ANNUAL REPORT ON THE KINGS TABLE TIN-TANTALUM PROSPECT
EXPLORATION LICENCE 2019
NEAR DARWIN, NORTHERN TERRITORY

J.W. Shields,
G. Orridge
GEONORTH, Darwin

December, 1983

CONTENTS

1. INTRODUCTION

The Kings Table Prospect is situated 17 km SSW of Darwin on the southwest side of Darwin Harbour. It consists of Exploration Licence 2019 consisting of four blocks with a total area of 11.5 km^2, which lie at the northernmost extremity of a belt of pegmatites which extends southwards for about sixty kilometres. The area contains at least six known pegmatites, some of which have been worked or prospected to a limited extent for their tantalite-cassiterite contents.

The area is of low elevation, with extensive soil and laterite cover and poor exposure. It is covered with moderately thick woodland and fringed with mangrove thickets on the coastal margin.

Access is by 11 km of bush track (dry season only) which connects Starfish Landing with the sealed Darwin-Mandorah road 92 km from Darwin. Alternative access is by boat to Starfish Landing at suitable high tides.

The Exploration Licence is situated in 1:250,000 sheet area Darwin and 1:100,000 sheet area Bynoe.

This report presents the results of field work (by J.W.S.), air photo/interpretation, and a review of available data on the pegmatite belt as a whole, with the objectives of making an assessment of the prospect and of determining the most appropriate methods for future exploration.

2. TENEMENTS

The prospect includes the following tenements, all held in the name of Mr. Murray Ross Martin, of 10 Colster Crescent, Darwin, N.T.

Exploration Licence 2019: expiry date 24 November 1986; area 10 km^2 until 24 November 1983 when 50% relinquishment was required.

Mineral Claims N243-255 inclusive, which cover a total area of about 468 ha. They were formerly held as MC's 369 - 380 incl., and DC 291 B.

Mineral Leases 1421B-23B inclusive, covering a total area of about 54 ha.

About three quarters of the area covered by the MC's and ML's are enclosed by the Exploration Licence as at 24/11/83 (see Figure 2).

3. REGIONAL GEOLOGY AND MINERALISATION

The prospect is located near the northwestern margin of the Pine Creek Geosyncline. The country rocks are shales, siltstones and greywackes belonging to the Burrell Creek Formation, of the Finniss River Group, which is the youngest part of the Lower Proterozoic succession.

The sediments are tightly folded on NNE trending axes and dips are steep. Recent mapping by N.T. Geological Survey shows a major synclinal axis located about 5 km southeast of the prospect and suggests that Kings Table may lie close to an adjoining anticlinal axis. This may be important in providing favourable conditions for pegmatite intrusion.

The area is located between the Archaean domal granitoid complexes of Rum Jungle and Waterhouse to the east, and the Archaean-Proterozoic-Carpentarian metamorphic/granitic belt of the Litchfield Complex to the west (Figure 3). The pegmatite intrusions are believed to be early Carpentarian in age.

Thin outliers of near horizontal Cretaceous sandstone, siltstone and conglomerate are scattered through the belt. The Kings Table mesa is formed by these rocks.

A deep lateritic weathering profile is superimposed on the Cretaceous and underlying Precambrian rocks. It is probably related to the early Tertiary Tennant Creek Surface. Laterites which crop out widely in the Kings Table area may be part of this profile, or may be younger re-deposited detrital laterites capping a truncated profile. The deep weathering of the pegmatites, with almost total destruction of feldspars, is related to the laterite profile.

The Kings Table tenements are at the northern extremity of a belt of cassiterite-tantalite bearing pegmatites which extend north-south over a length of 60 kilometres with a width of up to 10 kilometres. This is known as the West Arm-Mount Finniss Belt.

The pegmatites range up to perhaps 200 metres length and 20 metres width and are elongated north-south parallel to regional folding and shearing. They are commonly zoned with a quartz core and marginal feldspathic and micaceous zones. The cassiterite-tantalite may be present throughout the body or concentrated in the marginal zones, sometimes forming distinct rich shoots.

The bodies have been worked intermittently since about 1886; recorded production to 1957 was 585 tons of tin concentrate and 15 tons of tantalum concentrate. Workings were from shafts, open pits and adits.

It appears that the outcropping high-grade shoots have been worked out to shallow depths and drill testing of various prospects has been discouraging or inconclusive. Recent production and exploration has concentrated on eluvial deposits produced by disintegration of the pegmatite. For example, a survey at Mt. Finniss in 1944 indicated about 38,000 m^3 grading 0.37 kg tantalite/m^3 with subordinate tin.

Recent work by Greenbushes has reputedly indicated significant deposits of eluvial and alluvial in areas immediately south of the Kings Table leases.

The potential of the pegmatite belt probably lies in small to medium scale exploitation of detrital deposits and open pit mining of the weathered pegmatites, probably with the need to combine several deposits to achieve a worthwhile tonnage.

4. GEOLOGY AND MINERALISATION OF THE PROSPECT AREA

4.1 THE PEGMATITES

Six outcropping pegmatites are recorded in the area, although the one mapped as "Mugs Find" could not be located on the ground (Figure 4).

Outcrop is poor, but as far as could be determined the pegmatites are small with widths ranging up to at least six metres and lengths up to 100 metres.

The pegmatites are usually zoned, often with bands of solid quartz which crop out strongly, surrounded by mica-feldspar zones which do not crop out at all e.g. Starfish Landing. The pegmatite at Jewellers is exceptional in that very little solid quartz is evident.

It is possible that other quartz-poor pegmatites have been overlooked.

No quantitatively useful sampling results are available. A few analyses by Weka Pty. Ltd. (1980) serve to confirm the presence of cassiterite and tantalite but cannot be taken as an indication of grade.

4.2 LATERITES

Lateritic ferruginous cappings crop out widely and at first sight seem to cover the whole area. However, more detailed examination of aerial photography (1:25,000 false colour infrared) and ground inspection suggests that the hard iron caps form upstanding outcrops but cover only a small proportion of the area, with extensive intervening areas of soil resting directly on bedrock.

Greenbushes explored areas to the south using an auger drill with a special bit designed to penetrate laterite. A similar method would no doubt work effectively at Kings Table.

4.3 DETRITAL TANTALITE-CASSITERITE DEPOSITS

The present land surface is only a few metres (possibly 15-20 m) below the projected base of the Cretaceous, and this puts a limit on the amount of pegmatite eroded and cassiterite/tantalite released and available for accumulation in detrital deposits. Pre-existing placer deposits in the basal Cretaceous are possible but have not been recorded in this district.

The possibility exists for accumulations of eluvial material derived from disintegration of the pegmatites concealed by laterite or thin soils. A minor amount of trenching and hand augering has been carried out but has been insufficient to permit any realistic evaluation of the eluvial potential.

The aerial photography shows several areas of relatively thick superficial cover, leading down to mangrove inlets, which may represent old valleys infilled with recent alluvium and mangrove muds. Concealed alluvial placers could be present in these channels, analogous to the "deep leads" which Greenbushes are reputed to have discovered further south. The locations of these possible alluvials is shown in Figure 4.

5. EXPLORATION METHODS

The first stage of exploration at Kings Table would have the objective of determining whether the pegmatites and/or their derived detrital deposits have potential for sufficient grade and volume to interest be of commercial interest. This would require three lines of investigation namely:-

(i) to determine the dimensions, geology (zoning) and distribution and grades of mineralisation of the known pegmatites.
(ii) to establish the presence (or otherwise) of concealed pegmatites.
(iii) to estimate the volumes and grades of eluvial material derived from the known (or newly discovered) pegmatites.
(iv) to check the possibility of alluvial concentration in buried channels.

The investigation of eluvial deposits and the search for new pegmatites, could both be achieved by means of systematic auger drilling, initially at 50 metre spacing on E-W traverses 500 metres apart. Samples would be logged for the presence of pegmatite derived materials, and panned for heavy minerals. Concentrates would be analysed if Sn/Ta was suspected.

The possible alluvial areas would also be tested by auger drilling but on a closer spaced pattern.

In either case, positive indications would be followed up by a closer pattern of auger holes as appropriate.

Investigation of the known pegmatites would best be undertaken by backhoe or bulldozer trenching, mapping and sampling, with testing of samples by panning where the rock is decomposed.

Such a programme would not provide reliable information on grades. If the indicated volumes of mineralised material were significant a follow-up programme of bulk sampling by backhoe or bucket rig, and pilot plant treatment would be required to indicate grades.

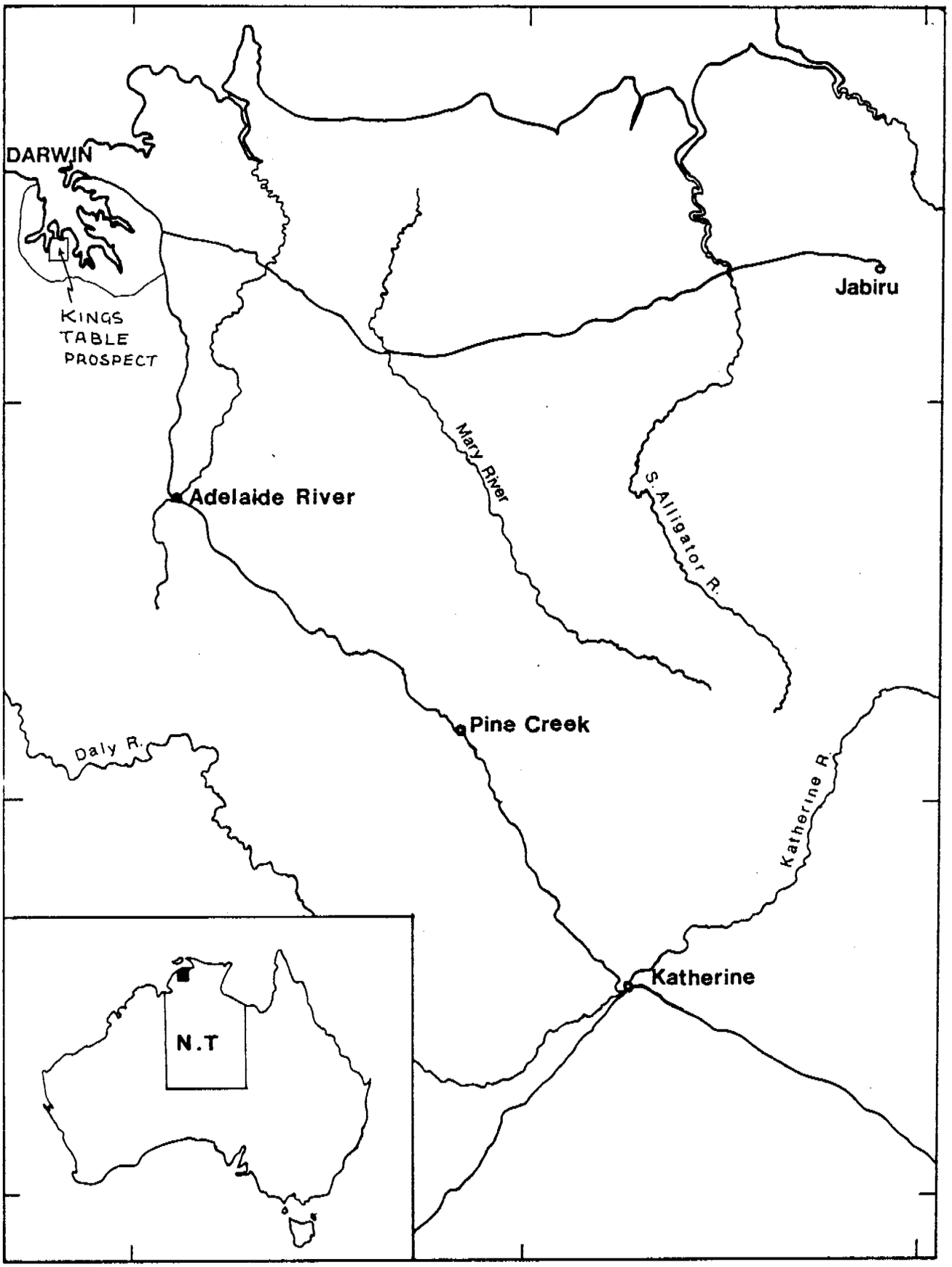
6. ASSESSMENT

Information on the Kings Table area is very scanty. In brief, the tenements cover a zone some six kilometres long and 1.5 km wide, in which occur several apparently small mineralised pegmatites, and which could contain other pegmatites concealed by superficial cover.

Potential may exist for bulk mining of decomposed pegmatite and exploitation of possible eluvial/alluvial detritals derived therefrom. Exploration for and exploitation of such deposits might uncover rich shoots in the pegmatites which could be mined selectively.

The area is relatively favourably situated in terms of proximity to Darwin, access, and availability of a work force in small nearby settlements. Adequate supplies of fresh water might be a problem for a large operation.

Initial exploration aimed at searching for new pegmatites and detrital deposits, and better defining the extent and mineralisation in the known pegmatites, could be relatively easily accomplished by means of coordinated programmes of auger drilling and back hoe trenching and small scale pilot plant treatment of bulk samples. The first stage of such a programme could be completed for a total cost of about $25,000 with a duration of about six weeks.



LOCALITY MAP

FIGURE 1

MINING TENURES

1:100,000

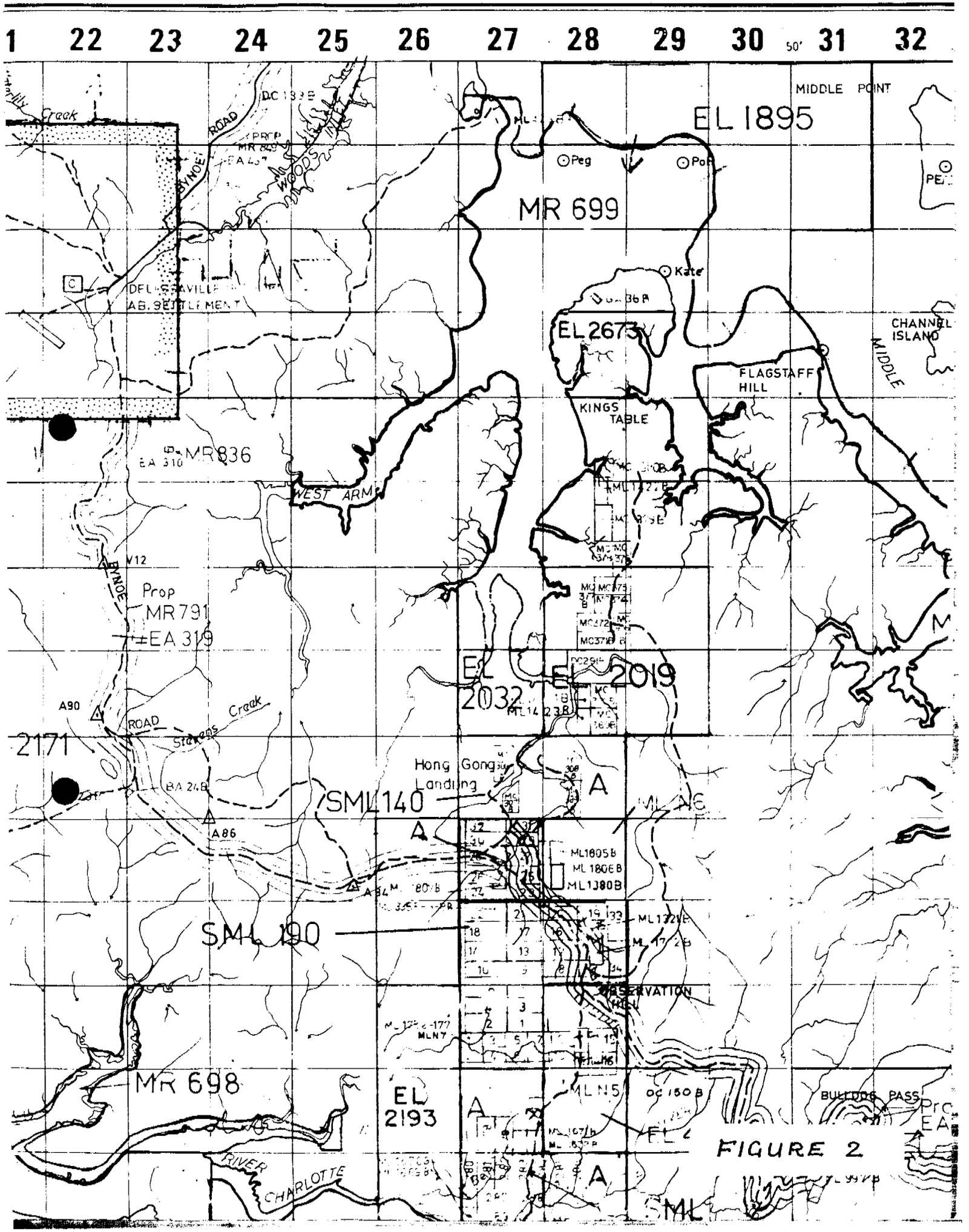


FIGURE 2

MINERAL DEPOSITS
KATHERINE-DARWIN REGION
NORTHERN TERRITORY

SCALE 1:1,000,000

10 5 0 10 20 30 40 Miles

10 5 0 10 20 30 40 50 60 Kilometres

Geology by officers of the Bureau of Mineral Resources
Compiled by: P. W. Crohn
Drawn by: I. Cherlok

Compiled and published by the Bureau of Mineral Resources, Geology and Geophysics, Department of National Development.
Aerial photography: complete vertical coverage by the Royal Australian Air Force
Transverse Mercator Projection

- Post Ordovician rocks excluding Cretaceous
- Cretaceous rocks
- Ordovician and Cambrian rocks
- Adelaidean rocks
- Carpentarian rocks
- Lower Proterozoic rocks
- Archaean rocks
- Carpentarian granitic rocks
- Archaean and/or Proterozoic granitic rocks

BOY *Mineral area*
Geological boundary
Fault

Mn	*Manganese*	Sd	*Sand*
Th	*Thorium*	Gv	*Gravel*
Bi	*Bismuth*	Lst	*Limestone*
Mo	*Molybdenum*	Lsd	*Lime Sand*
Ta	*Tantalite*	Coral	*Coral*
P	*Phosphate*	Clay	*Clay*
Ba	*Barite*	Shale	*Shale*
Gph	*Graphite*	Rc	*Crushed Rock*
Mg	*Magnesite*	St	*Building Stone*
Mc	*Mica*		
Ti	*Amblygonite*		
S	*Sulphides*		

FIGURE 3

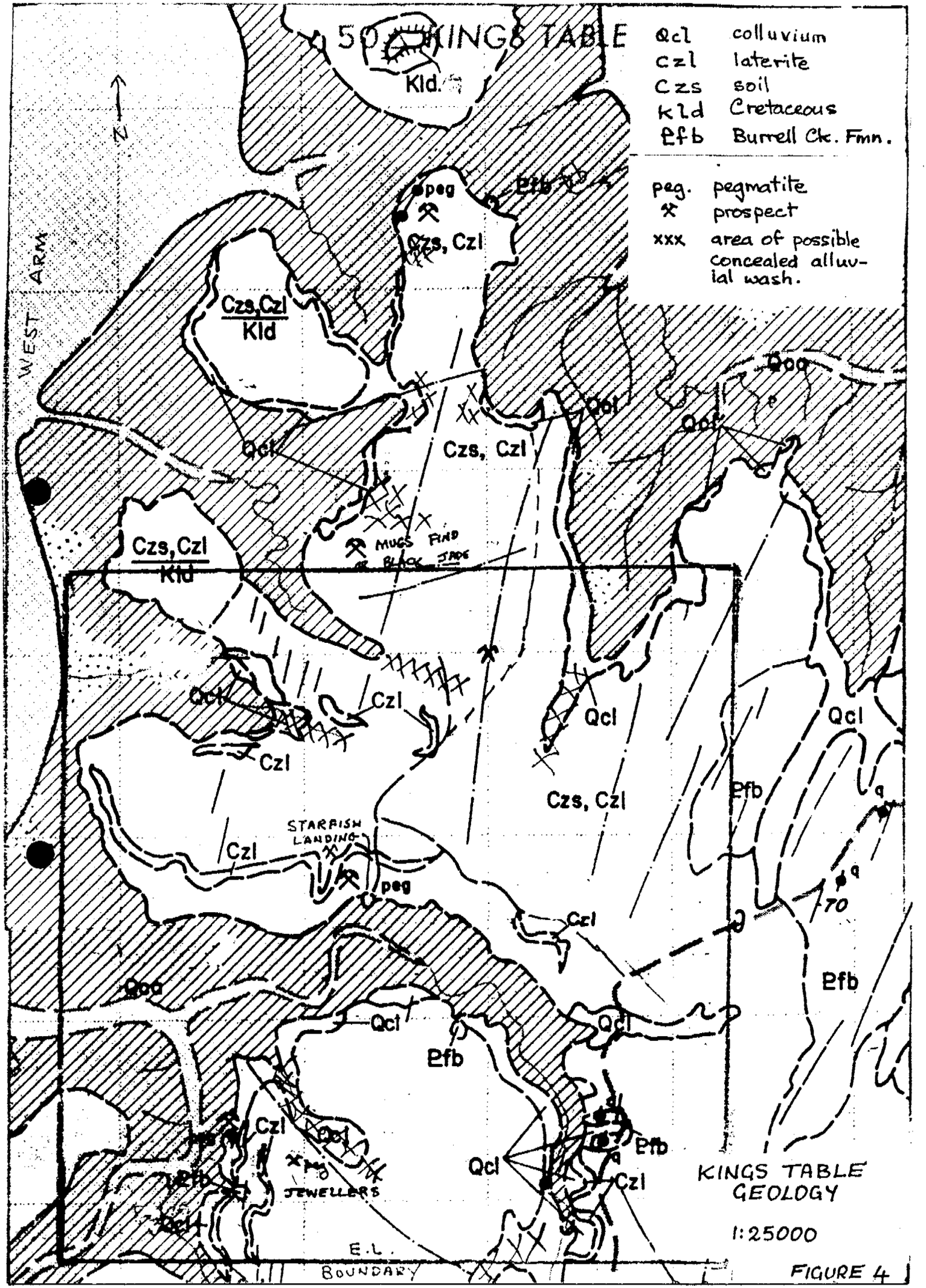

KINGS TABLE
Kld.
N
WEST ARM
peg
Pfb
Czs, Czl
Czs,Czl
Kld
Qcl
Qoa
Qof
MUGS FIND
Czl
STARFISH LANDING
JEWELLERS
E.L. BOUNDARY
Qcl colluvium
czl laterite
Czs soil
Kld Cretaceous
Pfb Burrell Ck. Fmn.
peg. pegmatite
prospect
xxx area of possible concealed alluvial wash.
KINGS TABLE GEOLOGY
1:25000

FIGURE 4