



4<sup>th</sup> October 2019

**RE: Mt Mulgine Targeted Declared Rare Flora Search, *Stylidium scintillans***

Claire McGuire  
Senior Environmental Advisor  
Tungsten Mining NL

Dear Claire,

Spectrum Ecology recently completed a Targeted Threatened Flora Survey for the Threatened Flora species, *Stylidium scintillans*. This species is known to occur in the vicinity of Tungsten's Mt Mulgine Project area. Botanists, Carmel Forrester and Raimond Orifici, conducted the survey for the Mt Mulgine tenements M59/425, E59/1324, M59/386 and M59/387 on the 5<sup>th</sup> – 7<sup>th</sup> September 2019.

There were no populations of the Threatened Flora species *Stylidium scintillans* found in the study area. Please see the memo report detailing the results of this assessment

Please contact me if you require any further information in relation to the above.

Yours sincerely,  
Carmel Forrester  
Botanist

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## INTRODUCTION

### Scope of works

Tungsten Mining NL (Tungsten Mining ) is developing the Mt Mulgine Project (Mt Mulgine or the Project) which is located in the Yalgoo bioregion of Western Australia (Thackway & Cresswell, 1995). The Project consists of two main areas; the Mulgine Hill and the Mulgine Trench deposits. Both are within the tenement M59/425. Additional proposed site infrastructure includes a Processing Plant and ROM Pad, Waste Rock Landforms, Stockpiles, Tailings Storage Facility, and Camp facilities which will be located within the M59/425, M59/387 and M59/386 tenements.

Tungsten Mining engaged Spectrum Ecology to undertake a Flora and Vegetation Assessment and Targeted Threatened Flora Survey for *Stylidium scintillans* in tenements M59/425, E59/1324, M59/386 and M59/387. The targeted assessment of these combined four tenements will be referred to as the "Study Area" (see Figure 2). This Memo outlines the findings from the Targeted Threatened Flora Survey for *Stylidium scintillans* conducted in September 2019.

### Targeted Threatened Flora Species *Stylidium scintillans*

Database searches and previous surveys for the Mt Mulgine Flora and Vegetation study area indicate that the Threatened Flora (TF) species, *Stylidium scintillans*, is known to occur in the vicinity of the Mt Mulgine Project Area (see Figure 1).

Three previously recorded locations of *Stylidium scintillans* were documented in the vicinity of the Mt Mulgine Project Area. These populations are west (1.2 km) and north-west (1.6 and 2.0 km) of tenement M59/425 and mapped in Figure 1. Co-ordinates for the existing populations are not available publicly and have been excluded from this memo. Co-ordinates can be supplied separately to TGN upon request.

Prior to the field survey, Spectrum's botanists familiarised themselves with *Stylidium scintillans*, including the appearance, size, form, diagnostic features, distribution, habitat, phenology, associated species, and associated geology. The botanists also thoroughly read and discussed the journal article defining microgeophytic triggerplants (Wege, 2012). This journal article contains a taxonomic key to identify *Stylidium scintillans* and was utilised throughout the field survey.

Authorisation to Take or Disturb Threatened Species was obtained for this targeted survey (Authorisation Number: TFL 59-1920). A copy of this can be supplied upon request. Requirements for this licence are understood and were adhered to during the Targeted Survey.

## METHODOLOGY

### Survey Timing

The Targeted Flora Survey was conducted by two botanists from the 5<sup>th</sup> to 7<sup>th</sup> September 2019 (six person days).

Field survey timing was selected to coincide with the optimal flowering season of *Stylidium scintillans* as stipulated in Section 3.1.5 of the Threatened and Priority Flora Report Form – Field Manual (DBCA 2017). *Stylidium scintillans* flowers from early August to mid-September (Wege, 2012). Peak flowering time is subject to rainfall and seasonal variation.

## Project Team

Details on the field team for the Targeted Threatened Flora survey are included in Table 1.

**Table 1: Project Team**

Botanist	Qualification	Experience	License
Carmel Forrester	BSc.(Sust Dev)	5 years	FB62000134 TFL 59-1920
Raimond Orifici	BSc (Hort. Hons)	15 years	FB62000158

## Survey Effort

Botanists, Carmel Forrester and Raimond Orifici, traversed potential habitats likely to contain the TF species, *Stylidium scintillans*, occurring within TGN's Mt Mulgine tenements M59/425, E59/1324, M59/386 and M59/387.

Prior to field mobilisation, potential habitat sites were selected using aerial imagery, taking into account the known populations, habitat, and associated geology. During the survey, the closest known population of *Stylidium scintillans* was located and assessed. Potential habitat selection was refined considering this field information.

When ground-truthing the potential habitat areas, each potential habitat was classified as optimal to unsuitable, based upon associated geology, vegetation and soil. This classification is outlined in Table 2 and mapped in Figure 2.

For areas identified as optimal habitat, the botanists walked transects with 5 m spacing. For areas of sub-optimal habitat, 50 – 100m spacing was used. Boundaries of selected rocky outcrops or breakaways were traversed.

There were no areas of optimal habitat found in the study area.





Potential and known BIF locations were confirmed with the site Geologist, Henry Thomas. There are no known BIF locations in the study area. All areas of interest were targeted and sufficiently searched.

Locating the known *Stylidium scintillans* population strengthened the survey effort, ensuring:

- Appropriate habitat areas were traversed;
- Appropriate geology was targeted;
- Seasonal field survey timing was accurate; and
- Field effort direction was accurate.

Thirty-two individual plants of varying life stages were recorded from the known population. This population was searched and recorded in accordance with the DBCA's requirements for assessment of Threatened Flora populations (DBCA 2017). The Threatened and Priority Flora Report Form will be submitted to the DBCA Threatened Species & Communities Branch by the 10<sup>th</sup> October 2019.

Table 2: Classification of *Stylidium scintillans* Potential Habitat

Habitat Classification	Rock Type	Soil type	Associated vegetation	Notes	Photo
Optimal Habitat	Heavily weathered granite, BIF, Break aways and bedrock.	Clay loam	Present	Sunny patches, isolated clumps of leaf litter. Very little sand between	
Sub-optimal 1	Bedrock outcrop with loose boulders. Hillslope +/- southern aspect. +/- BIF	Sandy	Present with other shrubs	Open/exposed areas with abundant leaf litter and shade	
Sub-optimal 2	Bedrock outcrop on flats or footslopes. +/- Hillslope BIF absent	Sandy Clay	Present	Open/exposed areas with sand between	
Unsuitable	+/- Bedrock Quartz or claypan. Cleared or degraded area.	Sand or Clay loam	Absent	Sandy soils or degraded vegetation.	

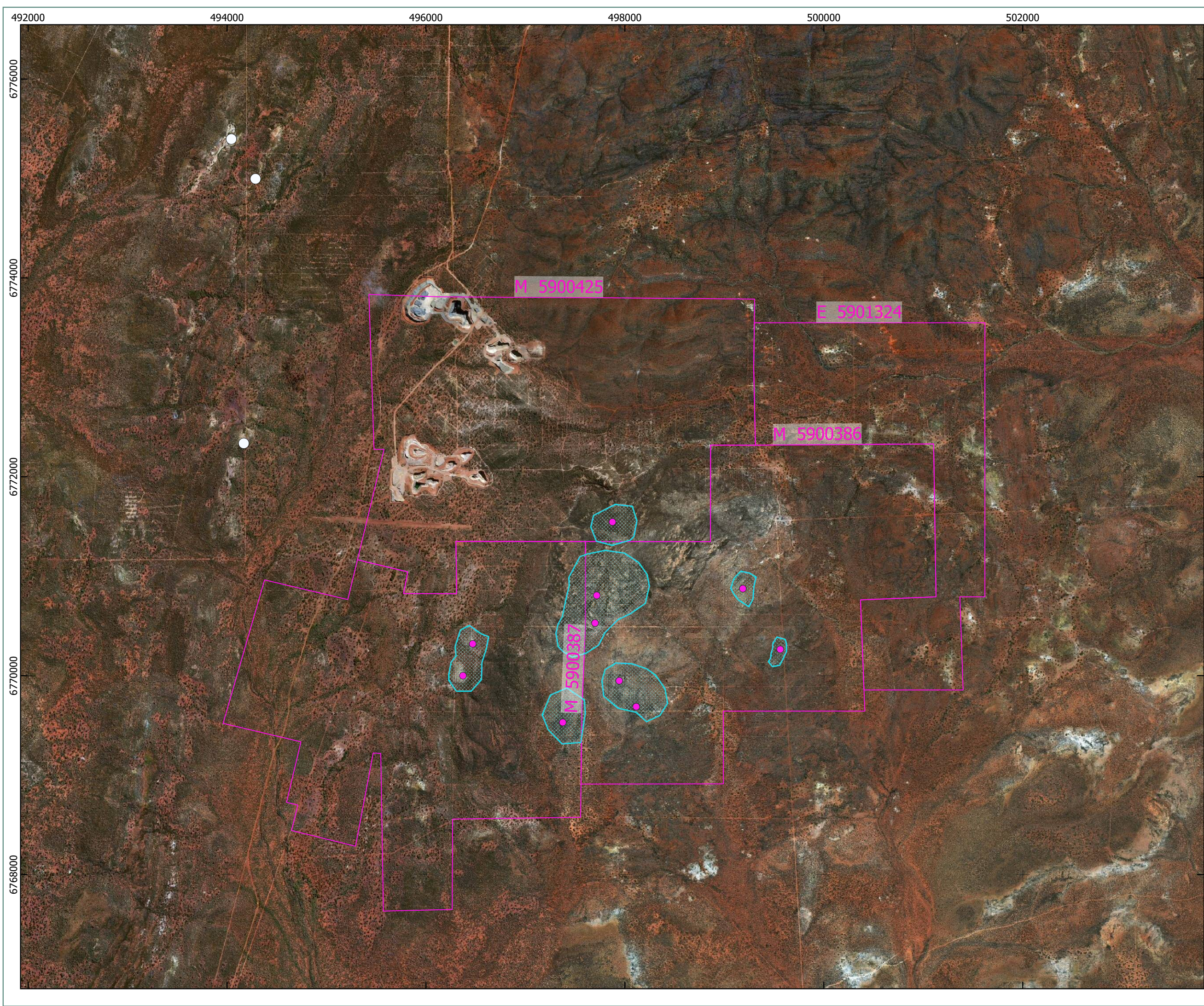
## Requirements for Assessment of Threatened Flora Populations

The Department of Biodiversity, Conservation and Attractions require location, sighting or collection information to be submitted on a Threatened and Priority Flora Report Form when a population of Conservation Significant flora is recorded.

The technical guidance for recording Threatened Flora is outlined in the Threatened and Priority Flora Report Form – Field Manual (DBCA 2017) and requires recording the following criteria:

- Comment on species presence/absence
- Land Access Permission granted
- Description of location including:
  - Photo;
  - Waypoint co-ordinates;
  - Map;
  - Vegetation Description; and
  - Nearest town and directions to get to location without co-ordinates
- A boundary polygon of the population, where population boundaries are defined by no more than 500 m between plants and not separated by tenure or abiotic feature;
- Number of minutes spent searching per 100 m<sup>2</sup>;
- Area of population in m<sup>2</sup>; and
- Records of life stages of plants including dead plants.

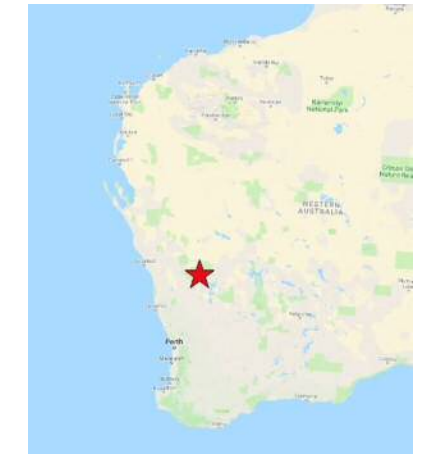





**Legend**

Location of *Stylidium scintillans*

- Known Populations
- Potential Occurrence
- ▨ Pre-field Potential Habitat Selection
- Tungsten Tenements



 0 0.3 0.6 0.9 km  
Scale 1:35000 @ A3

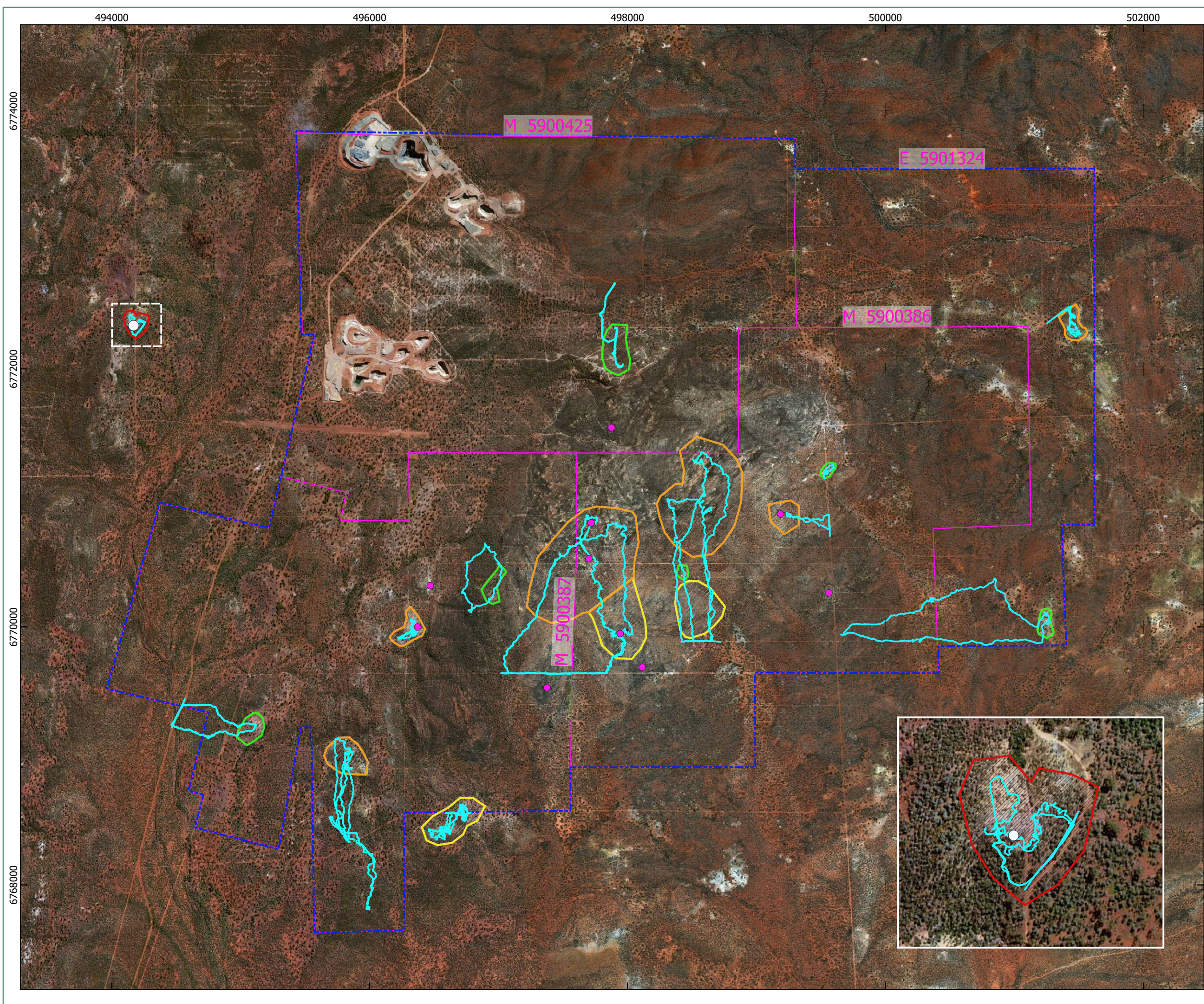
Coordinate System: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Units: Meter

Author: CF    Approved: AH    Date: 09-10-2019

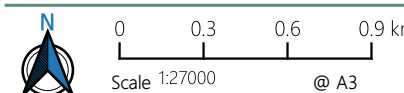
Known *Stylidium scintillans*  
Locations and Pre-field Sites

Mt Mulgine Project





- Legend**
- Location of *Styliidium scintilans***
- Known Populations
  - Potential Occurrence
- Field Traverse
- ▭ Targeted Fora Survey Study Area
- ▭ Tungsten Tenements
- Field Habitat Classification**
- ▨ Optimal
  - ▨ Sub-Optimal 1
  - ▨ Sub-Optimal 2
  - ▨ Unsuitable



Coordinate System: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Units: Meter

Author: CF    Approved: AH    Date: 09-10-2019

Field Survey Effort

Mt Mulgine Project



## RESULTS & DISCUSSION

There were no *Stylidium scintillans* (Threatened) populations recorded in the study area.

It is unlikely that any *Stylidium scintillans* populations occur in the study area, given that:

- All areas of potential habitat were adequately searched;
- There was no optimal habitat recorded in the study area;
- The field botanists had sufficient experience and information to conduct the targeted search and identify the species; and
- Field survey timing was optimal.

## LIMITATIONS AND CONSTRAINTS

Table 3: Limitations and Constrains of the Targeted Survey

Limitation	Constraint	Comment
Availability of contextual information at a regional and local scale.	No	Database searches were conducted prior to the survey.
Competency/experience of the team carrying out the survey, including experience in the bioregion surveyed.	No	The field botanists Carmel Forrester and Raimond Orifici have suitable experience conducting botanical surveys in Western Australia.
Proportion of flora recorded and/or collected, any identification issues.	No	The known <i>Stylidium scintillans</i> population was found in suitable condition to conclusively identify. There were no <i>Stylidium</i> species found in the study area.
Was the appropriate area fully surveyed (effort and extent).	No	All areas of potential habitat were sufficiently searched
Access restrictions within the survey area.	No	Access to some rocky break-aways was difficult. There were no vehicle tracks to the central foothills. However the south western foothills were adequately searched and found to be sub-optimal habitat for <i>Stylidium scintillans</i> .
Survey timing, rainfall, season of survey.	No	The field survey was conducted in September during the optimal flowering time of the targeted species, <i>Stylidium scintillans</i> . This is in accordance to the Threatened Priority Flora Report Form – Field Manual. Location of the known population of <i>Stylidium scintillans</i> confirmed that the species was in flower at the time of the survey.
Disturbance that may have affected the results of survey such as fire, flood or clearing.	No	No disturbances were recorded at the study area that have affected the results of the survey.



## REFERENCES

- Department of Biodiversity Conservation and Attractions. (2017). *Threatened and Priority Flora Report Form - Field Manual*. Department of Biodiversity, Conservation and Attractions.
- Thackway, R., & Cresswell, I. D. (1995). *An Interim Biogeographic Regionalisation for Australia (IBRA)*.
- Wege, J. A. (2012). Navigating the floral Milky Way: the taxonomy of the microgeophytic triggerplants (*Stylidium petiolare* and allies: Stylidiaceae). *Australian Systematic Botany*, 25(2), 138–169. Retrieved from <https://doi.org/10.1071/SB12001>