



FLORA & FAUNA  
GUARANTEE

Nomination no. **867**  
Community

## FLORA AND FAUNA GUARANTEE - SCIENTIFIC ADVISORY COMMITTEE

### FINAL RECOMMENDATION ON A NOMINATION FOR LISTING

#### North Western Goldfields Intermittent Soak Community

Date of receipt of nomination: 28 June 2015  
Date of preliminary recommendation: 16 September 2016  
Date of final recommendation: 21 November 2016

File No.: FF/54/3706

**Validity:** The nomination is for a valid item.

**Prescribed Information:** The prescribed information was provided.

**Name of the Nominator** is adequately provided.

**Name of the Item** is adequately provided.

The nominated community is 'North Western Goldfields Intermittent Soak Community'.

The nominated community is accepted by the Scientific Advisory Committee (SAC) as a valid community because it is adequately defined and described according to accepted practice, and it is described in such a way as to be distinguished from all other communities.

#### Description

'North Western Goldfields Intermittent Soak Community' is a naturally restricted and rare groundwater dependent ecosystem (GDE) that supports unique and endemic species. The community is associated with less predictable periods of high rainfall, and therefore considered intermittent in nature. The community is associated with soak activity around the lower foot slopes of higher granitic and metamorphic ranges in the north western goldfields of Victoria.

In 2012 a similar community type ('Granite Foothills Spring Wetland North-East Victoria Community') was listed under the *Flora and Fauna Guarantee Act 1988* (SAC 2011). The two community types differ in terms of hydrology and vegetation structure and composition (see below). The Granite Foothills Spring Wetland is a 'seasonal wetland' becoming wet annually, typically in spring, whereas this community is classified as an 'intermittent wetland'. Intermittent wetlands are alternatively wet and dry, but less frequently than seasonal wetlands (Boulton et al. 2014) with the wetting pattern of the North Western Goldfields soak community reflecting local rainfall patterns. Foreman (2015) reported on analysis of rainfall patterns indicated that wetland flow typically occurs in years of >10% above the long term average, which between 1970 and 2001 occurred approximately once in every two years, but since then has dropped to approximately once in six or seven years. This supports the classification as an intermittent water regime.

The SAC notes that the following species are present in the 'North East community' but do not occur in the current nomination.

Warby Swamp Gum *Eucalyptus cadens*, Long-leaf Box *Eucalyptus goniocalyx/nortonii*, Ground Fern *Hypolepis* spp., Swamp Isotome *Isotoma fluviatilis*, Matter St John's Wort *Hypericum japonicum*, Small Mud-flat *Glossostigma elatinoides*, Pale Sundew *Drosera peltata* subsp. *peltata*, Slender Aphelia *Aphelia gracilis*

The North West Goldfields Intermittent Soak Community is located on lower slopes of granitic hills that have large areas of exposed granite rocks on the upper slopes. Sites of the community are characteristically level or gently sloping, in hollows or to the side of watercourses. Joints in the granite enable water movement from entry points on the upper slopes to its emergence near and out from the bases of the hills, resulting in intermittent soaks. On most sites surface runoff appears to contribute to localised soil moisture levels, in addition to groundwater supplied from the rock aquifers. Therefore the intensity and timing of local rainfall is a key influence on the community, with great variation in the time periods between soakings.

Local environmental factors such as particular jointing patterns in the granite, distance from water entry points to the outflows, the amount of local surface runoff, and a site's soil depth, structure and composition appear to be important influences on the community.

Examples of this community can often be recognised by a dominant over-storey of Blakely's Red Gum (*Eucalyptus blakelyi*), often with Grey Box (*Eucalyptus macrocarpa*) as a co-dominant. Blakely's Red Gum requires a period of inundation for seed establishment. Climatic conditions, grazing and, to a lesser extent, fire history are likely to contribute to between-site variation in vegetation structure and composition.

### Distribution

The higher granitic ranges of the north western Goldfields are scattered in north central Victoria, in a region to the west of Bendigo, lying broadly between the towns of St Arnaud, Charlton and Inglewood. The key areas are the Mount Kooyoora and Korong ranges, respectively to the south and north of Calder Highway between Wedderburn and Inglewood; with outlying occurrences at The Granites near Borung, Mount Buckrabanyule, Yawong Hills between Charlton and St Arnaud, Carapooee Hills south east of St Arnaud, and the Sunday Morning Hills – a prominent metamorphic range sandwiched between the Mount Kooyoora and Korong systems. Table 1 provides details of areas with soaks in the North Western Goldfields.

**Table 1:** Summary of key areas for soaks within the North Western Goldfields

NCR = Nature Conservation Reserve, SR = Scenic Reserve, GR = Geological Reserve, SF = State Forest

Range	Lithology	No. of soaks	Area of soaks (ha)	Tenure
Mount Kooyoora	Granite	160	159.7	Kooyoora State Park (SP) & farmland
Mount Korong	Granite	83	146.0	Korong NCR & farmland
The Granites	Granite	10	31.7	The Granites SR (Wychitella NCR) & farmland
Mount Buckrabanyule	Granite	N/A	N/A	Mount Buckrabanyule SR & farmland
Yawong Hills	Granite	19	32.9	Yawong Hill GR & farmland
Sunday Morning Hills	Metamorphic	22	64.6	Kooyoora SP, Sunday Morning Hills SF & farmland
Carapooee Hills	Granite	N/A	N/A	Farmland
<b>Totals</b>		<b>294</b>	<b>434.9</b>	

The community exhibits two distinct phases – wet and dry. In the dry phase the species present include a suite of widespread dryland species that become more prominent when the soak is inactive (Foreman 2015). The wet phase has a suite of aquatic indicator species which persist in the dry phase as part of a dormant seed bank (Foreman op cit.).

The species adapted to the wet state are considered indicator species that identify this community and include areas of intermittent herbland typically dominated by a diversity of lifeforms and species that can appear scalded or virtually devoid of any vegetation in the dry state. Typical species include

- Common Bog-sedge (*Schoenus apogon*), Varied Raspwort (*Haloragis heterophylla*), Swamp Goodenia (*Goodenia humilis*), Swamp Wallaby-grasses (*Amphibromus* spp.), various species of *Aphelia* spp., *Centrolepis* spp. and *Isolepis* spp., Joint-leaf Rush (*Juncus holoschoenus*), Broad-leaf Rush (*J. planifolius*), Wiry Rush (*J. homalocaulis*) and diminutive Trigger-plants *Stylidium* spp.

Other wet phase indicator species occasionally recorded in these soaks include:

- Soft Twig-rush *Baumea rubiginosa*
- Common Pipewort *Eriocaulon scariosum*
- Common Fringe-sedge *Fimbristylis dichotoma*
- Narrow Goodenia *Goodenia macbarronii*
- Quillworts *Isoetes* spp.
- Water-milfoils *Myriophyllum* spp.\*
- Bladderworts *Utricularia* spp.\*

\*The presence of these latter species indicates that in some soaks surface water is present for several months.

Perennial species are most prominent when the community is in a dry state. The better quality remnants of the community are open Blakely's Red Gum (*Eucalyptus blakelyi*) woodland, often with co-dominant Grey Box (*Eucalyptus microcarpa*) over a complex mosaic of vegetation types. The patch types can include:

- Shrubland dominated by Prickly Tea-tree (*Leptospermum continentale*), and rarely Golden Spray (*Viminaria juncea*). This latter species also occurs in the 'Granite Foothills Spring Wetland North-East Victoria Community'
- Areas dominated by robust graminoids – tussock grasses, sedges and rushes such as: Narrow-leaf Cumbungi (*Typha domingensis*), Tall Sedge (*Carex appressa*), Shiny Wallaby-grass (*Rytidosperma indutum*), Common Tussock-grass (*Poa labillardierei*), and Gold Rush (*Juncus flavidus*)

**Table 2.** Conservation status of selected indicator species of the North Western Goldfields Intermittent Soak Community. These species have been recorded within Kooyoora State Park. *Source:* Foreman (2015)

EPBC = *Environment Protection & Biodiversity Conservation Act 1999*

FFG = *Flora and Fauna Guarantee Act 1988*

Advisory List = DEPI (2014),

\* = Victorian endemic species

Scientific name	Common name	Conservation status		
		EPBC	FFG	Advisory List
<i>Baumea rubiginosa</i> s.l.	Soft Twig-rush			
<i>Callitriche umbonata</i>	Winged Water-starwort		X	r
<i>Centrolepis cephaloformis</i> subsp. <i>cephaloformis</i>	Cushion Centrolepis			
<i>Cyperus lhotskyanus</i>	Creeping Flat-sedge			
<i>Eriocaulon scariosum</i>	Common Pipewort			r
<i>Eucalyptus blakelyi</i>	Blakely's Red-gum			
<i>Goodenia humilis</i>	Swamp Goodenia			
<i>Goodenia macbarronii</i>	Narrow Goodenia	V	L	v
<i>Hypoxis hygrometrica</i> var. <i>villosisepala</i>	Golden Weather-glass			
<i>Isoetes drummondii</i> subsp. <i>anomala</i>	Plain Quillwort			k
<i>Isoetes muelleri</i>	Rock Quillwort			
<i>Isoetes pusilla</i> *	Small Quillwort		L	e
<i>Leptospermum continentale</i>	Prickly Tea-tree			
<i>Myriophyllum integrifolium</i>	Tiny Water-milfoil			
<i>Myriophyllum striatum</i>	Striped Water-milfoil		L	v
<i>Pentapogon quadrifidus</i> var. <i>quadrifidus</i>	Five-awned Spear-grass			
<i>Rytidosperma indutum</i>	Tall Wallaby-grass			
<i>Rytidosperma laeve</i>	Smooth Wallaby-grass			
<i>Schoenus nanus</i>	Tiny Bog-sedge			r
<i>Stylidium calcaratum</i> var. <i>ecorne</i>	Foot Triggerplant			k
<i>Utricularia dichotoma</i> s.l.	Fairies' Aprons			
<i>Viminaria juncea</i>	Golden Spray			

#### **Eligibility for listing as a community under the Flora and Fauna Guarantee**

The nominated item satisfies at least one criterion of the set of criteria prepared and maintained under Section 11 of the *Flora and Fauna Guarantee Act 1988*, and stated in Schedule 1 of the *Flora and Fauna Guarantee Regulations 2011*.

#### **Evidence that criteria are satisfied:**

**Criterion 2.1** *The community is in a state of demonstrable decline which is likely to result in extinction.*

##### *Evidence:*

The North Western Goldfields Intermittent Soak Wetland Community is a rare groundwater dependent ecosystem wetland type restricted to the north western Goldfields of Victoria. The community occurs as intermittently wet seepage zones skirting the higher granite ranges that support unique vegetation including rare and endemic species. The community occurs in areas where agricultural land use has severely degraded or destroyed the soaks. Natural springs and soaks are particularly prized by farmers as a semi-permanent water source in a region of unpredictable rainfall and have largely been cleared, dammed, over grazed or cropped. Change in climatic conditions and changed rainfall patterns, also threaten the long term viability of these sites. Annual Return Intervals (ARI) for the wet phase have changed from being 1:2 to an ARI of 1:6 (excluding the Millennium Drought period).

**Sub-criterion 2.1.1** *the community is in a demonstrable state of decline which is likely to result in a significant loss of its component taxa*

##### *Evidence:*

The community supports unique vegetation, including threatened species Narrow Goodenia (*Goodenia macbarronii*), Small Quillwort (*Isoetes pusilla*) and Striped Water-milfoil (*Myriophyllum striatum*) and other species listed as endangered, rare or vulnerable in Victoria (DEPI 2014, as outlined in Table 2). Threats to the community, as indicated below, are likely to put further pressure on these rare and threatened species.

Recent field assessment at Mount Kooyoora and Korong suggests <13% by area of the original extent of the community remains in least modified condition (Foreman 2015). There is also evidence of the loss of component flora,

especially with the larger perennial indicator species. Anecdotal and limited historical data suggest numbers of indicator species have declined in recent decades. Shrubs such as Prickly Tea-tree *Leptospermum continentale* and Golden Spray *Viminaria juncea* (both vulnerable to grazing) are especially under pressure. Twenty year old records from Mount Kooyoora and Korong suggest Golden Spray is now all but extinct regionally and most of the Prickly Tea-tree sites are characterised by dead and dying populations.

It is likely a similar story applies to the graminoids and ephemeral flora. The abundance of the only known regional record of Soft Twig-rush *Baumea rubiginosa* has declined dramatically since last assessed in 1990 while other plants haven't been recorded regionally for about 20 years, including Common Pipewort *Eriocaulon scariosum*, Foot Trigger-plant *Stylidium ecorne* and Narrow Goodenia *Goodenia macbarronii* (nationally vulnerable).

**Sub-criterion 2.1.2** *the community's distribution has decreased markedly in a short time and the decrease is continuing*

*Evidence:*

Recent information suggests that the community is now all but extinct outside the Mount Kooyoora and Korong areas and further contractions are anticipated, especially on private land. Most sites on farms remain unfenced from stock and vulnerable to development pressures. Grazing pressure from macropod populations and inadvertent damage caused by roading and compaction by off-road vehicles remain key threats, especially in Kooyoora State Park where these soaks have been overlooked in the past. Due to their direct association with the higher granitic ranges of the north western Goldfields in north central Victoria, these wetlands once lost, will not recover or be found elsewhere.

**Sub-criterion 2.2.1** *the community is very rare in terms of the total area it covers or it has a very restricted distribution or it has been recorded from only a few localities*

*Evidence:*

This community is rare in both space and time, restricted to very small and isolated seepage zones at the foot slopes of higher granite ranges in the north western Goldfields (Foreman 2015). These habitats are mainly active during unpredictable above average rainfall years (eg. 2010/2011). A total of only 294 natural seepage areas (occupying 435 ha) have been mapped to date, and of these, <13% are considered to persist today in a relatively least modified state, the majority of which remain unprotected (Foreman 2015).

**Sub-criterion 2.2.2** *the threat is currently operating and is expected to operate at a level in the future which is likely to result in the extinction of the community.*

*Evidence:*

On private land the remaining soaks are seriously threatened from dam construction, cropping and tree planting, over grazing by stock, macropods and rabbits, and weed invasion. On public land, the remaining sites are also seriously threatened by macropods and rabbits (and sometimes stock), vehicle compaction, erosion, sediment 'slugs', and weed invasion. All sites are vulnerable to climate change with a likely future drying climate driving declines in structure, function and composition, including the loss of keystone, outlier and state/national rare or threatened species. The increasingly isolated, fragmented and intermittent nature of remnants makes the community especially prone to these disturbances and negative population genetic effects.

**Additional Information**

- Major threatening processes facing outcrop plant communities include: weed invasion, grazing by stock and feral animals, too frequent fire, clearing, loss of shrub layer, salinity and dieback (Hopper et al. 1997).

**Documentation**

The published information and research data provided to the SAC has been assessed. To the best of its knowledge, the SAC believes that the data presented are not the subject of scientific dispute and the inferences drawn are reasonable and well supported. The data presented on distribution and abundance are the result of recent surveys and provide strong evidence that the community is rare in terms of abundance and distribution.

**Advertisement for public comment**

In accordance with the requirements of Section 14 of the *Flora and Fauna Guarantee Act 1988*, the preliminary recommendation was advertised for a period of at least 30 days.

The preliminary recommendation was advertised in:

'The Herald Sun'	Wednesday 12 October 2016
'The Weekly Times'	Wednesday 12 October 2016
'Bendigo Advertiser'	Wednesday 12 October 2016
'Wimmera Mail-Times'	Wednesday 12 October 2016
Government Gazette	Thursday 13 October 2016

Submissions closed on Friday 18 November 2016.

**Further evidence provided:**

No submissions were received on this item and no evidence was provided to warrant a change to the Scientific Advisory Committee's preliminary recommendation that the taxon is eligible for listing.

**Final Recommendation of the Scientific Advisory Committee**

The Scientific Advisory Committee concludes that on the evidence available the nominated item is eligible for listing in accordance with Section 11(1) of the Act because criterion 2.1 and sub-criteria 2.1.1, 2.1.2, 2.2.1 and 2.2.2 have been satisfied. The Scientific Advisory Committee also concludes that no evidence exists to suggest that primary criterion 2.2 cannot be satisfied as a consequence of sub-criteria 2.2.1 and 2.2.2 being satisfied.

The Scientific Advisory Committee makes a final recommendation that the nominated item be supported for listing under the *Flora and Fauna Guarantee Act 1988*.

**Selected references:**

Boulton, A.J., Brock, M.A., Robson, B.J., Ryder, D.S., Chambers, J.M. and Davis, J.A. (2014) *Australian Freshwater Ecology: Processes and management*. Second Edition, Wiley Blackwell.

DEPI (2014) *Advisory list of rare or threatened plants in Victoria – 2014*. Department of Environment and Primary Industries, Victoria. <https://www.depi.vic.gov.au>

Foreman, P.W. (2015) Protecting spring soaks in the north western Goldfields; Final report. Report prepared for the Department of Environment, Land, Water and Planning (DELWP) and Wedderburn Conservation Management Network (CMN) by Blue Devil Consulting, Castlemaine.

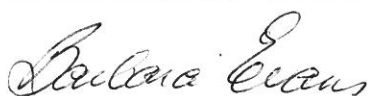
Hopper, S.D., Brown, A.P. and Marchant, N.G. (1997) Plants of Western Australian granite outcrops. *Journal of the Royal Society of Western Australia* **80**: 141-158.

SAC (2011) Final Recommendation on a nomination for listing: 'Granite Foothills Spring Wetland (North-East Victoria) Community' (Nomination no. **804**). Flora and Fauna Guarantee Scientific Advisory Committee. Department of Sustainability & Environment, Melbourne.

**Endorsement by the Convenor of the Scientific Advisory Committee**

**Date**

24/11/2016



**Professor Emerita Barbara Evans**  
**Convenor**