2).

Previous work includes Gibson (1972, 1975), McGugan and Rapson (1964), and personnel of Esso Resources Canada Ltd. (1980, Assessment Report 8 407, Mineral Resources Division). In addition, stratigraphic sections of the Permian and Triassic rocks are presented in Assessment Report 1 870 (Petroleum Resources Division).

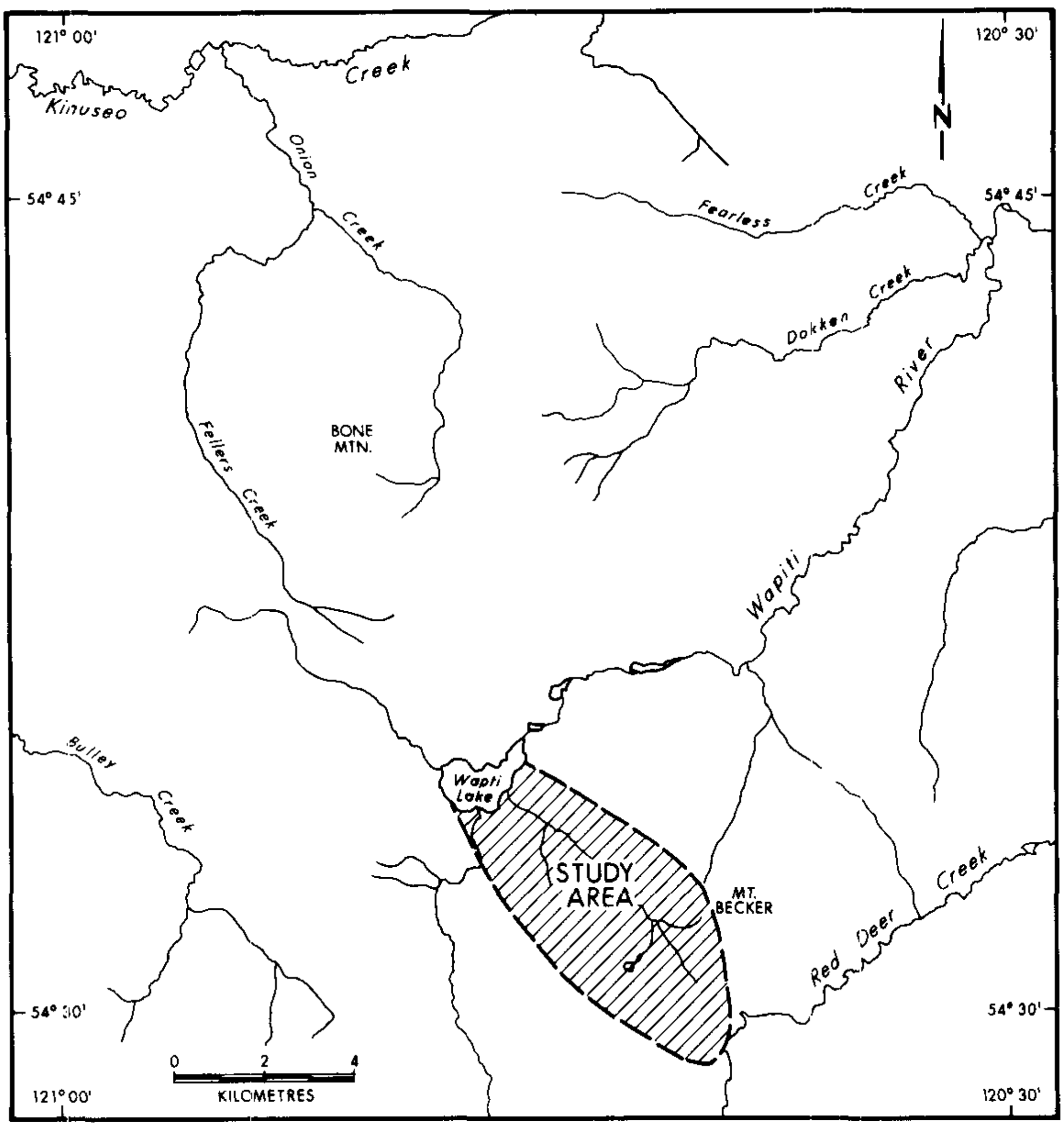

Figure 21-1. Location of study area, Wapiti Lake phosphate project.

British Columbia Ministry of Energy, Mines and Petroleum Resources, Geological Fieldwork, 1985, Paper 1986-1.

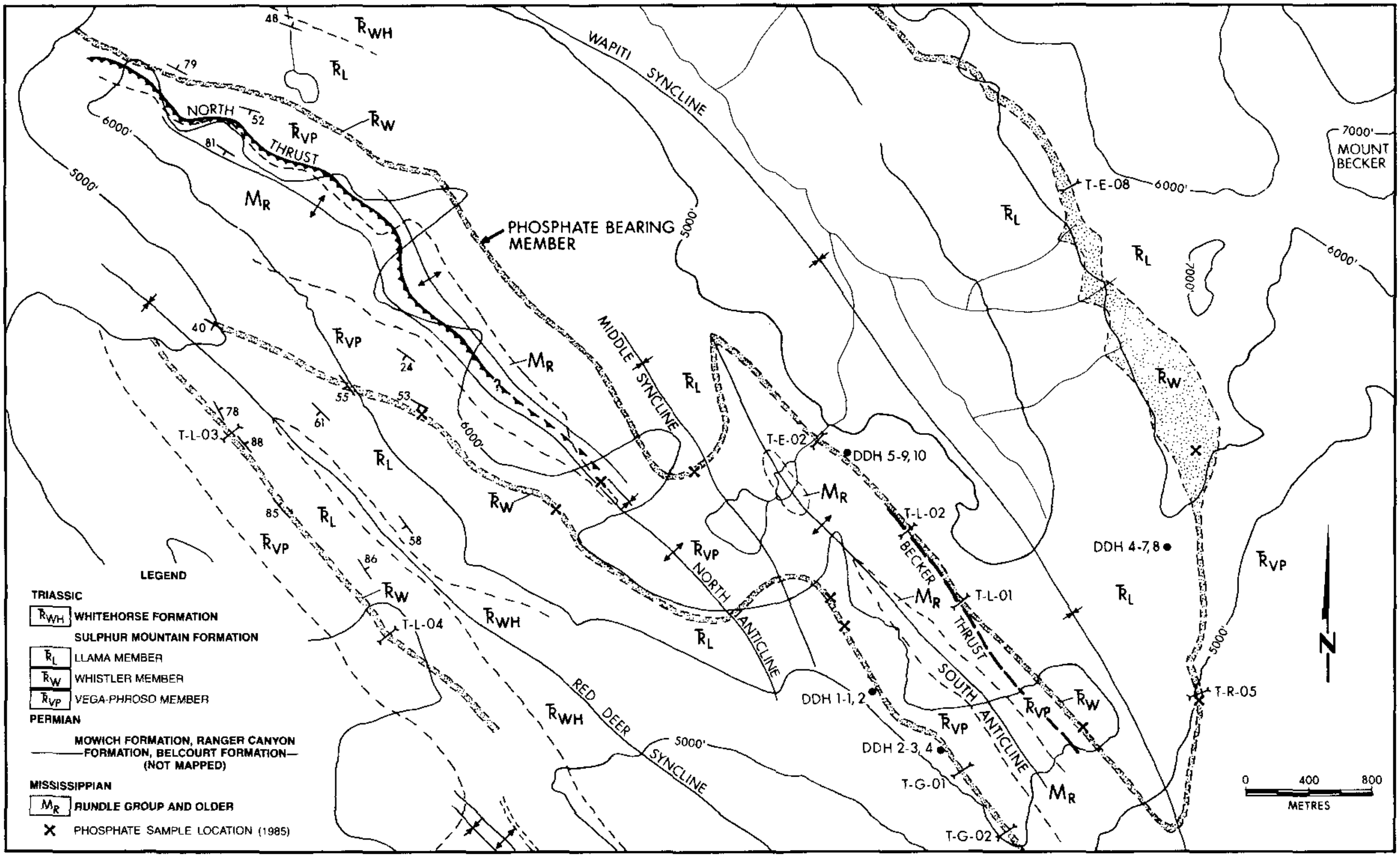

Figure 21-2. Wapiti phosphate (93I/7, 10).

OBJECTIVES OF THE STUDY

This study is designed as part of a larger effort that is directed toward locating areas of high phosphate potential in northeastern British Columbia. A large number of individual references to phosphate occurrences in northeastern British Columbia exist in the literature but, publically, little attempt has been made to synthesize the data. No general synthesis exists that identifies what stratigraphic intervals and what areas are worthy of follow-up. An *exception to this is the work of Esso Resources Canada Ltd. south of* the Pine River; eventually Esso Resources focused on the Whistler Member of the Triassic Sulphur Mountain Formation in the Wapiti syncline area. Although Esso Resources dropped the Wapiti claims, phosphate grades up to 29.7 per cent over 1.01 metres, which are encouraging when compared with analytical results in other studies (*see* MacDonald, 1985), were reported.

This study was initiated to evaluate Esso Resources's work, to carry out follow-up analyses, and to trace phosphatic intervals in the area.

METHOD OF STUDY

The geology map for the Wapiti claims of Esso Minerals Canada was used as a guide in locating the phosphatic unit at the base of the Whistler Member. Old trenches were found and in some cases resampled. New exposures were located and channel sampled. In this regard a portable scintillometer proved useful in prospecting. In old trenches, the variation in total counts per second of combined uranium and thorium radiation roughly matched the variation in P_2O_5 grades for the intervals; higher counts correlated with higher grades. Consequently the scintillometer was used in combination with visual recognition of phosphorite to determine sampling cutoff widths. A total of 11 locations were sampled; these included 2 samples of the Mowich Formation sandstone of Permian age which outcrops in the area and is a known phosphatic interval (MacDonald, 1985). Fourteen samples were submitted to the Ministry of Energy, Mines and Petroleum Resources' laboratory in Victoria for whole rock oxide analysis and 30-element semi-quantitative emission spectrographic analysis. The results will identify P_2O_5 grade, chemical impurities such as calcium, toxic adulterants such as cadmium and lead, or valuable byproducts such as fluorine, rare earths (yttrium, europium, neodymium), or uranium, which are are known to be associated with phosphate.

RESULTS

Analytical results were not available at time of writing; the thickest uninterrupted interval of phosphorite found during the field reconnaissance was 1.1 metres; within it the maximum scintillometer count was 50 000, which is 100 times background. Phosphate occurs as pelletal phosphorite and minor phosphate pebble conglomerate. In some locales thin beds of bivalve and belemnite shell hash and vertebrate bones are present with visible purplish thorite. The bottom contact of the phosphate zone consists of mottles of pelletal phosphorite in a siltstone background. The origin of these mottles is unknown. It may be diagenetic; it could represent burrow fillings; it may even be of clastic, soft sediment rip-up origin.

The trace of the Whistler Member on Esso Minerals' map is essentially correct. The only geology that we added on Figure 21-2 is the 'V' trace of the Whistler unit about the axis of the south anticline. The Whistler unit could not be located to the north because the anticline has a considerable northward plunge.

Tracing the Triassic phosphate interval in reasonably well-exposed alpine terrain showed that the phosphatic units lense out over short lateral distances into more barren siltstones. Considerable variation in grade might be expected and this is supported by known analytical data, which indicates grades ranging from approximately 10 to 30 per cent P_2O_5 across a 1-metre-wide phosphatic interval.

According to Gibson (1975, Fig. 10, p. 13) outcrop sections containing good phosphatic sandstone with conglomerate interbeds at the base of the Whistler Member generally are associated with 'shelf' or thinning trends illustrated on his isopach maps. The thinning trend continues from the area of the Wapiti syncline southeastward to the Peak of Muinok Mountain. The thickness of the *phosphate interval at Muinok Mountain is not known but could be* significant. Once available the analytical data may suggest other trend directions that are worthy of pursuit.

REFERENCES

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