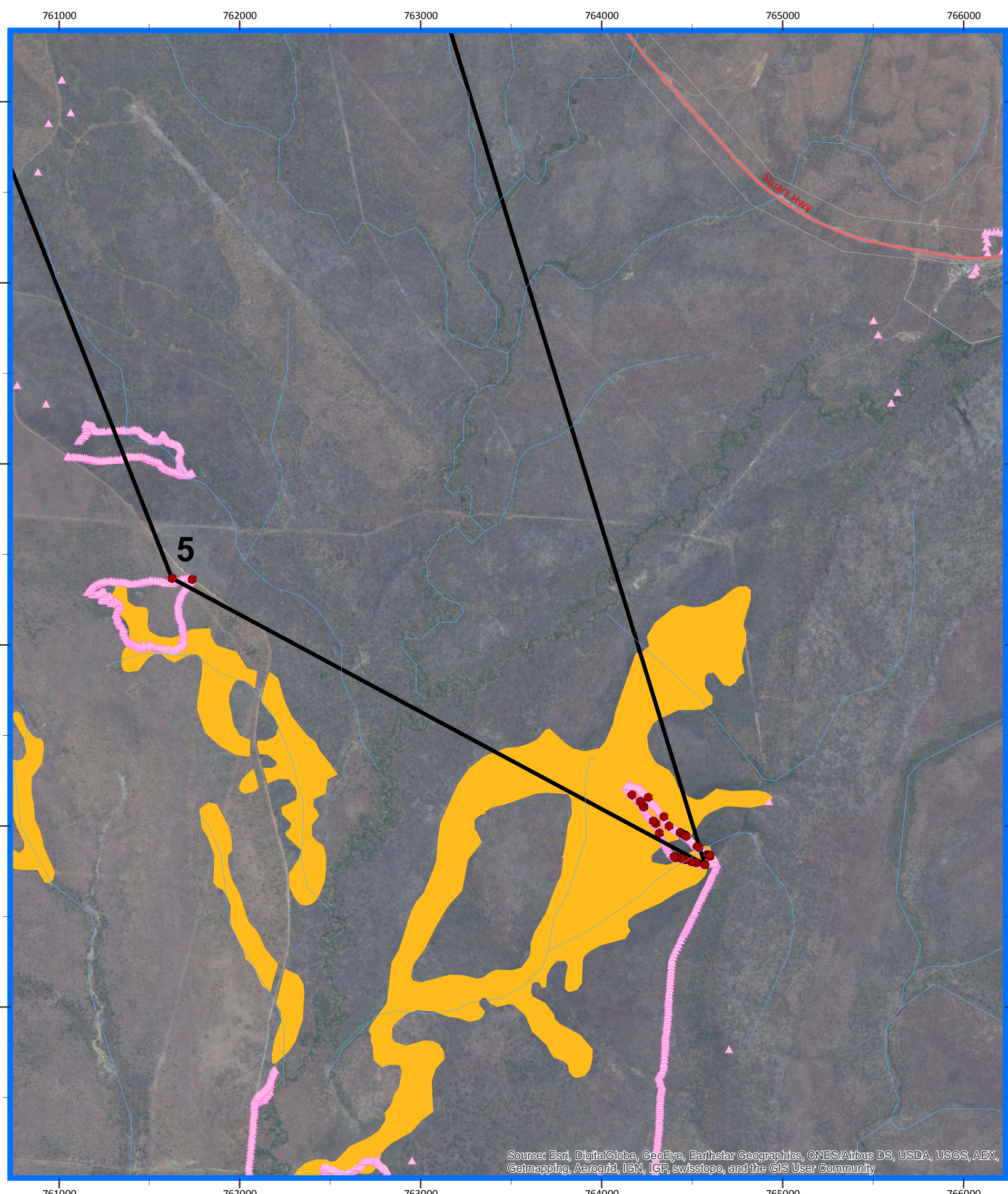
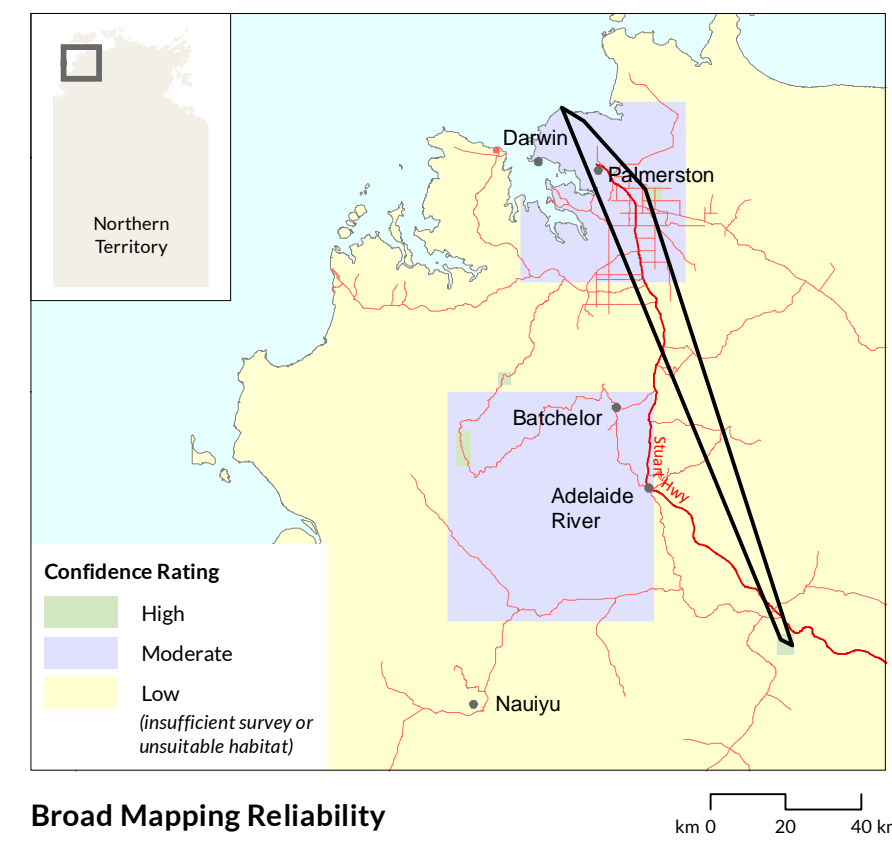
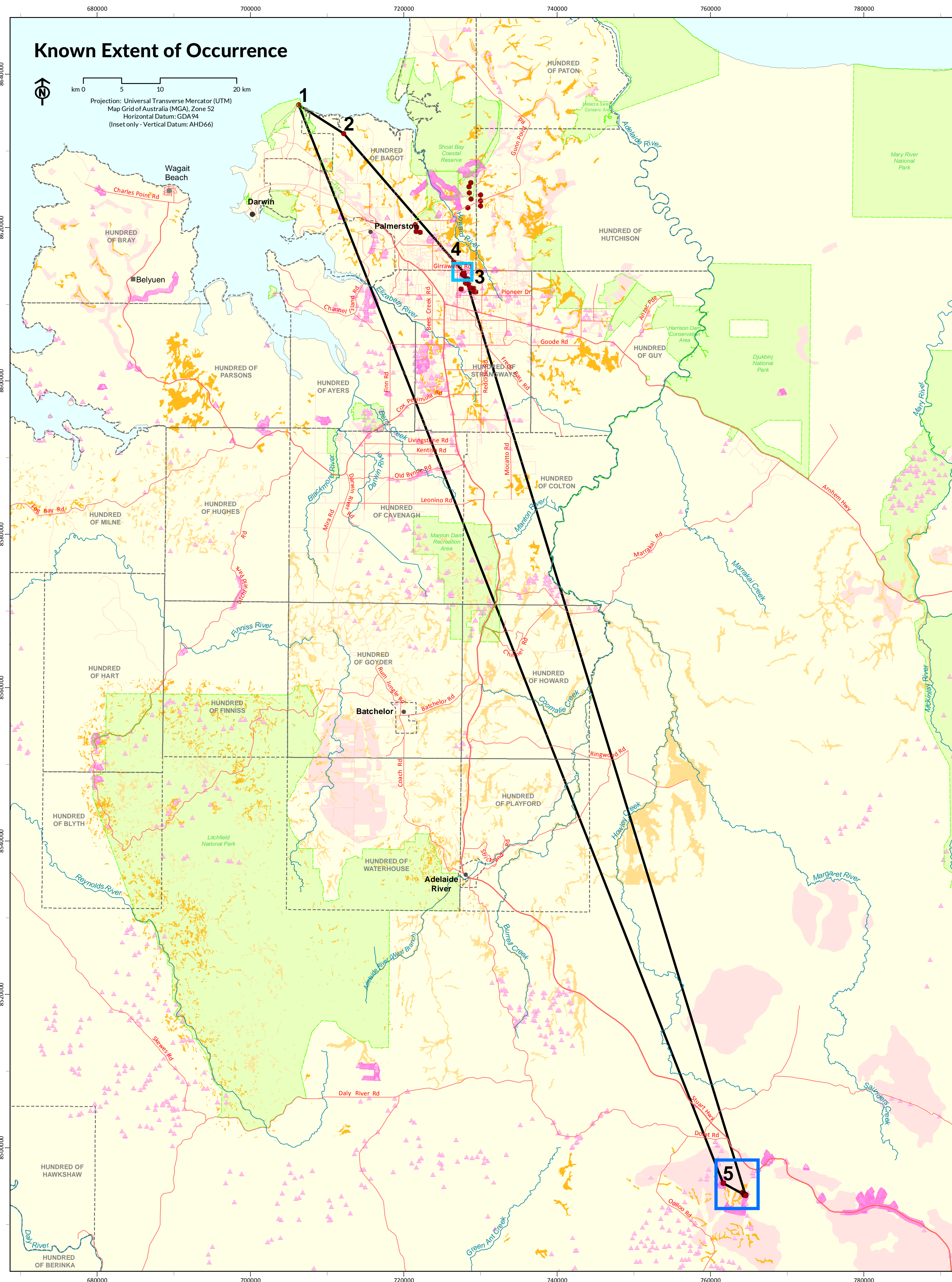


**Inset - Intensive Survey Area: Girraween**



**Inset - Intensive Survey Area: Hayes Creek**



- LEGEND**
- 1 Recorded species location (point)  
Subpopulation location reference number \*
  - Confirmed Absence
  - Extent of Occurrence (ECO) Minimum Convex Polygon
  - Potential Habitat
    - Highest Suitability
    - Moderate Suitability
    - Lowest Suitability Not displayed on inset maps
  - NT Park/Reserve
  - Cadastre (hundreds)
  - Cadastre (parcels) Main map: land parcels > 1km<sup>2</sup>, Inset: all land parcels shown
  - Contours (Inset) scale 1:25 000
  - Index (25m intervals)
  - Intermediate (5m intervals)

\* Subpopulation location reference number  
Details about species population density are described in the table, Population Status of *Styliodium ensatum*, June 2016, in the attached Guidelines for Map Use.

\*\* Potential Habitat  
Represents the most suitable areas for *Styliodium ensatum* within the land units thought to be most closely associated with the distribution of the species in the Darwin region. These areas represent the margins of the lateritic plateau and associated low hills and rises, generally with lower upper-storey tree cover and more open ground-layer vegetation. Unsuitable Land Use types were erased to create the final dataset.

Data Source  
Flora Data and Surveys:  
- Flora and Fauna Division, Department of Land Resource Management  
Potential Habitat:  
- Rangelands Division, Department of Land Resource Management  
Land Resource survey details described in the Guidelines for Map Use  
Major Mine Streams: scale 1:250 000  
- © Commonwealth of Australia (Bureau of Meteorology) 2012  
NT Parks and Reserves:  
- Parks and Wildlife Commission of the Northern Territory  
Cadastre/Roads/Placenames/Contours/Imagery:  
- Department of Lands, Planning and Environment  
Aerial Photography (Inset Girraween) - NTLIS WMS Image Server, DLPE  
Aerial Photography (Inset Hayes Creek) - ESRI DigitalGlobe, GeoEye, Earthstar /Geographics

**CONTENTS**

Page 1 of this document contains an Interactive PDF Map.  
Use Adobe Reader and open the left panel to review individual map layers.  
Users are encouraged to hide/show layers to find out more about this species' distribution, particularly in the inset maps, where some layers may mask layers underneath.  
Scroll to Page 2 to read the Guidelines for Map Use.

**USE OF MAP**

Maps of Threatened Species Distributions in the Greater Darwin Area should be interpreted with the attached Guidelines for Map Use. Scroll to page 2.  
This map provides the most up to date available information regarding the known distribution and extent of the species at the time of publication.  
Refer to the [NT GOV website](http://nt.gov.au) to view Threatened Species Information Sheets.  
Refer to <http://eflorant.gov.au> our online resource for Northern Territory's flora.

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Map compiled: 5/07/2016  
Caroline Green and Nicholas Cuff, Department of Land Resource Management



**NORTHERN TERRITORY GOVERNMENT**  
For further information, please contact:  
Flora and Fauna Division  
Department of Land Resource Management (DLRM)  
CSIRO Complex, 564 Vanderlin Drive, Berrimah NT 0828  
Web: <https://nt.gov.au/environment/native-plants>

**Threatened Species Distribution in the Greater Darwin Region**  
*Styliodium ensatum*



Department of Land Resource Management

[Flora and Fauna Division](#)

July 2016, Version 1.0

## Threatened Species of the Greater Darwin Region - *Stylidium ensatum*

### Guidelines for Map Use

Data used to compile this map product is current at the date of publication. Users are encouraged to check the project [Metadata record](#) for more recent versions of this map product.

1. **Potential habitat mapping** is principally derived from historical land resource survey information collected using a range of methods and technologies since the 1960's. Consequently the accuracy of this data at fine scales may be limited by the resolution of the original data. Site based assessment at an appropriate intensity should accompany use of this map data for all areas.

**More detail:** Potential habitat mapping is derived from Land Unit and Land System Mapping conducted at scales ranging between 1:25, 000 and 1:250, 000. These map products were derived using aerial photography interpretation and digitized on a range of mapping bases between the mid-1960's and the 1990's. It should be noted that the potential habitat mapping has an inherent level of spatial inaccuracy associated with the scale and methods of production used to derive the original Land Unit Mapping. These spatial inaccuracies are principally a function of the age of the surveys and the technology available at the time to produce the ORIGINAL maps, the mapping base (topographic or cadastral) on which the original hard-copy mapping was produced and the process of transferring these products to digital media at a later date. The scale of the original mapping was at best 1:25, 000 in parts and enlarging the mapping beyond this scale does not provide further detail.

2. **The extent of potential habitat displayed on the map** is current at the publication date of the latest available land use data for the region.

**More detail:** Areas of remaining potential habitat were identified by intersecting the most up-to date land-use information to exclude areas of intensive land-use and/or cleared areas now unlikely to support viable potential habitat for the species. Data on the extent of remaining potential habitat is current to 2008 and it is likely that the area of remaining intact viable habitat differs from that indicated on the map. This is particularly true in the peri-urban region of Darwin where current land uses do not reflect the historic mapping of the area. This may result in areas of indicated potential habitat no longer existing or conversely transitional vegetation regrowing after historic land-use changes may provide additional habitat not accounted for by the mapping data (e.g. Inset 1 on map).

3. **The map should be used as a guide to identifying the probability that the species is present** in any particular area and not a definitive assessment of distribution. The map can be used to assess the risk associated with a particular activity at a location and the likelihood that the activity may result in a significant impact upon a (sub-) population of a threatened species.

**More detail:** The land units and land systems identified as potential habitat on the map represent those most likely to support populations of *Stylidium ensatum* based on current ecological

knowledge at the date of publication. They do not identify all areas where the species may occur and conversely *S. ensatum* is highly unlikely to occur in all the areas identified on the map as potential habitat. The map should be used as a guide to identifying the probability that the species is present in any particular area and not a definitive assessment of distribution. The map can be used to assess the risk associated with a particular activity at a location and the likelihood that the activity may result in a significant impact upon a population of a threatened species.

4. **Highest likelihood of occurrence** of *Stylidium ensatum* appears to be associated with areas of low-lying, poorly drained sandy soil (sandy wetlands) with a water regime that results in free-water or saturated soil moisture conditions at/near the land surface for an extended part of the year (i.e. into the mid-late dry season (August)). These areas have been mapped using historic land survey information and inherent inaccuracies in the mapping data, discussed previously, may result in known locations of *S. ensatum* falling outside of the potential and most suitable habitat areas.

**More detail:** At a finer spatial resolution, current understanding of the distribution of *S. ensatum* indicates that the occupancy envelope for appears to be centred on those parts of the landscape where saturated soil profiles (Hydrosols) or free surface water persist into the mid-late dry season (i.e. the parts of the landscape which remain 'wet' into July/August). These particular edaphic conditions are further limited by what appears to be a preference for low-nutrient, sandy soils somewhat atypical of low-lying topographic positions and wetlands in the Top End.

A buffer was not applied to the boundaries of the potential habitat polygons in this instance as the potential habitat is considered to significantly limit the likelihood that the species occurs beyond the boundaries of these polygons and is more likely to be restricted to core central areas within the potential habitat where water persists in the landscape for longer periods. Currently available spatial information regarding water body persistence and regolith composition does not correlate well with the hypothesised distribution of the species. Consequently, a precautionary approach was adopted in identifying areas of highest likelihood of *S. ensatum* occurrence and all potential habitat was considered of uniform significance in his assessment. Consequently, occurrences of *S. ensatum*, may fall outside the mapped areas inferred as most likely support the species as a result of issues associated with inaccuracies in the potential habitat mapping and site-scale variations in habitat conditions and/or error associated with the positional accuracy of the species record. As with any natural resource spatial product, it is recommended that this information be used as a guide to the most likely areas in which *S. ensatum* may be encountered and should be accompanied by appropriately timed field survey to clarify the presence or absence of the species from a particular location more definitively.

5. **Confirmed absence locations** represent detailed floristic survey sites sampled at an appropriate time of year where *Stylidium ensatum* was not recorded.

**More detail:** Targeted search locations (absence) data are full-floristic sites sampled within the expected distribution of *Stylidium ensatum* over a number of years between June and August. These sites represent locations sampled at an appropriate time of year where *S. ensatum* was not recorded and collection data suggests the species should be present and most detectable. Surveyed sites were largely sampled using a standardised methodology (Brocklehurst et al. 2007) by experienced NTG botanical staff and represent the best available information on the known distribution of the of the taxon within the Darwin Region. This does not definitively imply that the species was not present at the location given the cryptic life history of the taxon and the seasonal conditions at the time of sampling. However, it can be considered to represent the temporal 'window' of maximum-likelihood that the species would have been detected if it was present at the time of sampling.

6. **'Point' data on the occurrence** of *S. ensatum* represent vouchered individual specimens or discrete locations at which the species has been recorded in the field.

7. **Mapping reliability (Confidence Rating)** has been assigned to areas in which varying intensities of field assessment have been undertaken or are considered to represent suitable habitat for the species. These generically range from 'High' being high-intensity, targeted, species specific surveys or areas in which confirmed sub-populations are known to occur through to 'Low' where reconnaissance level or incidental surveys have been undertaken or habitat is considered unsuitable.

**More detail:** In the broader regional context (represented on the location map) areas within the greater Darwin region where appropriately timed general surveys have not encountered the species are considered a moderately reliable indication of species presence/absence based on the intensity of field data collection.

At the finer scale within the Extent of Occurrence (EoO – represented by the inset maps), the confidence levels have been combined with the potentially suitable areas (i.e. highest likelihood of occurrence) to give an indication of the confidence in not only the level of survey undertaken, and therefore, the presence/absence of the species, but also the presence of habitat suitable for the species. Areas where targeted surveys have been undertaken are considered highly reliable, whereas areas of low reliability within the EoO are indicative of unsuitable habitat (e.g. wetlands or built up areas)

## References

<b>Name</b>	<b>More Information</b>
Mapped Distribution for Threatened Species of the Greater Darwin Region Project description, metadata record	<ul style="list-style-type: none"> <li>• <a href="#">Metadata</a></li> </ul>
Bean A.R. (2000) <i>Threatened Species of the Northern Territory Stylidium ensatum</i> Department of Land Resource Management, Palmerston. (sourced from <a href="#">Flora NT website</a> )	<ul style="list-style-type: none"> <li>• <a href="#">Web Details</a></li> <li>• <a href="#">Information sheet</a></li> </ul>
Brocklehurst, P., Lewis, D., Napier, D. and Lynch, D. (2007) <i>Northern Territory Guidelines and Field Methodology for Vegetation Survey and Mapping.</i> Technical Report No. 02/2007D, Department of Natural Resources, Environment and the Arts, Palmerston, Northern Territory.	<ul style="list-style-type: none"> <li>• <a href="#">Report (NT Library)</a></li> </ul>
<i>Land Unit Mapping of the Greater Darwin Region</i> (survey scale 1:25 000) This is a compilation of 16 land resource surveys - from 1979 to 1986 Report links are noted in the Metadata record.	<ul style="list-style-type: none"> <li>• <a href="#">Metadata</a></li> </ul>
Hill J.V., Fett D., Perrett F. (2002) (survey scale 1:25, 000) <i>Land Resources of the Lower Finniss</i> Technical Report 19/2002, Natural Systems Division, Department of Infrastructure Planning and Environment, Northern Territory	<ul style="list-style-type: none"> <li>• <a href="#">Metadata</a></li> <li>• <a href="#">Report (NT Library)</a></li> </ul>
<i>Land Resources of the Daly Basin</i> (survey scale 1:50, 000) This is a compilation of 9 land resource surveys - from 1972 to 1995 Report details are noted in the Metadata record	<ul style="list-style-type: none"> <li>• <a href="#">Metadata</a></li> </ul>
Forster B.A. and Fogarty P.J. (1975) (survey scale 1:25, 000) <i>Report on the Land Units of Mount Bunday Station</i> Land Conservation Section, Animal Industry and Agriculture Branch, Department of Northern Australia, Darwin, Northern Territory	<ul style="list-style-type: none"> <li>• <a href="#">Metadata</a></li> <li>• <a href="#">Report (NT Library)</a></li> </ul>

Name	More Information
<p>Olsen C.J. (1985) (survey scale 1:50, 000)  <i>A Report on the Land Units, Erosion and Land Use with the Catchment Area of the Proposed Warrai Dam</i>            Technical Memorandum No 85/5, Land Conservation Section, Conservation Commission of the Northern Territory, DARWIN, NT.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Metadata</a></li> <li>• <a href="#">Report (NT Library)</a></li> </ul>
<p><i>Land Systems of the Northern Part of the Northern Territory (1:250, 000)</i>            This is an amalgamation of 18 land resource surveys (from 1961 to 2011)            Report details are noted in the Metadata and summary report from NT Library</p>	<ul style="list-style-type: none"> <li>• <a href="#">Metadata</a></li> <li>• <a href="#">Report (NT Library)</a></li> </ul>
<p>Trueman, M. and Cuff, N. (2014) (survey scale 1:100, 000)  <i>Provisional Vegetation Types over Litchfield National Park (digital data only)</i>            Rangeland Division, Department of Land Resource Management, Palmerston, Northern Territory.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Metadata</a></li> </ul>
<p><i>Land Capability of the Coomalie Shire (2009)</i> (survey scale 1:25, 000)            This is a compilation of 9 land resource surveys describing Land Capability.            Report details are noted in the Metadata record</p>	<ul style="list-style-type: none"> <li>• <a href="#">Metadata</a></li> </ul>
<p>Berghout, M. Robinson, H. and Owen, G. (2008)  <i>Revised Land Use Mapping of the Northern Territory</i>            Tech Report No. 20/2008D, Department of Natural Resources, Environment, the Arts and Sport, Northern Territory</p>	<ul style="list-style-type: none"> <li>• <a href="#">Metadata</a></li> <li>• <a href="#">Report (NT Library)</a></li> </ul>

## Population status of *Stylidium ensatum* (July 2016)

<b>Sub-population Reference no</b>	<b>Status</b>	<b>Size</b>	<b>Trend</b>	<b>Pressures</b>	<b>Uncertainties</b>	<b>Current Knowledge State</b>
<b>1</b> Lee Point	Extinct?	Unknown – likely extinct	Demonstrable decline	Weed incursion	Extent and status of the sub-population unknown – likely to be extinct.	Extensive searches at the correct time of the year have not relocated this sub-population in recent years. Previously recorded locations are now dominated by invasive exotic species which are highly likely to outcompete <i>S. ensatum</i> at these locations.
<b>2</b> Shoal Bay Conservation Reserve	Unknown	Unknown	Unknown	Management Weed incursion	Geocode precision for collection unlikely to be high. Current status of sub-population, unable to be relocated in area to date. Longer-term security and viability of sub-population.	Only one individual confirmed during inspection for subdivision (EcOZ, 2015). Current status of sub-population unknown.
<b>3</b> Giraween Road	Extant	<100 individuals	Unknown	Management Weed incursion	Mechanisms for conservation on-site given potential development unknown at this point in time.	Additional sub-population located in 2014 Well documented and identity verified. Large sub-population, uncertain if connected with Noonamah South?
<b>4</b> Mc Minns Lagoon	Unknown	Unknown	Unknown	Adjacent development Management Weed incursion	Geocode of collection appears incorrect	Population unlikely to be extant at location if the original geocode was correct.
<b>5</b> Hayes Creek	Extant	<100 individuals; patches vary	Unknown	Management	Mechanisms for conservation on-site given potential development unknown at this point in time.	Relocated in 2014 in the vicinity of the original collection by S.T. Blake in 1946. Identity verified. The geocode for the S.T.Blake collection is assumed to be the same as the 2014 collection location.

**Extent of Occurrence**<sup>1</sup> (excluding ocean)  
**1 085 km<sup>2</sup>** Total EoO;  
**81 km<sup>2</sup>** Conservatively estimated potential habitat within currently known extent; &  
**30 km<sup>2</sup>** Potential habitat with highest likelihood of occurrence within the currently known extent.

**Area of Occupancy**<sup>1</sup> **4 (5)** Number of 2 km<sup>2</sup> cells within which mapped records occur (brackets represent ALL historical records\*)

**Estimated Area of Occupancy at Reference Scale: 88 km<sup>2</sup>**

\*Field evidence suggests at least one of these AoO cells is no longer occupied.

<sup>1</sup> International Union for Conservation of Nature (IUCN) Standards and Petitions Subcommittee. (2014). *Guidelines for using the IUCN Red List categories and criteria*. Version 11. Prepared by the Standards and Petitions Subcommittee. <http://www.iucnredlist.org/documents/RedListGuidelines.pdf>