

## Species with uncertain taxonomic status that require further review

### *Acacia doreta* long phyllode form (G. Cockerton & S. Cockerton WB38633)

*Acacia doreta* long phyllode form has been previously reported as *Acacia grasbyi* between Leinster and Mt Keith to date in previous reports prepared by Western Botanical. It is a small tree to 6 m high with terete foliage to 8 cm long and narrow flat pods to 3 mm wide and red miniritchie bark (Plate 16). A review conducted by Bruce Maslin of the abundant material collected on Yakabindie Station in late spring 2016 found that the longer phyllodes (to 8 cm) and the narrow fruits of the plants between Leinster and Yakabindie warrant recognition of an infra-specific taxon. *Acacia doreta* long phyllode form occurs on basalt outcrops, common in parts of the Mt Keith – Perseverance fault line, both within and outside the Violet Range PEC. The substrate preferred by *Acacia doreta* long phyllode form contrasts strongly with the sandplains and limonitic landforms of the typical form of the species.

*Acacia doreta* short phyllode form (type of the species) is widespread (Figure 49), and more commonly encountered in the Pilbara, Little Sandy Desert and Gibson Desert biogeographic regions in W. A., and into the western central part of the Northern Territory. *Acacia doreta* long phyllode form is more commonly encountered in the Murchison biogeographic region.



**Plate 16.** *Acacia doreta* long phyllode form, Yakabindie Station, MKS Proposal Study Area, October 2016.

Both forms of the species are widespread and abundant and neither warrant conservation listing.

56 results for text:acacia doreta

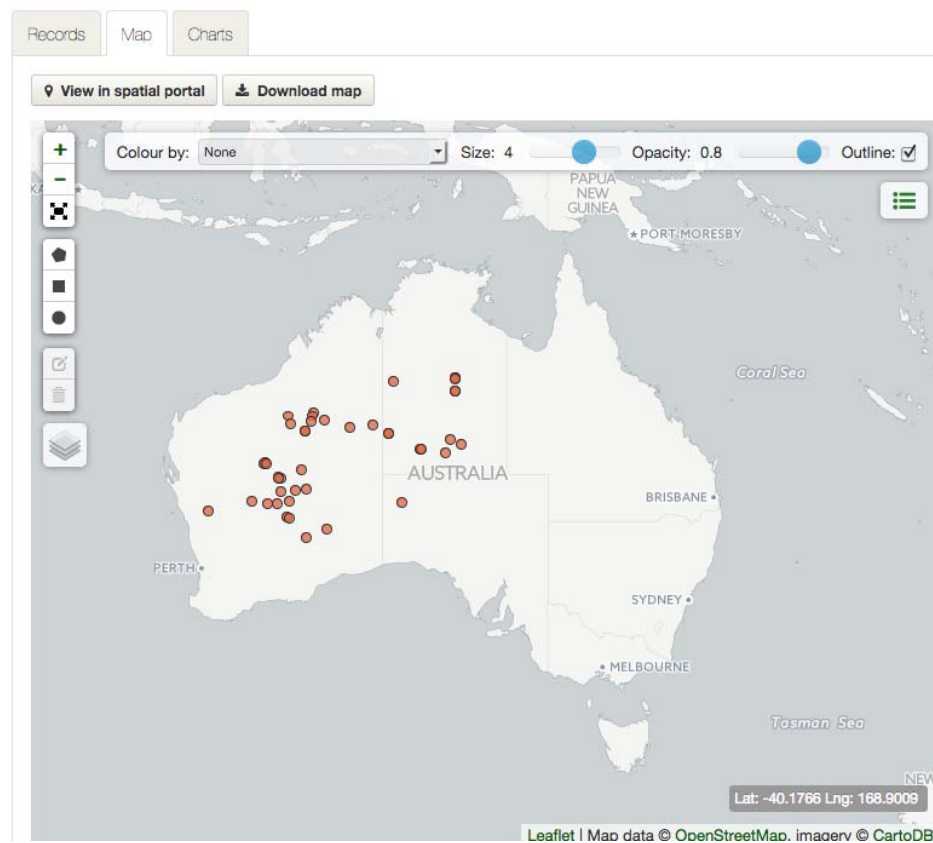


Figure 49. Distribution of *Acacia doreta* in Australia (AVH, February 2017).

***Acacia subtessarogona* (flat pod form) (G. Cockerton WB38658)**

*Acacia subtessarogona* (flat pod form) (G. Cockerton WB38658) is a multi-stemmed (branching above ground level) shrub to 4 m high with pale green flat phyllodes to 12 cm long x 12 mm wide and notably flat pods to 8 cm long x 8 mm wide x 3 mm thick, (Plate 17).

A review of specimens held at the WA Herbarium found that typical *A. subtessarogona* has a pod that is markedly quadrangular in cross section, compared with the flat pod of the three vouchered specimens from Yakabindie, Wiluna and Meekatharra. Further, there is a strong disjunction in the distribution of the two forms, with the typical form being common between Exmouth and Carnarvon in the western Gascoyne, while the flat pod form is known from a few scattered collections near Meekatharra, Yakabindie Station, Wiluna and one in the Great Sandy Desert (Figure 50).

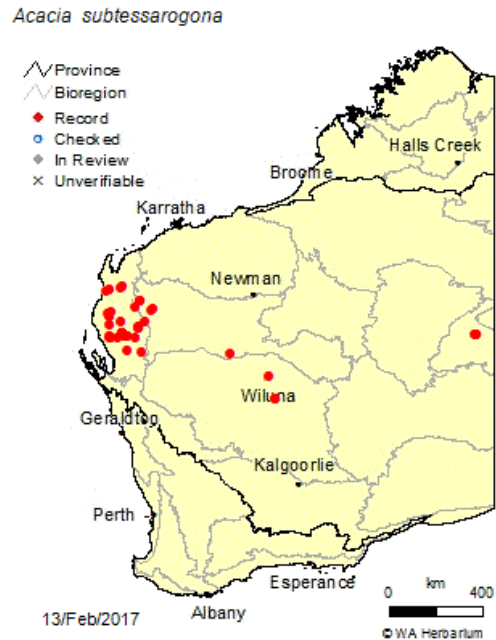


**Plate 17. *Acacia subtessarogona* (flat pod form) (G. Cockerton WB38658), Yakabindie Station, adjacent to the Kalgoorlie – Wiluna Highway, 2010.**

The flat pod form of *Acacia subtessarogona* is uncommon on Yakabindie Station and is mostly associated with gritty sandy plains down slope of the Archaean granite breakaways of the Barr-Smith Range. However, a few individuals are also known south of the proposed MKS Development Envelope, within the MKS Proposal Study Area (Figure 51).

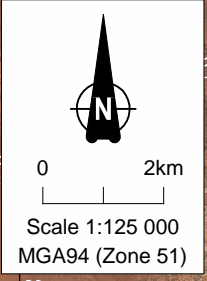
No *Acacia subtessarogona* flat pod form occur within any proposed Development Envelope within the MKS Proposal Study Area.

Populations near the coast represent the typical form while the scattered points between Meekatharra and the N.T. border represent the flat pod form. The point at Wiluna is an old record with a generalised location and may represent the same site as those at Yakabindie Station which are adjacent to the old Kalgoorlie – Wiluna road.



**Figure 50. Distribution of *Acacia subtessarogona* in Western Australia (Western Australian Herbarium, 2017).**

**Figure 51. Known locations of *Acacia subtessarogona* within and near the MKS Proposal Study Area.**



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





Mt Keith Operations

Mt Keith TSF

Goldfields Highway

Wanjarri Nature Reserve

**LEGEND**

-  Species of Interest
-  Study Area
-  Disturbance Footprint
-  Wanjarri Nature Reserve
-  Tenements
-  Surface Water

**Mount Keith Satellite**  
*Acacia subtessarogona*  
**(flat pod form) (G. Cockerton 38658)**  
 Author: Western Botanical      Date: December 2017

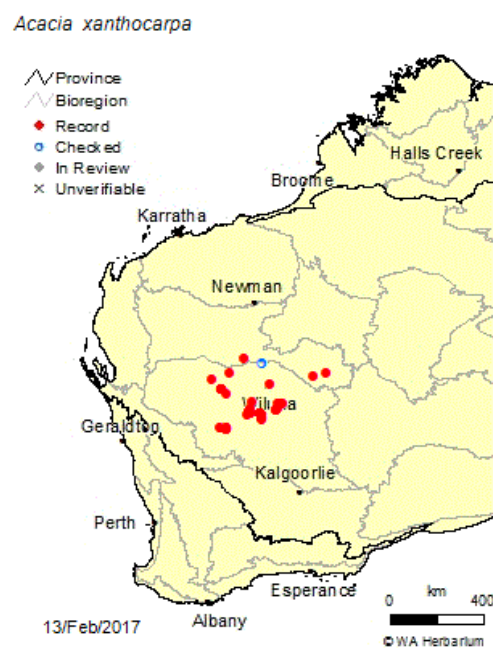
Drawn: CAD Resources ~ Tel 9246 3242 ~ URL www.cadresources.com.au ~ December 2017 ~ A4 ~ Rev: A ~ CAD Ref g2414\_R02\_04\_SOL\_AS.dgn ~ Imagery: Landgtg (2011)

***Acacia xanthocarpa* (flat phyllode form) (G. Cockerton & J. Warden WB39702)**

A discussion of *Acacia xanthocarpa* requires differentiation of two forms of the species: one with terete phyllodes (the typical form) and one with flat phyllodes.

***Acacia xanthocarpa* terete phyllode form**

Typical *Acacia xanthocarpa*, a shrub to small tree from 2 to 4 m high x 2 to 6 m wide, has terete to subterete phyllodes lacking any red glandular margins and a characteristically hairy pod. It was described from specimens collected near Meekatharra and is currently mapped as occurring as far south-east as near Leonora, mostly within the central Murchison biogeographic region (Cowan & Maslin, 1995) (Figure 52).



**Figure 52. Distribution of *Acacia xanthocarpa* in Western Australia (Western Australian Herbarium, 2017).**

The typical terete leaved, red margined, hairy pod form of *Acacia xanthocarpa* is common and widespread on some of the basalt hills on Yakabindie Station. It is present in large numbers on the Violet Range west of the MKS Proposal Study Area and is also present on basalt hills in the southern part of the MKS Study Area. It is widespread and does not require conservation listing.

***Acacia xanthocarpa* (flat phyllode form) (G. Cockerton & J. Warden WB39702)**

In field assessments on Yakabindie Station in May 2016, specimens of *Acacia xanthocarpa* were observed to have distinctly red resinous margins on the phyllodes, which also varied in shape from terete to subterete to clearly flat (to 3 mm wide). Further collections made in October 2016 to October 2017 found pods were variably hairy, as in typical *A. xanthocarpa*, and resulted in delineation of *Acacia xanthocarpa* flat phyllode form (G. Cockerton & J. Warden WB39702) by the authors.

At MKS, *Acacia xanthocarpa* flat phyllode form (G. Cockerton & J. Warden WB39702) is found growing with *Acacia* sp. East Murchison Basalt (G. Cockerton & J. Warden WB39701) *q.v.* with a population of an estimated 120 mature trees (around 30% of the overall *Acacia* shrubland community here) occurring on phyllite shale outcrop over an estimated 2.96 ha occurs within the MKS Proposal Study Area. This lies on the margin between the Goliath orebody pit area and the eastern wastedump (indicative point 51J 261927, 6962350) within the BaAxS Community. It is also common to dominant on basalt hills on the Goliath orebody area but has not been specifically mapped or quantified as yet.

*Acacia xanthocarpa* flat phyllode form is a shrub to small tree from 2 to 4 m high x 3 to 6 m wide. It has narrow, flat, dark green phyllodes that are held upright on the plant, 2.5 to 3m wide x 75 to 120 mm long with distinctly hooked tips. Pods are green, drying pale brown, flat to undulate with slightly thickened marginal veins. Pod surfaces are covered in dense white to yellow, short (0.2mm long), simple hairs completely obscuring the surface. Underlying these hairs are a few scattered short, red, branched, patent hairs. Pods measure 7 to 12 mm wide x 5 to 8 mm thick x 80 to 150 mm long and are slightly constricted between seeds.

*Acacia xanthocarpa* flat phyllode form is abundant and dominant on basalt hills north of Leinster in monospecific stands where several tens of thousands of individuals are known. In the area east of the Cosmos Nickel mine and northwards to the MKS Study Area, it is sympatric with *Acacia xanthocarpa* typical form with terete to subterete phyllodes. Within the MKS Study Area it is sympatric with *Acacia* sp. East Murchison Basalt (G. Cockerton & J. Warden WB39701) on a phyllite shale outcrop, Figure 53.

In order to clarify the taxonomy and the conservation status of the species, a thorough review of the *Acacia xanthocarpa* complex, inclusive of *Acacia* sp. East Murchison Basalt (G. Cockerton & J. Warden WB39701) by Mr Bruce Maslin is required.





**Figure 53. Regional distribution of *Acacia xanthocarpa* flat phyllode form (G. Cockerton & J. Warden WB39702) known to end October 2017.**

### Potential Hybridity

The *Acacia xanthocarpa* complex – *Acacia* sp. East Murchison Basalt (G. Cockerton & J. Warden WB39701) *q.v.* complex is by far the most challenging group of *Acacia* to deal with in the MKS Proposal Study Area. Either there are three separate species with closely related phyllode and pod characteristics or there are two species with possible significant hybridisation occurring on the basalt geology of the Mt Keith – Perseverance fault line and in the Violet Range PEC. This may only be resolved using genetic assessment techniques.

The formal description of *Acacia xanthocarpa* is presented in *Nuytsia* 10: 58-59 (1995). A description of *Acacia* sp. East Murchison Basalt (G. Cockerton & J. Warden WB39701) is presented below.

***Acacia* sp. East Murchison Basalt (G. Cockerton & J. Warden WB39701)**

*Acacia* sp. East Murchison Basalt (G. Cockerton & J. Warden WB39701) is a newly recognised species, which is found growing in two small sub-populations and as scattered individuals within the MKS Proposal Study Area. *Acacia* sp. East Murchison Basalt is a single trunked small tree 2 to 5 m high x 2 to 6 m wide (Plate 18, Plate 19). Bark is rough, grey on trunk and major branches; smooth grey on distal branches and twigs. Phyllodes glossy, dark green, glabrous, linear, flat to quadrangular, 1.5 to 3 mm wide x 80 to 120 mm long, gland on dorsal surface 2 to 3 mm from pulvinus, tip acute, yellow to brown, strongly hooked, two major leaf margins with discontinuous red resin droplets, mid vein prominent on both surfaces making narrower phyllodes appear quadrangular in cross section when dried. Pods are flat, to 100 mm long x 7 to 8 mm wide with slightly raised margins and slightly swollen over the seeds; surface is sparsely hairy with deciduous scattered simple white hairs and the flattened surfaces of the pods are covered in clear resin and a dense covering of short red patent (spreading) hairs.

*Acacia* sp. East Murchison Basalt (G. Cockerton & J. Warden WB39701) is known from numerous locations on phyllite shale outcrops and basalt hills between Menzies, Laverton and Yakabindie Station. A population of an estimated 280 mature trees (around 70% of the overall *Acacia* shrubland community here) occurs on a phyllite shale (Plate 20) outcrop over an estimated 2.96 ha within the MKS Proposal Study Area. The site lies on the margin between the Goliath orebody pit area and the eastern wastedump (indicative point 51J 261927, 6962350) within the BaAxS Community.

*Acacia* sp. East Murchison Basalt (G. Cockerton & J. Warden WB39701), equivalent to *Acacia quadrimarginea* narrow phyllode form, is a small tree from 3 to 6 m high x 3 to 8 m wide. It has narrow, flat, dark green phyllodes that are held upright on the plant, 2.5 to 3m wide x 75 to 120 mm long. Pods are green, drying pale brown, flat with slightly thickened marginal veins (though not raised into flanges as in typical *A. quadrimarginea*) and the pod surfaces are covered in shiny clear resin exuded by short, red, branched, patent hairs. Pods measure 60 to 120 mm long x 7 to 10 mm wide x 3 to 5 mm thick and are slightly constricted between seeds.

The populations between Leinster and MKS also have scattered short simple white hairs on the surface which may indicate some hybridity with *Acacia xanthocarpa* flat phyllode form (G. Cockerton & J. Warden WB39702) with which it is sympatric on a phyllite shale outcrop.

*Acacia* sp. East Murchison Basalt (G. Cockerton & J. Warden WB39701) is abundant on basalt hills north-west of Laverton (hills adjacent to the Windimurra nickel mine) and south west of Laverton on un-named basalt hills, where several thousands of individuals are known, Figure 54. There is a significant disjunction between the Laverton – Leonora populations and those between Leinster and MKS, though this may be an artefact of survey effort to date.

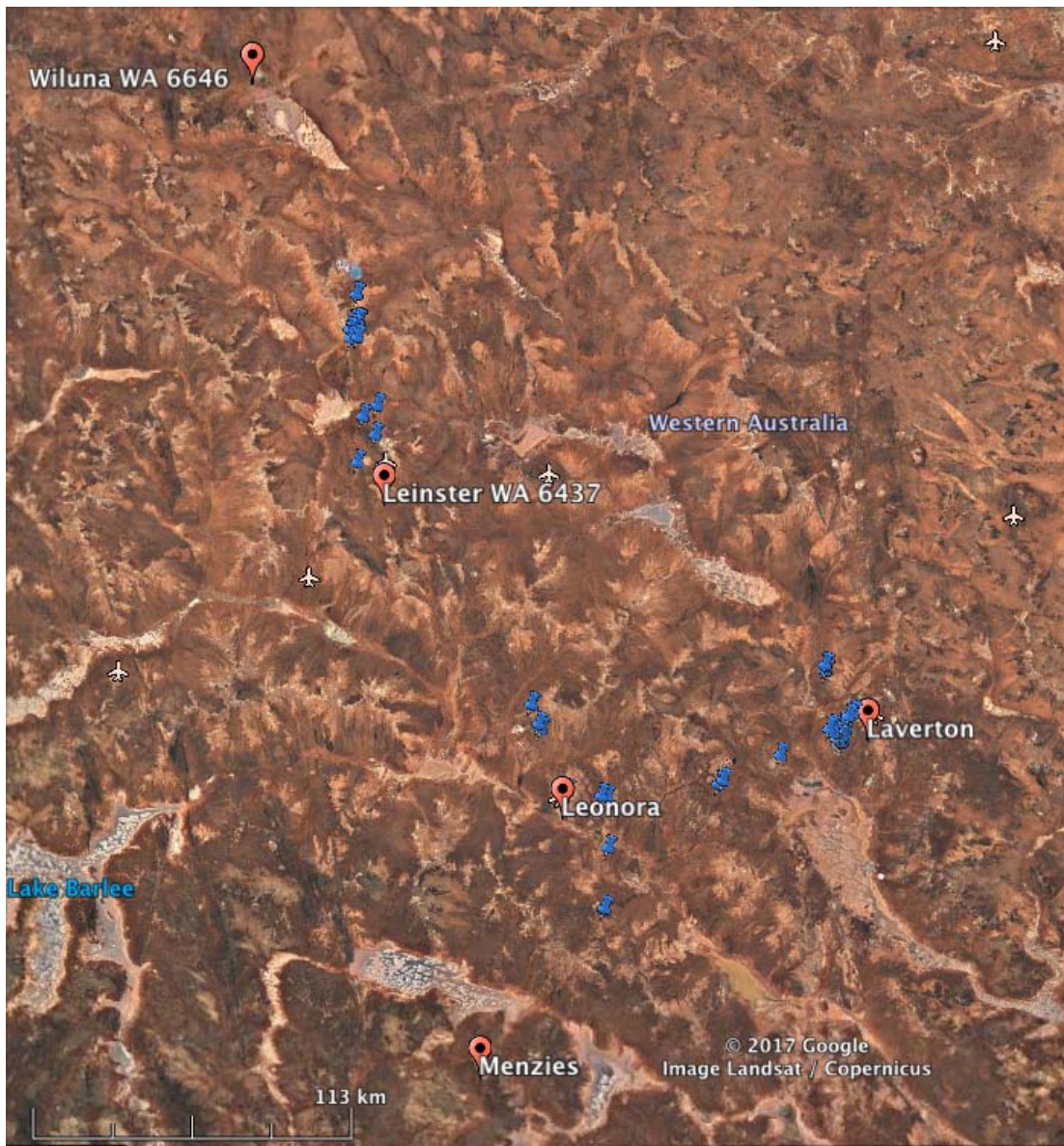


Figure 54. Regional distribution of *Acacia* sp. East Murchison Basalt known as at end October 2017.



**Plate 18.** *Acacia* sp. East Murchison Basalt (G. Cockerton & J. Warden WB39701) tree to 4 m high x 6 m wide, Yakabindie Station, 2016, growing on footslope of low phyllite shale outcrop.

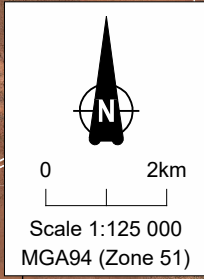


**Plate 19.** *Acacia* sp. East Murchison Basalt foliage and flowers, Yakabindie Station, 2016.



**Plate 20. Phyllite shale rock supporting *Acacia* sp. East Murchison Basalt, Yakabindie Station, 2016.**

**Figure 55. Known occurrence of *Acacia* sp. East Murchison Basalt (G. Cockerton & J. Warden WB39701) within the MKS Proposal Study Area.**



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



Mt Keith Operations

Mt Keith TSF

Goldfields Highway

Wanjarri Nature Reserve

**LEGEND**

-  Species of Interest
-  Study Area
-  Disturbance Footprint
-  Wanjarri Nature Reserve
-  Tenements
-  Surface Water

**Mount Keith Satellite**

*Acacia* sp. East Murchison Basalt  
(G. Cockerton & J. Warden WB39701)

Author: Western Botanical

Date: December 2017

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**Erroneous species: *Acacia* aff. *resinimarginea***

The surveys conducted by Meissner and Wright (2009) for the Department of Environment and Conservation, now DBCA, encountered an *Acacia* in a vegetative state on the basalt hills in the southern part of the MKS Proposal Study Area. These were identified at that time as *Acacia* cf. *resinimarginea* and no material was vouchered at the WA Herbarium as the quality of the specimens was poor (Dr. Neil Gibson, pers. comm.). A re-visit to the DEC quadrat sites where this species was recorded within the MKS Study Area in October 2017 by the Western Botanical found that all records of *Acacia* cf. *resinimarginea* by Meissner & Wright (2009) should be amended to *Acacia xanthocarpa* terete phyllode form.

A similar species, *Acacia* sp. Marshall Pool (G. Cockerton & K. Stratford WB3024), aff. *resinimarginea*, is a distinct species and subject of separate studies in 2017 by Western Botanical. It occurs between Leonora and Laverton and on Weebo Station, north-west of Leonora and does not occur within the MKS Proposal Study Area.



***Olearia* sp. Sherwood Breakaways (A. Taylor 25552)**

*Olearia* sp. Sherwood Breakaways (A. Taylor 25552) is a shrub to 0.7 m high, commonly no more than 0.3 m high, x 0.3 m wide with small hairy, dentate grey-green leaves and small purple flowers on short terminal stalks (Plate 21 & Plate 22). It is found exclusively on the breakaway plateaux of the Sherwood Land System in the Leinster – Wiluna region but is also known from low Banded Ironstone Hills west of Menzies. It is currently curated within *Olearia stuartii*, a group that is in dire need of formal taxonomic revision.

*Olearia* sp. Sherwood Breakaways was first recorded on the breakaway plateaux of the Barr-Smith Range (Plate 23) west of NMK in 1996 and has since been irregularly encountered on rocky landforms within and outside the MKS Proposal Study Area.

In the local region, *Olearia* sp. Sherwood Breakaways has fewer than 1,000 individuals known and is associated with a very specific parent rock, soil and landscape position. In the Mt Keith to Leinster area, it is associated with a range of species with limited distribution including *Calytrix uncinata*, *Calytrix erosipetala*, *Sida picklesiana* P3, *Baeckeia* sp. Melita Station, *Thryptomene* sp. Leinster P3, *Stenanthemum mediale* P1 as well as more common species such as the native Cypress Pine *Callitris columellaris*, *Acacia thoma* and Mulga (*Acacia aneura sens. lat.*). *Olearia* sp. Sherwood Breakaways is known from low Archaean granite outcrops and breakaways within and outside the MKS Proposal Study Area.



**Plate 21. *Olearia* sp. Sherwood Breakaways (A. Taylor 25552); (left) lateral view of flower, about actual size, (right) above view of flower, about actual size.**



Plate 22. Shrub of *Olearia* sp. Sherwood Breakaways (A. Taylor 25552), approximately 0.7 m high.



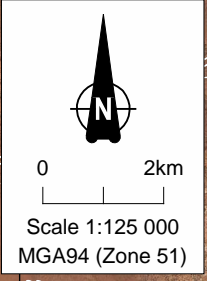
Plate 23. Low breakaway of Archaean granite, Sherwood Land System, Mt Keith, July 2007, supporting *Olearia* sp. Sherwood Breakaways (A. Taylor 25552).

*Olearia* sp. Sherwood Breakaways is known from the Sherwood Land System, Archaean granite breakaways between Albion Downs Station, Yakabindie Station and Leinster Downs Station. It is also likely to occur on Weebo Station and other occurrences of the Sherwood Land System in this region. The species has also been collected by Jonathan Warden (Western Botanical) at Mt Alfred, on Perrinvale Station, west of Menzies.

The distribution of *Olearia* sp. Sherwood Breakaways within and nearby the MKS Proposal Study Area is presented in Figure 56. Minor direct impacts to *Olearia* sp. Sherwood Breakaways will ensue from development of the MKS Proposal with one of the local populations being taken in the wastedump footprint adjacent to the Goliath pit and possibly a few individuals within the proposed haul road alignment.

A preliminary investigation into the *Olearia stuartii* complex as well as *O. humilis* at the WA Herbarium by Geoff Cockerton and subsequently by Dr. Steven Dillon (WA Herbarium), proved inconclusive in dealing with *Olearia* sp. Sherwood Breakaways though did confirm its close relationship to *O. stuartii* in the Pilbara of WA. This review did effectively separate numerous other species that had misidentified but curated within the two groups reviewed. A detailed analysis of WA Herbarium held material, likely incorporating other closely related taxa, is required to progress this species.

**Figure 56. Known distribution of *Olearia* sp. Sherwood Breakaways (A. Taylor 25552) within and outside the MKS Proposal Study Area.**



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





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**LEGEND**

-  Species of Interest
-  Study Area
-  Disturbance Footprint
-  Wanjarri Nature Reserve
-  Tenements
-  Surface Water

**Mount Keith Satellite**  
*Olearia* sp. Sherwood Breakaways  
**(A. Taylor 25552)**  
 Author: Western Botanical      Date: December 2017

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***Olearia xerophila sens. lat.* (G. Cockerton & P. Goodman WB38116)**

In May 2016, specimens of an *Olearia* were collected on the eastern border of the MKS Proposal Study Area (Plate 24). These were identified as *Olearia xerophila*, being similar to material held at the WA Herbarium under that name that had been widely collected in the Pilbara region. Two records from between Wiluna and Meekatharra made by A.R. Fairall in 1966 represent occurrences in the Murchison biogeographic region. A review of the highly disjunct distribution of *Olearia xerophila* across Australia (Figure 57) led to a closer review of material held at the WA Herbarium's Research Collection in January 2017 where it was found that the Type collection for *O. xerophila* was taken from north-eastern Qld. and that the W.A. entity differed significantly from that in the eastern part of its distribution (Dr. Steven Dillon pers. comm.).

The review of the taxonomy of this group will require a Herbarium based review of the wider *Olearia xerophila* group. It is satisfactory at this stage to determine that the species located on the eastern margin of the MKS Proposal Study Area, outside any areas of proposed impact but within the defined Disturbance Envelope, is identical to the material collected by A.R. Fairall between Wiluna and Meekatharra in 1966 and to specimens collected by Western Botanical near Leinster in 1997 and September 2017 (Figure 58). These are superficially similar to the species that is common in the Pilbara of W.A. but differ in many characteristics. In discussion with Dr. Steven Dillon at the WA Herbarium, who kindly reviewed the material held at the WA Herbarium in September 2017, it has been resolved to label the WA material as *Olearia xerophila sens. lat.*, awaiting further taxonomic revision of this group.



**Plate 24.** *Olearia xerophila sens. lat.* shrub, MKS Proposal Study Area, May 2016.

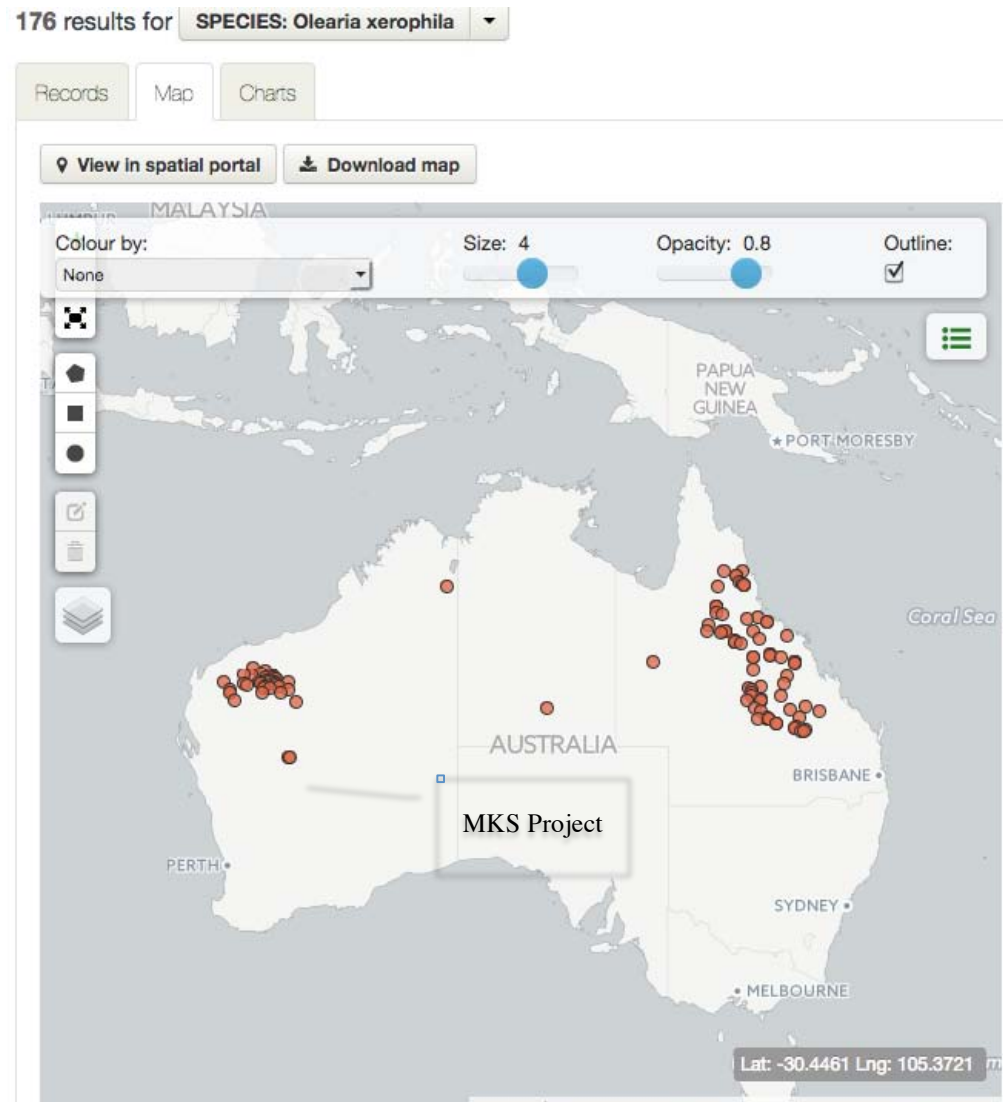
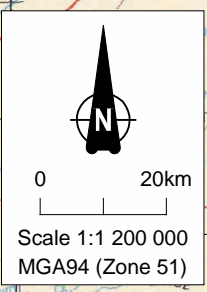


Figure 57. Distribution of *Olearia xerophila sens. lat.* in Australia.

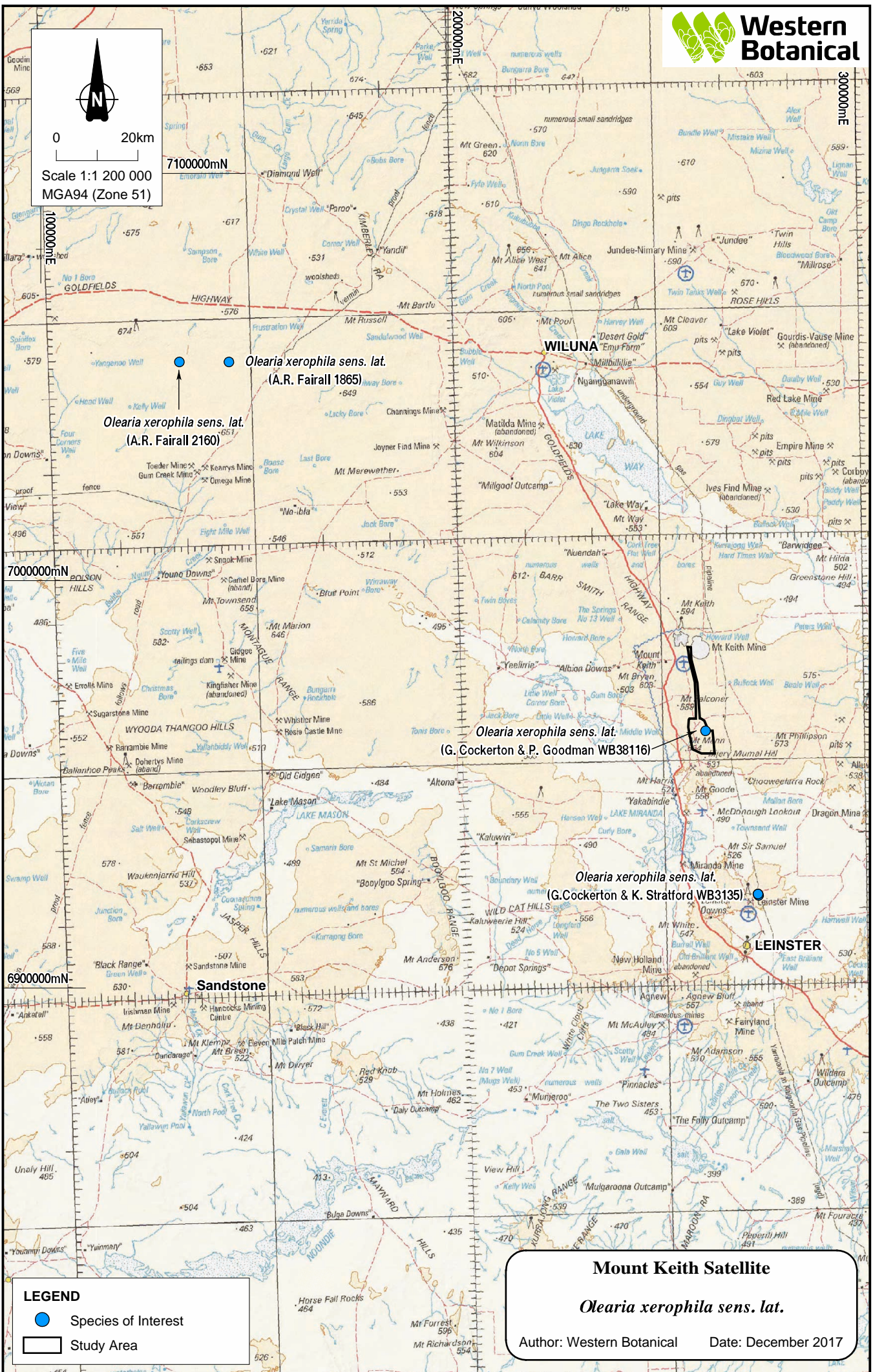
**Figure 58. *Olearia xerophila sens. lat.* records in the Murchison biogeographic region with collection details at each site shown.**





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*Olearia xerophila sens. lat.*  
(A.R. Fairall 2160)

*Olearia xerophila sens. lat.*  
(A.R. Fairall 1865)

*Olearia xerophila sens. lat.*  
(G. Cockerton & P. Goodman WB38116)

*Olearia xerophila sens. lat.*  
(G. Cockerton & K. Stratford WB3135)

**LEGEND**

- Species of Interest
- Study Area

**Mount Keith Satellite**

*Olearia xerophila sens. lat.*

Author: Western Botanical      Date: December 2017

The population of *Olearia xerophila sens. lat.* occurs some 50 to 100 m outside the eastern margin of the wastedump Disturbance Footprint (Figure 59). The extent of the population here has not been assessed as yet.

Though not impacted by the MKS project, the occurrence of *Olearia xerophila sens. lat.* at the MKS Proposal Study Area and at Leinster represents a poorly collected species (in this region) at the limit of its disjunct range, representing a range extension, hence the species is discussed as a Species of Interest.

**Figure 59. Known location of *Olearia xerophila sens. lat.* at the MKS Proposal Study Area.**