YMIP 2014

FOCUSED REGIONAL

PROJECT 14-044

# SEAGULL CREEK RARE METAL PLACER

# REPORT OF FIELDWORK

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## INTRODUCTION

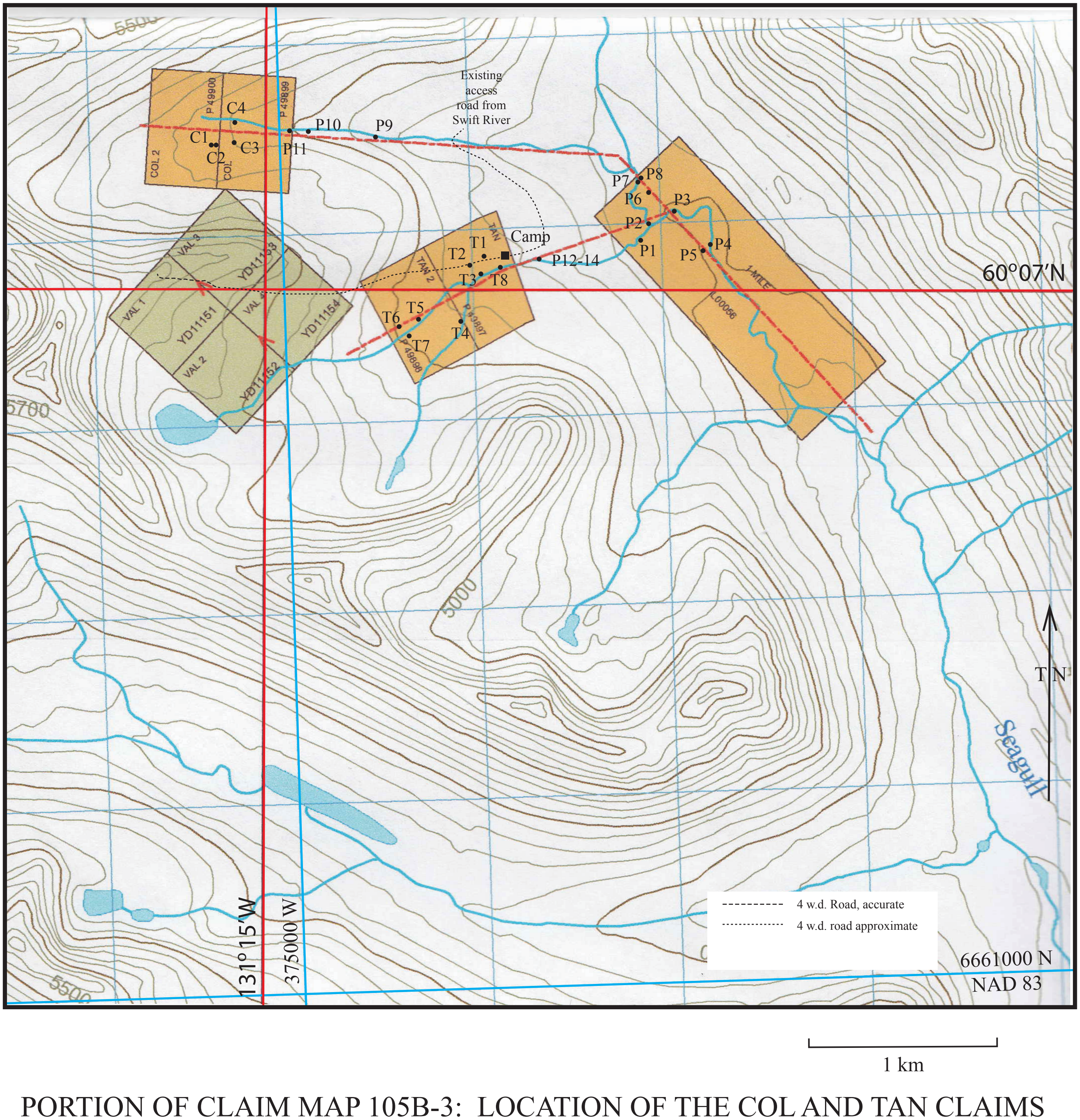
The project was devised to investigate the possibility of economic concentrations of rare metals (rather than the traditional gold deposits sought in the Yukon) in placers at the headwaters of Seagull Creek. Some initial stream sediment sampling was carried out during 2010 (YMIP grant 10-051) which indicated that heavy mineral concentrates would have a significant contained metal value (for Sn, Ta, Nb, W, La, Ce, and particularly Nd). That fieldwork did not look for particular concentration of heavy minerals in the streams. Figure 1 gives the location of the project on the 1:30,000 claim map 105B-3 and Figure 2 shows the approximate extent of alluvial material of interest.

## SOURCE REGION GEOLOGY

The Seagull batholith is the largest of the 100± Ma old A-type granites (the Seagull Suite, Rasmussen, 2013) that crop out in a NW-SE striking zone that parallels the Cassiar batholith to the NE. The Seagull batholith is a biotite-only monzo-to syenogranite that is noticeably enriched in F and B. The granite contains accessory fluorite, topaz, fergusonite and much monazite. Outcrops show frequent miarolitic cavities and decimetre-scale orbicules containing schorl and cassiterite, hence depth of emplacement was very shallow. The high B and F content of the granite magma would have allowed the magma to have a solidus temperature < 700° C. This chemistrycombined with the low temperature and pressure produced ‘ultrafractionation’, enriching the alkalies and forming hydrothermal fluids that were enriched in halogens and high field strength elements, particularly Sn, Nb, and Ta. Rare earth metals are abundant in accessory minerals monazite, fergusonite and scarcer xenotime.

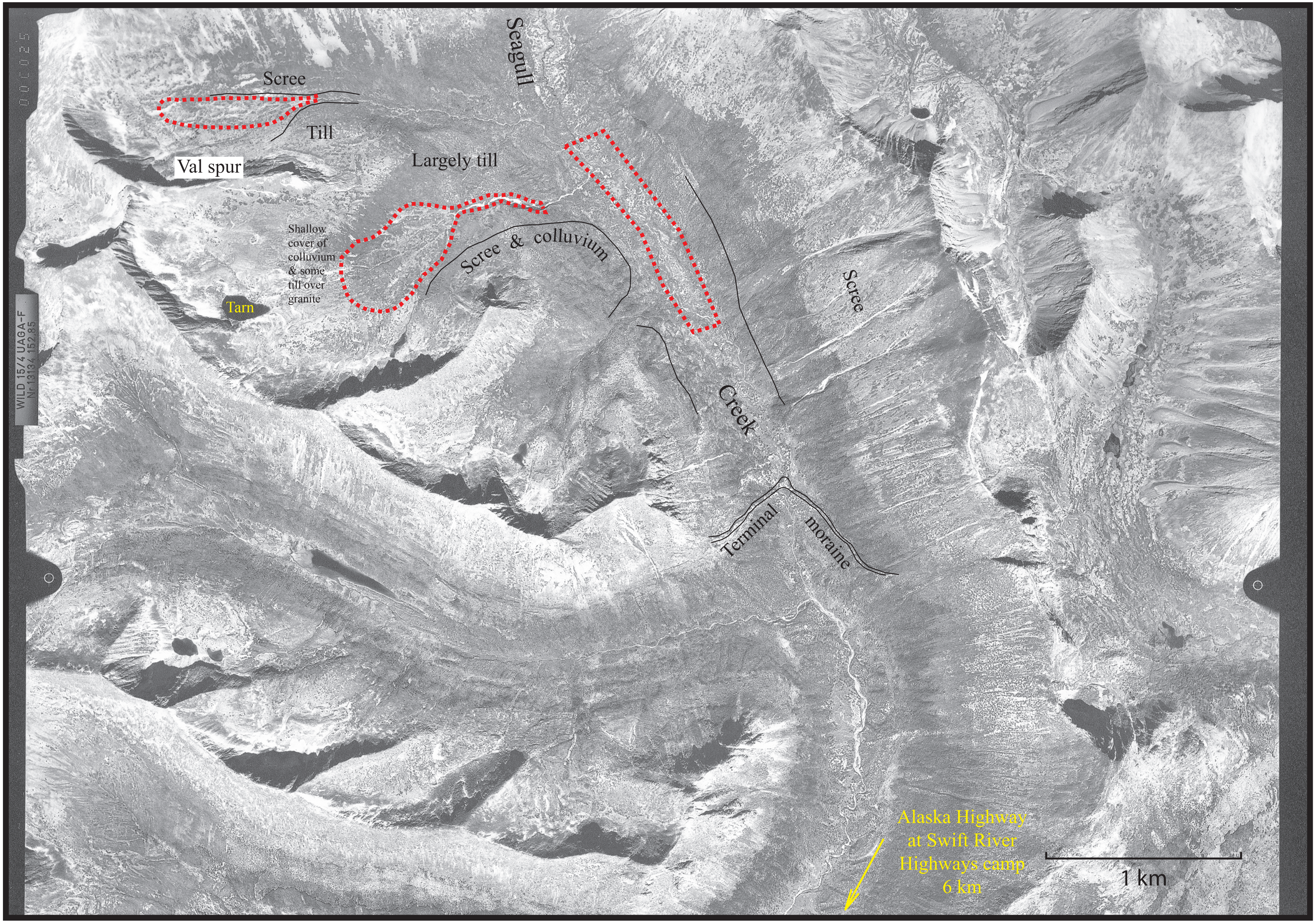
The granite on either side of the Val marble pendant, which divides the two branches of Seagull Creek investigated in this work, shows E-W striking near vertical sheeted vein systems that carry cassiterite, much tourmaline and monazite (Fig. 3). Columbite-tantalite is also expected to be present in the veins and has been recognised in heavy mineral concentrates from below the Val cirques (YMIP report for 2010).

Country rocks to the north and east consist of polydeformed metasediments and metavolcanics of the Yukon-Tanana terrane. The Val quartz claims cover a roof pendant




PORTION OF CLAIM MAP 105B-3: LOCATION OF THE COL AND TAN CLAIMS SHOWING PLACER SAMPLING

Figure 1.




**NORTHERN PART OF AERIAL PHOTOGRAPH A27521-189**
**SHOWING FLUVIALLY WORKED ALLUVIAL MATERIAL**
Alluvial material of interest outlined in red

**Fig. 2**


**Figure 3. Panorama of the Val & Tan claims from Seagull Creek.**

consisting of a marble unit that overlies a thin quartzite. The marbles have been metamorphosed-metsomatised to skarn in various bedding-parallel layers and in discordant veins. At the granite contact high temperature skarns of melilite-garnet-diopside are developed, with actinolite skarn as the retrograde assemblage. At several disjointed localities along that contact greisenised skarn is also developed. This `wrigglite`- textured rock contains banded magnetite, phengite, fluorite, fluoborite and ludwigite-vonsenite. Cassiterite is associated with the magnetite-fluorite layers and may be present to >1% grade. Scheelite was also noted in outcropping actinolite skarn. Provided that wolframite and scheelite are deposited in streams close to their source, they can be recovered from placers. A more complete description, together with photographs and photomicrographs is given in the 2010 report.

## 2014 PLACER SAMPLING

Sampling of stream sediments was to be performed on the two northwestern headwaters of Seagull Creek where the Col, Col 2, Tan and Tan 2 claims are situated, plus the main bed of Seagull Creek below these tributaries (covered by placer prospecting lease L00056). It was initially hoped to be able to use a Candig miniature backhoe for the work on the Tan claims and the placer lease. After extensive walking over the hill slope below the camp site (see Fig. 1) it was found to be impractical to move the machine to Seagull Creek without major trail construction. Steep slopes, a string bog and boulder fields were encountered. In fact, the only relatively easy walking access was to follow close to the north side of the southern creek. Transport of the machine to the Col claims might have been possible, but would have involved considerable disturbance of the alpine tundra, which was not acceptable. The Candig was used for three pits on the Tan claim. The remainder of the work was performed using hand tools. For most samples one 20 l bucket of gravel was taken and panned down to a ‘dirty’ concentrate. The sampling covered till (T1, T2) recent alluvial terrace (T4, T7, C1, C2, P5, P8) and recent creek deposits (T8, P12-P14). Active stream sediment was sampled in C3, C4, P9-11, P1-P4, P6 and P7. The active sediment was chosen from either short flat, broader sections of the creek bed (C3, C4, P9-11, P1, P6) or at the start of a bend where point bar deposits are to be expected (P3, P4). In all cases some heavy minerals were collected, but none came close to what might be an economic quantity. A calculation of the contained metal value of concentrate, without regard to refining cost, in the 2010 samples indicated a range of  $4040 to $13, 200 per tonne.  If a value for placer of $10 per cubic metre is sought, then at the lower value, some 2.5 kg of concentrate would be required.  The present sampling indicated that `clean` concentrates were mostly under 2g per bucket i.e., approximately 115 g per cubic metre, only a fraction of practical values. Table 1 gives detail of samples collected.

## RESULTS: ANALYSIS

Of the 28 heavy mineral samples obtained some 15 were in excess of 10 g weight, the minimum required for analysis and of these, three were rejected by the laboratory. These were submitted to ALS Chemex for analysis by fusion and XRF. Results are shown in Table 2. The approximate grade in grammes per cubic metre has been calculated. The maximum combined metal content was 91.7g for sample T3 (i.e., 5% of what might be interesting economically). The smaller specimens were examined under the stereo microscope and a selection of non-magnetic opaque mineral grains were tested on the zinc plate for cassiterite (the `nascent hydrogen` method). Observations are presented in Table 3.

## CONCLUSIONS

The active stream sediments and recent alluvial benches at the headwaters of Seagull Creek all carry some heavy minerals that include cassiterite, columbite-tantalite or fergusonite and monazite plus tungsten minerals. Quantities, however, are under one tenth of that required for economic placer extraction. The upper reaches of the creek do not seem to offer placer prospects. Other nearby localities may be amenable to enhanced concentration of `heavies`. The upper portion of Goddardt Creek drains sheeted vein systems. The lower part of Seagull Creek, closer to the Alaska Highway and of lesser gradient, may have some parts where placer has been developed. That region should be investigated by panning before the concept of rare-metal placer is abandoned.

Timothy Liverton

# QUALIFICATIONS

## Timothy Liverton: Geologist

Qualifications: BSc in Geology & Geophysics, University of Sydney, conferred 1965
BSc (Hons) in Economic Geology, University of Adelaide, conferred 1968
PhD in petrology, structural geology & metallogeny, Royal Holloway, University of London 1992.
Chartered Geologist, Fellow of the Geological Society, Fellow of the Geological Association of Canada, Member of the Geological Society of America, Member of the Society of Economic Geologists

Experience: 45 years' experience in engineering geology, mine geology and mineral exploration for tin, tungsten, uranium, manganese, base metals, silver, gold and industrial minerals in Australia, Canada, U.S.A., Brasil, Guyana, Norway, Portugal and Egypt.