

# Litchfield Minerals Pty Ltd

## *Litchfield Lithium Project*

*Bynoe Pegmatite field, Litchfield National Park along Litchfield Park Road*

**EL 31300 Annual and Final Report for the period  
06/06/2018 to 19/06/2019**

*Tenement holder: Litchfield Minerals Pty Ltd*

*Target Commodities: Lithium*

*Compiled by:*

*Michael Pustahya*

*EL 31300 Annual and Final report for the period 06/06/2018 to 19/06/2019*

**Bibliographic Data**

Report title	EL 31300 Annual and Final report for the period 06/06/2018 to 19/06/2019
Author/compiler	Michael Pustahya
Project Name	Litchfield Lithium Project
Tenement Number	EL 31300
Tenement Holder	Litchfield Minerals Pty Ltd
Operator	Litchfield Minerals Pty Ltd
Commodities	Lithium
Geological Province	Pine Creek Orogen
Stratigraphic units	Burrell Creek formation, Two Sisters Granite (Ca1850Ma), Bynoe pegmatites, Walker creek group.
Map sheet 250K	Pine Creek SD 5208
Map sheet 100K	Reynolds River 5071
Key words	Bamboo creek tin mine, Goodwill tin mine, Blyth tin occurrence, Bynoe, Burrell creek formation pegmatites

## Summary

No field work was carried out on EL 31300 during the reporting year.

Due to a change in the companies' corporate structure during the reporting period and a subsequent tenement prospectivity review of licenses held by Litchfield Minerals, it was decided that EL31300 should be relinquished in full.

The fact that the tenement was wholly within the Litchfield National Park had a major bearing on the decision to surrender the tenement.

From a company viewpoint, advanced exploration let alone mining in a National Park presents operational challenges and hurdles, ultimately impacting on and limiting funding for constrained exploration in such an environment.

The current global financial and geopolitical outlook has impacted heavily on Litchfield Minerals ability to raise exploration funds for any meaningful work to be carried out on EL31300, given the potential constraints on exploration and ground disturbing work.

The company will focus all its attention to the exploration and other advanced activities on the Mt Doreen mineralised fields in the western Arunta where it holds, in the companies' view, highly prospective mineralised ground.

Several industry players and other investors have expressed interest to partner Litchfield Minerals in pursuing a program of exploration in order to be able to discover viable quantities of base and strategic metals within less restrictive ground.

## Table of Contents

1. Introduction	page 5
2. Tenure Details	page 5 & 6
3. Geology and mineralisation	pages 7-10
3.1: Regional geology	page 7 & 8
3.2: Local geology	page 8 & 9
3.3: Mineralisation	page 9 & 10
4. Previous Exploration and company report references	page 11
5. Work Completed	page 12
6. Conclusions	page 12
7. Copyright statement	page 12
8. Bibliography	page 13

## 1. Introduction

This report covers the operational year 1 (6<sup>th</sup> June 2018 to 5<sup>th</sup> June 2109).

The tenement was granted on the 6<sup>th</sup> June 2018.

No field exploration activities have been carried out since the grant of the tenement.

The Exploration License, EL31300 is located approximately 120 km southwest of Darwin. The project area is situated on the Pine Creek 1:250,000 map scale sheet.

Access to the mooted exploration areas is along the Litchfield Park road.

### History

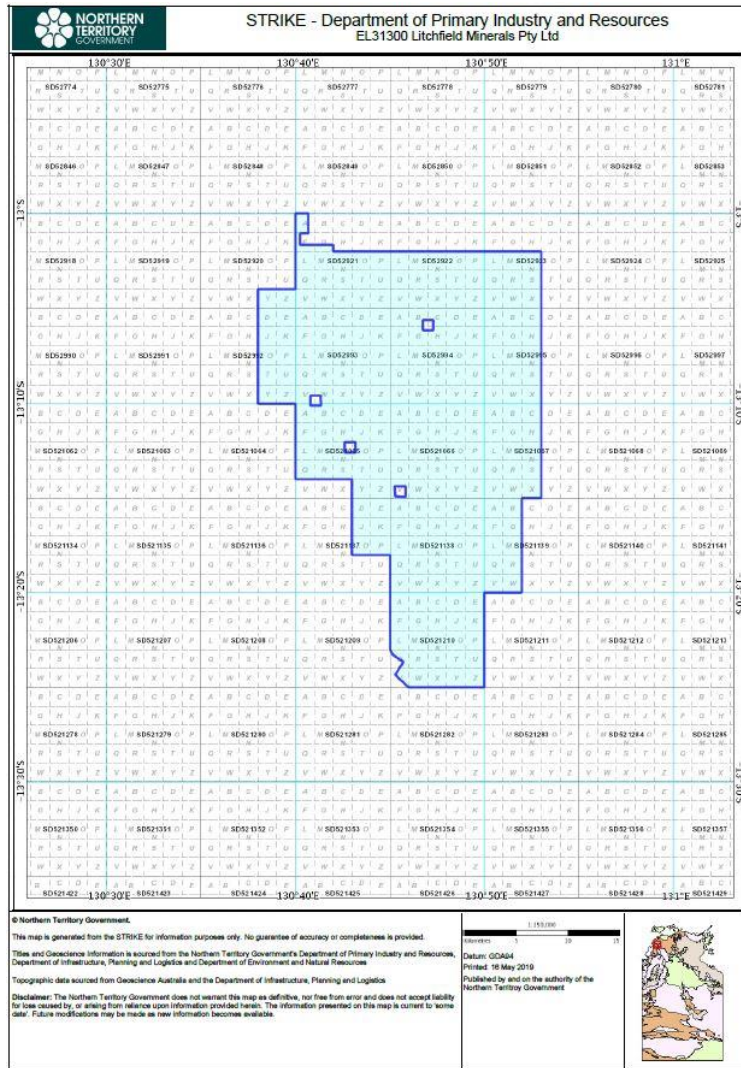
.

## 2. Tenure Details

EL 31300 was granted to Litchfield Minerals Pty Ltd on the 6<sup>th</sup> June 2018 for a period of five years expiring 5<sup>th</sup> June 2023.

Litchfield minerals held 100% interest in EL 31300 and was also the operator of the license. The tenement originally comprised of 247 blocks.

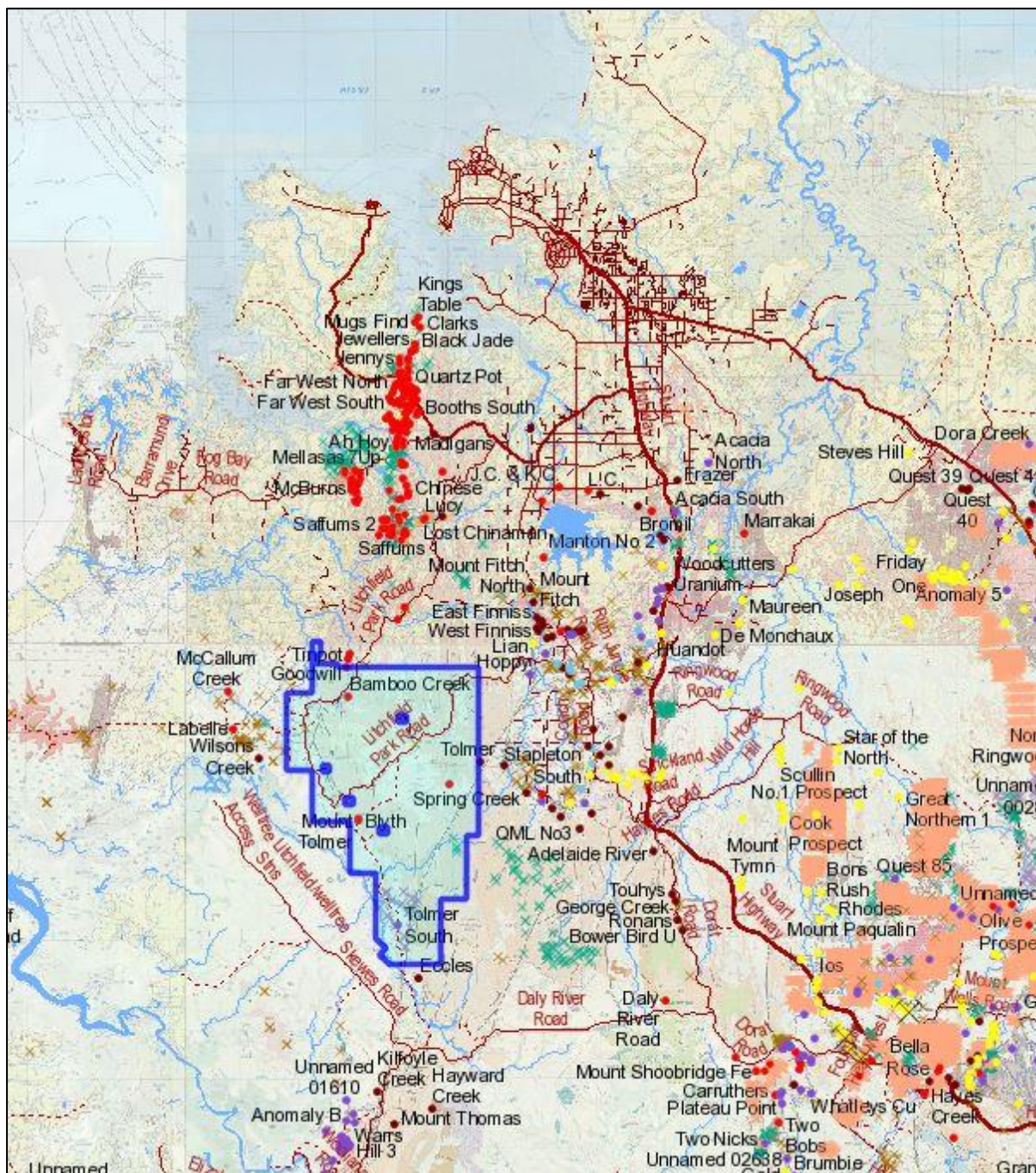
Sub block outline drawing of EL31300 (Fig 1) is shown below and the tenement sub block table is shown as, **Table 1: EL 31300 sub blocks.**



EL31300 current sub blocks as at 23rd May 2019		
SD No	Sub blocks	total sub blocks
52921	A,F,G,L,M,N,O,P,Q,R,S,T,U,V,W,X,Y,Z	18
52920	Y,Z	2
52922	L,M,N,O,P,Q,R,S,T,U,V,W,X,Y,Z	15
52923	L,M,N,Q,R,S,V,W,X	9
52992	D,E,J,K,O,P,J,U,Y,Z	10
52993	A,B,C,D,E,F,G,H,J,K,L,M,N,O,P,Q,R,S,T,U,V,W,X,Y,Z	25
52994	A,B,C,D,E,F,G,H,J,K,L,M,N,O,P,Q,R,S,T,U,V,W,X,Y,Z	25
52995	A,B,C,F,G,H,L,M,N,Q,R,S,V,W,X	15
521065	A,B,C,D,E,F,G,H,J,K,L,M,N,O,P,Q,R,S,T,U,Y,Z	22
521066	A,B,C,D,E,F,G,H,J,K,L,M,N,O,P,Q,R,S,T,U,V,W,X,Y,Z	25
521067	A,B,C,F,G,H,L,M,N,Q,R,S,V,W,X	15
521137	D,E,J,K,O,P	6
521138	A,B,C,D,E,F,G,H,J,K,L,M,N,O,P,Q,R,S,T,U,V,W,X,Y,Z	25
521139	A,B,F,G,L,M,Q,R,V,W	10
521210	A,B,C,D,E,F,G,H,J,K,L,M,N,O,P,Q,R,S,T,U,V,W,X,Y,Z	25
		<b>247</b>

Table 1: EL 31300 sub blocks.

### 3. Geology and Mineralisation



#### 3.1 Regional Geology

Pine Creek pegmatite province

The (Pine Creek Orogen) PCO is one of two areas in the Northern Territory containing rare-element pegmatites (see Regional distribution).

The regional geology of the PCO is described briefly below, before a review of the petrology and chemistry of the Two Sisters Granite, which is the parent granite for the

important Bynoe field pegmatite, the deformed Archaean and Paleoproterozoic succession is overlain by a relatively undeformed late Paleoproterozoic and Phanerozoic succession.

Archaean granites and metamorphics (>2500 Ma) are exposed in the Rum Jungle and Waterhouse complexes near Rum Jungle, in the Nanambu Complex near Jabiru, and are intersected in drilling near Woolner (Woolner Complex).

These Archaean rocks are overlain unconformably by a succession of Paleoproterozoic sandstone, siltstone and minor carbonate that was intruded by dolerite (Zamu Dolerite). This sedimentary succession includes the Namoonna, Mount Partridge, South Alligator and Finniss River groups.

The Finniss River Group commonly hosts most rare-element pegmatites of the Province.

The PCO succession was deformed and metamorphosed during the Nimbuwah Event of the Barramundi Orogeny 1880–1850 Ma, (Page 1997). During this event, regional metamorphism reached amphibolite facies in the west (Litchfield belt) and east (Alligator River), but only lower-greenschist facies in the central region. In the west, the Nimbuwah Event culminated in the intrusion of the 'Allia Creek Suite' (1845 Ma, Budd et al 2002), which included the Two Sisters Granite, parent to the Bynoe field pegmatites.

Subsequent to the Nimbuwah Event, post tectonic felsic magmatism extended into the central region of the PCO (Cullen Event, 1830–1820). The Shoobridge and Fenton granites, the probable source of the Tipperary district pegmatites, were emplaced at approximately 1825 Ma during Cullen magmatism. The Cullen Event was accompanied by extensional tectonics in the South Alligator region, where sedimentation and volcanism in two discrete grabens formed unconformity-bounded successions (El Sherana and Edith River groups).

A regional unconformity separates the early Paleoproterozoic from an undeformed late Paleoproterozoic succession of sandstone, siltstone, conglomerate and carbonate in the south (Katherine Group) and west (Tolmer Group).

Palaeozoic sediments (carbonate, sandstone and siltstone) and plateau basalt onlap the Proterozoic succession, forming extensive sedimentary basins to the north and south of the PCO.

### **3.2 Local Geology**

The tenement is situated on the western section of the Pine Creek Geosyncline and comprises parts of the Daly and Birrinbindu Basins. Geologically, the area is also identified as ideally suited to host unconformity and vein-style uranium deposits.

#### *Two Sisters Granite*

The Two Sisters Granite is part of the 'Allia Creek Suite', an elongated north–south belt of granites on the western side of the PCO. Straddling the Fog Bay, Anson, Bynoe and Reynolds River map sheets, it is generally considered the source of the numerous dyke swarms that comprise the Bynoe pegmatite field. It covers an area in excess of 2000 km<sup>2</sup>,



intruding the Burrell Creek Formation in the east, Welltree Metamorphics in the west and Wangi Basics in the south.

An albite-epidote hornfels contact aureole in the Burrell Creek Formation extends up to 15 km to the northeast and east of the Two Sisters batholith, indicating that the body probably has a shallowly dipping eastern margin (Pietsch1986). A relatively shallow easterly dip is borne out by progressively smaller Bouguer anomaly values in regional gravity and featureless magnetics, indicative of a shallow underlying granite beneath the non-magnetic sediments.

The Two Sisters Granite is a fractionated S-type granite, comprising two phases, a medium-grained or porphyritic biotite granite and a coarse-grained pegmatitic phase

Previous exploration in the 1980s had identified several areas with high levels of uranium mineralisation. The geology is largely comprised of the Burrell Creek Formation of the Finnis River Group. The Burrell Creek Formation comprises greywackes, phyllites and schists and is described as brown to grey-green, thickly bedded to massive, fine to coarse feldspathic metagreywacke with graded bedding in places and minor lenses of volcanolithic pebble conglomerate; brown to grey, laminated phyllite, slate and mudstone. This formation is prospective for vein hosted uranium and gold and polymetallic veins

The Depot Creek Sandstone of the Tolmer Group is a sandstone and conglomerate sedimentary rock described as pink quartz sandstone with quartz pebble conglomerate **lenses** with a shallow marine environment of deposition. There is a small lens of the Stray Creek Sandstone, also from the Tolmer Group, conformably overlying the Depot Creek Sandstone. It is described as a quartz arenite, flaggy, micaceous and ripple marked.

### **3.3 Mineralisation:**

The first discovery of tin-tantalum pegmatites in the Northern Territory was near Mount Shoobridge in 1882 and was followed soon after by the discovery of tin (and tantalum) on the Cox Peninsula at Leviathan Creek (Bynoe pegmatite field) in 1886.

Since these discoveries, production of tantalum and tin from alluvial, eluvial and hard-rock deposits has been sporadic. The mining record indicates a total Northern Territory production of approximately 237 700 lb of Ta<sub>2</sub>O<sub>5</sub> and 442 t of tin (plus a further 549 t of tin concentrate prior to 1906), but production was probably considerably greater given the absence of production records prior to 1927, when much of the high-grade alluvial and eluvial ore was won.

A number of granites, potentially favourable as a source of Sn-Ta-bearing pegmatites are recognised from the Geoscience Australia geochemical database for the Northern Territory, such as the 'Allia Creek Suite' and Shoobridge Granite of the Cullen Suite in the west and southwest of the Pine Creek Orogen, are associated with known mineralised pegmatites..

The known tin-tantalum pegmatite fields are on the exposed western and southwestern margins of the Pine Creek Orogen. Their location on craton margins is typical of Proterozoic terranes.

The most important producing area is the Bynoe pegmatite field in the Litchfield pegmatite belt.

The Bynoe field includes several clusters (groups) of mineralised pegmatites that are probably located above the site of shallow apophyses of 'Allia Creek Suite' (Two Sisters) granite.

These mineralised pegmatites typically occur in linear swarms and range in size from a few metres long and less than a metre wide up to hundreds of metres long and tens of metres wide shaped typically as tabular or pod-like bodies and their orientation is steep to sub-horizontal.

of well-developed brittle-ductile deformation commonly bounding windows of undeformed or mildly deformed pegmatite.

The bulk mineralogy of surface pegmatites is typically quartz, muscovite, kaolinite, cassiterite, tantalite and columbite. Beryl and amblygonite may occur but are not common.

Most pegmatites display some degree of zoning; in most this consists of a narrow border zone of fine-grained quartz and muscovite. A core zone of massive quartz may be present in larger bodies.

Narrow, steeply dipping greisen zones and veins bearing cassiterite and tantalite are a common feature of mineralised pegmatites. The most common position for tin-tantalum mineralisation to occur is in the pegmatite wall zone. In the Bynoe pegmatite field, ore minerals occur in two generations.

Dating of tantalite, cassiterite (U-Pb SIMS) and greisen-associated muscovite (Ar-Ar) in pegmatites of the Bynoe pegmatite field indicates a mineralisation age of 1740–1720 Ma.

This age is irreconcilable with an 1845 Ma age attributed to the 'Allia Creek suite' and Two Sisters Granite (OZCHRON).

#### 4. Previous Exploration and company report references

Hardie, C 2011. Whitvista Annual Report for EL26257 West Batchelor.

Lally, J H 2002 Stratigraphy, Structure and Mineralisation, Rum Jungle Mineral Field, Northern Territory. NTGS

NTGS Department of Mines and Energy. 1999. Report 10 Atlas of the mineral Occurrences and Petroleum Fields of the Northern Territory

Wygralak, AS and Scrimgeour IR. December 2009. Gold Deposits of the Northern Territory Northern Territory Geological Survey

Ashton Mining / Aberfoyle Exploration., 1983, Ashton Mining / Aberfoyle Exploration, Final report on exploration, 12-01-1982 to 26-01-1983, Open File Report CR1983-0058.

Podolsky, MH., 1992, Stockdale Prospecting, EL 7190 (Roper River), first annual report to 13-03-1992, Open File Report CR1992-0161.

Bishop, SR., 2003, Rio Tinto Exploration Pty Ltd, First annual report for the period ending 8 July 2003, EL 22740 "Larrimah 1", EL 22741 " Larrimah 2", EL 22742 "Larrimah 3", EL 22743 "Larrimah 4", EL 22340 " Nutwood Downs" and EL 22343 "Kempsey Creek", Open File Report CR2003-0265.

Gravity Capital / Diamond Mines Australia / Rio Tinto Exploration / Ashton Exploration Australia., 2004, Gravity Capital / Diamond Mines Australia / Rio Tinto Exploration / Ashton Exploration Australia, Combined annual report on exploration activities, EL 22340, EL 22343, EL 22740, EL 22741, EL 22742 and EL 22743, year two of tenure, 9 July 2003 to 8 July 2004, Open File Report CR2004-0431.

Other Historic Reports covering the EL31300 area are in the table below.

Title ID	Reports	Holder	Grant Date	Cease Date	Title status
EL3052	CR1982-0375 final rpt for EL's 3052-3054, 3137, 2863,2864. Target: Sn, Ta ... low tenor results	Pan D'or	2/03/1981	29/12/1982	Historical
EL588	CR1973-0013. Target: Fe, U, to 62% Fe, CRA-U ... not worthwhile	Kobe Steel/CRA exploration? Nevsam mining company	1/09/1972	31/08/1973	Historical
EL2428	CR1982-0136, CR1981-0172 . Target: Sn, Ta ... some worthwhile results	Greenbushes/Greenbushes tin	14/01/1980	15/06/1981	Historical
EL1739	CR1980-0116, CR1979-0104. Target: U ... not worthwhile	CRA Exploration	29/11/1977	19/04/1979	Historical
AP2066	CR1970-0009. Target: Sn, Ta 25 .. auger holes, disappointing results	Australus mining	3/10/1969	2/10/1970	Historical
EL3234	CR1982-0136. Target: Sn, Ta, W at Bamboo creek prospect ... little potential	Not Recorded	14/07/1981	1/02/1983	Historical
EL2090	CR1983-0091, CR1981-0043. Target: U ... Very little hope of viability	AOG m inerals	23/04/1979	30/10/1980	Historical
EL1296	CR1983-0188, CR1982-0238, CR1981-0175, CR1980-0136, CR1979-0100, CR1978-0094: U,Base metals, further work unjustified	Uranerz, Australian mines administration	3/05/1977	2/05/1983	Historical
EL2140	CR1981-0284. Target: U .. Disappointing results	Otter Exploration	11/06/1979	31/07/1981	Historical
EL3054	CR1982-0375. Target: Gold .. Very Low prospects	Aztec mining company limited	2/03/1981	29/06/1983	Historical
EL8412	CR1998-0027, CR1996-0875. Target: Gold .. Very Low prospects	Aztec mining company limited	5/11/1995	4/11/2001	Historical
EL4068	CR1984-0272, CR1984-0134. Target: Diamonds ... No indicator minerals, tenement dropped	BHP Minerals	2/06/1983	1/06/1989	Historical
EL2048	CR1986-0184, CR1985-0069, CR1982-0135. Tatget: Sn, Ta ... follow up recommended, incomplete data results	Horizon Pacific	12/12/1980	11/12/1986	Historical
EL971	CR1980-0111, CR1979-0174, CR1978-0058. Target: U ... no drill targets identified	CRA Exploration	17/12/1976	16/12/1977	Historical
EL2131	CR1981-0074. Target: U, Base & Precious metals ... results not encouraging tenement relinquished	International Nickel	31/05/1979	31/01/1981	Historical
EL3288	CR1986-0192, CR1984-0079, CR1983-0156. Target: Sn, Ta .. Grades sub economic	Territory exploration/ C R Townsend	31/08/1981	18/03/1988	Historical

## 5. Work Completed – Litchfield Minerals Pty Ltd

An extensive review and search of open (and other)-file data and historic exploration reports was conducted by Litchfield Minerals covering ground in tenement EL 31300.

No field work was carried out on EL 31300 during the reporting year.

## 6. Conclusions

Due to a change in the companies' corporate structure during the reporting period and a subsequent tenement prospectivity review of licenses held by Litchfield Minerals, it was decided that EL31300 should be relinquished in full.

The fact that the tenement was wholly within the Litchfield National Park had a major bearing on the decision to surrender the tenement.

From a company viewpoint, advanced exploration let alone mining in a National Park presents operational challenges and hurdles, ultimately impacting on and limiting funding for exploration in such an environment.

## 7. Copyright statement:

The author (Michael Pustahya) of the annual report has reviewed publicly available information and data sets from the DPIR Strike website and information available from the sources noted in the bibliography on page 13, using such information in order to compile the body of the report.

Michael Pustahya authorises the Minister and the Department to copy and distribute this report without changes as needed.

## 8. Bibliography:

Frater KM, 2005. Tin-tantalum pegmatite mineralisation of the Northern Territory. *Northern Territory Geological Survey, Report 16*.

Ahmad M, 1995. Genesis of tin and tantalum mineralisation in pegmatites from the Bynoe area, Pine Creek Geosyncline, Northern Territory. *Economic Geology* 42, 519–534.

David Rawlings<sup>1,2</sup> 2017. Lithium-rich pegmatites of the Bynoe Field © Northern Territory Government March 2017. *Copying and redistribution of this publication is permitted but the copyright notice must be kept intact, and the source attributed appropriately.*