

State Herbarium of South Australia Botanic Gardens and State Herbarium Department for Environment and Water

Milestone Report

Regional Landscape Surveillance for New Weed Threats Project

2023–2024

Milestone: Annual report on new plant naturalisations in South Australia

Chris J. Brodie, Peter J. Lang & Tim Hammer

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State Herbarium of South Australia	www.botanicgardens.sa.gov.au/science/research
Botanic Gardens and State Herbarium	know.ourplants.org
Hackney Road	
Adelaide, SA 5000	stateherbsa@sa.gov.au

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Authors' addresses:

¹ State Herbarium of South Australia, Botanic Gardens and State Herbarium, Hackney Road, Adelaide, South Australia 5000.

² The University of Adelaide, School of Biological Sciences, Adelaide, South Australia 5005

Summary

This report summarises the work carried out by the State Herbarium of South Australia for the project *Regional Landscape Surveillance for New Weed Threats*. This project improves our knowledge and understanding of the introduced flora of South Australia. It involves the provision of a weed identification service, active surveillance for new weeds and regional occurrences, as well as community education and outreach activities.

In 2023–24, as part of the active weed surveillance program, **seven** new weeds were added to the *Census of South Australian Plants, Algae and Fungi* (Census) as naturalised or questionably naturalised.

Four taxa were collected in South Australia for the first time. The remaining **three** taxa had been collected previously, but the specimens and/or record data had been insufficient for conclusive identification or assessment. For the latter, collection of additional specimens has permitted these taxa to be thoroughly investigated and assessed as naturalised (weedy), questionably naturalised or sparingly naturalised (questionably weedy) in South Australia.

A further **18** weed taxa had updates applied to the Census, involving either a change to the scientific name, a change to the known regional distribution, or a change to its establishment status.

During the last year, as part of the State Herbarium's funded weed surveillance program, **40** multi-day, full-day, or partial-day fieldwork trips, totalling **43.6** field-days were undertaken. **Six** of the State's nine Landscape Board regions were visited, with **532** specimens lodged with the State Herbarium of South Australia. A total of **ten** separate community engagement activities were attended and **136** enquiries were received from regional staff and community members. More than **84** hours were spent individually addressing these enquiries.

1. Activities and outcomes for the 2023/2024 financial year

Funding

Since 2020, the Department for Environment and Water, South Australia (DEW) has supported the program through base funding to the State Herbarium of South Australia (0.6 FTE to support the Weeds Botanist). In addition, funding has been received from Green Adelaide, attached to a Service Level Agreement (SLA) with a schedule of services. Further specific task cost recovery work for weed surveys and community engagement work attached to funding was received from the following Landscape South Australia regions: Murraylands and Riverland; Northern and Yorke; and South Australian Arid Lands. In addition, the provision of plant identification services for Landscape SA Eyre Peninsula assisted in specific task cost recovery.

The State Herbarium of South Australia's staff and Honorary Research Associates provided considerable in-kind support for the project. They assisted with identifications, taxonomic and nomenclatural expertise, analysis and reporting, project management, plant sample processing and data generation.

Activities

A major focus of this project was the identification and collection of new and under-collected weed taxa within South Australia. Between 1 July 2023 and 30 June 2024, **40** multi-day, full-day, or partial-day fieldwork trips were undertaken. Active field surveillance trips were conducted in six of the nine Landscape Board (Landscape SA) regions: Green Adelaide, Hills & Fleurieu, Limestone Coast, Northern and Yorke, Murraylands and Riverland, and South Australian Arid Lands.

Most field surveillance was completed in partnership with staff from Green Adelaide and regional Landscape SA Boards, local government association staff or with the assistance of community members (see Appendix 1, Table 4). During these fieldtrips, 532 plant specimens were collected for the State Herbarium of South Australia.

Eight (8) community and professional engagement activities were attended during the year (see Appendix 1, Table 5). These events (e.g. Fig. 2) help to increase awareness of the weeds themselves, the value of their early detection and the processes required to secure scientifically valid specimens and records for the State Herbarium.

The State Herbarium also provides an essential point of contact for regional staff and community members to gain precise plant identifications and associated information, including distribution, taxonomic status and establishment status of plants, including weeds.

During this reporting period the State Herbarium received **136** enquiries regarding suspected weeds and staff spent over **84** hours to respond. The majority of enquires entailed two or more interactions and can be separated into the following categories:

- **104** enquires were requests for precise plant identifications of suspected weeds via photographs or specimens submitted with or without data.
- **27** enquires were requests for associated information regarding weeds, including distribution, taxonomic status and establishment status of weeds.
- Five enquires were requests for images.

Of the 104 requests for precise plant identifications, more than **40** specimens have been submitted and retained by the State Herbarium.



Fig 1. Weeds Botanist Chris Brodie (far left) and Green Adelaide staff (middle top and bottom), participating in a Webinar, now published on the Green Adelaide YouTube page. Image: Chris Brodie.

Outcomes and progress of weeds monitoring

The State Herbarium defines all **naturalised** (established, *) and **questionably or sparingly naturalised** (questionably established, ?e) taxa as weeds or potential weeds. These are nonnative taxa to a particular region that have at some level established naturally in the wild, being either self-sustaining or showing some degree of self-propagation.

This year **seven (7)** new weeds or potential weeds for the State (see Section 2 & 3) were recorded. Four of the new weed records were collected in South Australia for the first time. For the remaining three taxa previous herbarium collections existed, but the specimen and associated data was insufficient for identification or assessment of establishment status. Recent high-quality collections of these taxa permitted identification and subsequent reassessment.

In addition, **18** weed taxa had updates applied to the Census¹, involving either a change to the scientific name, a change to its regional distribution, or a change to its establishment status (see Table 3. Section 4). Census changes were made over the period 13 May 2023–22 May 2024.

Since the project began in 2009, a total of **274** new naturalised or questionably naturalised plants have been recorded through field collections and research at the State Herbarium. These records have subsequently been added to the online Census.

An overview of the numbers of weeds reported through this project (Figs 2 & 3) shows that, beyond the initial rapid detection of new weeds at the start of the program, new weeds continue to be detected each year in South Australia.

The Census provides the South Australian community with information on the State's native and naturalised (weedy) plants occurring in the wild, listing their current name and synonyms (previous names), as well as their regional distribution and conservation status. This information underpins our knowledge on plant taxa identity and occurrence, and as such forms an official reference point for any legislative action relating to native and naturalised plants growing wild.

Data obtained from researchers and botanists throughout Australia and globally, new collections and ongoing taxonomic research in the State Herbarium all contribute to assessments included in the Census. Maintaining the Census involves monitoring and reviewing work published by botanists worldwide that affects the taxonomy and/or nomenclature of taxa occurring in South Australia.

¹ The *Census of South Australian Plants, Algae and Fungi* is currently available in PDF format at the following web-site: <u>https://know.ourplants.org/census/</u>





Data in **Figs 2 & 3** from the yearly *Regional Landscape Surveillance* reports, specifying new weeds recorded as established (*) or questionably established (**?e**) through **Field work** or existing State **Herbarium** collections. The distinction between Fieldwork and State Herbarium sources was not reported in the years 2010/11 to 2012/13 (green bars).

2. New naturalised or questionably naturalised records of plants in South Australia.

At the end of the financial year 2023/24, there are **5181** naturally occurring vascular plant taxa recognised in South Australia. Of these, **1645** are introduced plants, not native to any part of South Australia, that are considered to have become either established (weeds) or questionably established (potential weeds) in the wild.

The remaining **3536** are native South Australian taxa, with **78** of these considered as established or questionably established in the wild outside their natural range in other regions of South Australia (see Table 1.).

The total number established or questionably established taxa in South Australia totals [1645 + 78 =] **1723**. In other words, about one third (33.3%) of South Australia's plant taxa occur as weeds.

Table 1: The number of naturally occurring 'native' and 'established' or 'questionably established' vascular plant taxa recorded in the in *Census of South Australian Plants, Algae and Fungi* as of 30 June 2024.

Taxon type	Total no. of taxa for SA as of 30 June 2023	Total no. of taxa for SA as of 30 June 2024	Net increase in taxa in SA from 30 June 2023 to 30 June 2024	No. of native taxa also recorded as established or questionably established for SA as of 30 June 2024
Native vascular plant taxa	3533	3536	3	78
Established or questionably established vascular plant taxa	1638	1645	7	-
All vascular plant taxa	5171	5181	10	-

For this year's reporting period (13 May 2023–22 May 2024) a total of seven (**7**) new taxa that are naturalised or questionably naturalised plants in SA were added to the Census, based on collections deposited and accessioned in the State Herbarium (see Table 2 and Section 2 of this report).

These fall into four categories:

• Four (4) new fieldwork-detected taxa, collected recently for the first time from the wild and added to the Census in the past year. There is evidence of these taxa being established or questionably established as wild (non-planted) occurrences:

0	?e	Banksia prionotes	Acorn Banksia
0	?e	Calothamnus quadrifidus subsp. angustifolius	One-sided Bottlebrush
0	*	Hakea petiolaris subsp. trichophylla	Sea Urchin Hakea
0	?e	Opuntia rufida	Blind Cactus

- One (1) new taxon had an existing State Herbarium collection, but this lacked data on establishment status. A recent fieldwork collection allowed re-assessment of its establishment status and it was consequently added to the Census for the first time. There is evidence of the taxon being established, as wild (non-planted) occurrence:
 - * Colocasia esculenta

Taro

- One (1) new taxon had an existing State Herbarium collection, but this was vegetative material only and consequently could not be reliably identified. A recent fieldwork collection with reproductive structures allowed for a positive identification and subsequent assessment of establishment status and it was consequently added to the Census for the first time. There is evidence of the taxon being questionably established as a wild (non-planted) occurrence:
 - ?e *Grevillea leucopteris* White Plume Grevillea
- One (1) new taxon record was discovered when existing State Herbarium collections were re-examined. It was re-assessed based on existing historical specimens and recent (un-databased) collections made by external collectors and added to the Census for the first time. There is evidence of the taxon being established as a wild (non-planted) occurrence:
 - * Opuntia leucotricha

Aaron's Beard Prickly Pear

Table 2: The seven new South Australian weed or potential weed records added to the Census, based on recent collections and newly generated knowledge.

Naturalised/established:

* = naturalised (i.e., established in the wild)

?e = questionably established/naturalised in the wild

Regional distribution

See map and key to State Herbarium regions in Appendix 2 (Fig. 12).

Landscape South Australia (Landscape SA) region

See map and key to Landscape SA regions in Appendix 3 (Fig. 13).

New Taxon	Common Name	Family	Naturalised/ established	Regional distri- bution	Landscape SA region
Banksia prionotes	Acorn Banksia	Proteaceae	?e	KI	Kangaroo Island
Calothamnus quadrifidus subsp. angustifolius	One-sided Bottlebrush	Myrtaceae	?e	SL	Green Adelaide
Colocasia esculenta	Taro	Araceae	*	SL	Green Adelaide
Grevillea leucopteris	White Plume Grevillea	Proteaceae	?e	KI	Kangaroo Island
Hakea petiolaris subsp. trichophylla	Sea Urchin Hakea	Proteaceae	*	SL	Green Adelaide
Opuntia leucotricha	Aaron's Beard Prickly Pear	Cactaceae	*	FR, MU	South Australian Arid Lands & Murraylands and Riverland
Opuntia rufida	Blind Cactus	Cactaceae	?e	FR	Northern and Yorke

3. Descriptions of newly recognised weeds in South Australia

Taxa are listed here in alphabetical order. See also Table 3. for existing weeds that are newly recognised for regions of South Australia (SA).

Family: Proteaceae

Banksia prionotes Lindl.

Common name: Acorn Banksia

Description: *Banksia prionotes* is a striking ornamental species used in the cut flower industry due to its bright-coloured large showy orange flower spikes. It is a small tree or shrub to 10 m tall. Plants lack a lignotuber and therefore cannot regenerate vegetatively after being burnt in a bushfire, relying on seed for regeneration. The bark is grey, smooth, or horizontally grooved, with new growth covered in soft hairs (tomentose). The leaves are linear, about 15–30 cm long, 1–2 cm wide, and have striking deeply serrated (saw-like) margins. The large mature acorn-shaped cylindrical flower spikes are conspicuous orange in colour, about 7–15 cm long, 8 cm diameter, and occur at the end of the branches (terminal). Flower spikes are composed of many 100s of densely packed cream flowers with an orange visible limb towards the apex. Up to 60 dry fruits (follicles, formed from 1 carpel, splitting along a single suture, enclosing the seed) develop attached to a woody cone. The seeds are generally retained within the cone until burnt. The hard seed is 1 cm long, 0.5–0.6 cm wide, with a notched papery wing, combined seed and wing are 1.6–1.9 cm long. **Fig. 4**.

Native to: Western Australia.

Worldwide: Not known to have naturalised elsewhere in the world (POWO 2024). Commonly grown as a garden ornamental in Mediterranean-type climates and warm-temperate areas around the world.

Distribution in Australia: Native to Western Australia (WA). It is not known to have naturalised elsewhere in Australia. It is suited to cultivation in areas with a dry summers and wet mild winters. Several cultivated specimens appear on AVH (2024) from SA, Victora and New South Wales (NSW).

Collections in SA: A single collection, *C.J. Brodie* (*CJB*) *10413 & A. Murrell*, from Kangaroo Island, on Stokes Bay Road, made on 23 May 2023. Of the 3 self-established plants on the roadside verge next to an 'Australian Native Bush Garden', the largest plant in flower was collected. The other two were smaller without flowers. The seed likely spread, from cultivated plants from the neighbouring native bush garden, aided by the 2019/20 bush fires.

Status in SA: A new questionably naturalised record for SA and the Kangaroo Island Landscape South Australia region. Added to the Census for SA and the Kangaroo Island (KI) Herbarium region as questionably naturalised (for adventive), based on *CJB 10413 & A. Murrell*.

References: George (1999); APC (2024); AVH (2024); POWO (2024).



Fig. 4. *Banksia prionotes* growing on Stokes Bay Road, Kangaroo Island (*CJB 10413 & A. Murrell*). Images: Chris Brodie.

Calothamnus quadrifidus subsp. angustifolius (Ewart) A.S.George & N.Gibson

Synonym: Melaleuca quadrifida subsp. angustifolia (Ewart) Craven & R.D.Edwards

Common name: One-sided Bottlebrush

Description: Erect or spreading shrub to 2.5–4 m tall, without lignotuber. Plants that lack a lignotuber cannot regenerate vegetatively after being burnt in a bushfire and rely on seed for regeneration. Stems have long hairs (pilose) or are downy having short soft erect hairs (pubescent), but they eventually lose most or all hairs, or sometimes have none (glabrous). Leaves are needle-like (narrowly linear), 2–5.5 cm (sometimes to 8.5 cm long), 0.1–0.3 cm wide, occasional with silky hairs and commonly with small pustules. Flowers have parts in 4s (4–merous), usually produced among older leaves, commonly arranged on one side of the stem. The green sepals are 1–2.5 mm long and have a dense covering of short woolly hairs (tomentose) inside. Petals are 3.5–4 mm long, soon falling. The showy part of the flowers are not the petals but the bright to deep red staminal bundles that are \pm equal in size, 1.8–3.5 cm long. Female pistil 2.2–3.5 cm long. Fruits are woody, grey, smooth or warty and barrel-shaped, 0.6–1 cm long. Seeds 1.4–2 mm long, smooth. **Fig. 5.**

Native to: Western Australia.

Worldwide: Not known to have naturalised elsewhere in the world (POWO 2024). Occasionally grown as a garden ornamental in Mediterranean-type climates and warm-temperate areas around the world.

Distribution in Australia: Native to WA. It is not known to have naturalised elsewhere in Australia. It is suited to cultivation in areas with a dry summers and wet mild winters. A single cultivated specimens appears on AVH from Queensland.

Collections in SA: A single collection, *CJB 10572 & P.J. Lang*, from Belair National Park, near Lodge Track, made on 20 Oct. 2023. Of the 4 self-established plants seen, two were in flower, with the largest plant just under a metre tall, also with last year's fruits retained on the older stem. The two other smaller plants to 30–40 cm tall were without flowers or fruits. Growing in natural Grey-Box and Blue-Gum woodland with local natives and other introduced Australian natives that were also regenerating in an area that was burnt 12 years ago in a controlled burn.

Status in SA: A new questionably naturalised record for SA and the Green Adelaide Landscape South Australia region. Added to the Census for SA and the Southern Lofty (SL) Herbarium region as questionably naturalised (for adventive), based on *CJB 10572 & P.J. Lang.*

References: George & Gibson (2010); APC (2024); AVH (2024); POWO (2024); WFO (2024).



Fig. 5. Calothamnus quadrifidus subsp. angustifolius at Belair National Park (CJB 10572 & P.J. Lang). Images: Chris Brodie.

Colocasia esculenta (L.) Schott

Common name: Taro

Description: A large robust herbaceous colony-forming plant growing up to 1-1.5 m tall, producing large tuberous creeping underground stems (rhizomes) to 5 cm diameter. The large tropical looking heart-shaped leaves, 15-70 cm long, up to 30 cm wide, are held aloft on thick spongy purple stalks (petioles), 30-120 cm long, in groups of a few to several. The narrow flower clusters are 6-20 cm long, borne on short stalks below the height of the leaves. The flower spike is typical of the Araceae family consisting of a spadix (a stout inflorescence with a succulent axis with many short stout flowers), with the female flowers at the base and male flowers towards the tip, and a spathe (a large bract surrounding the inflorescence), to 20-35 cm long, light green to greenish yellow in colour. The fruits are small oval berries, 3-5 mm long, turning orange or red as they mature. **Fig. 6**.

Native to: Its native occurrence is somewhat unclear as its current distribution is pan-tropical and pansubtropical due to its historical and sometimes continuing cultivation as the staple starch crop in these areas. Thought to be native to Asia, from southern China and Taiwan, to the Indian subcontinent (including India, Nepal, Bangladesh) and south-east Asia (including Laos Myanmar, Thailand, Malaysia and Indonesia). Some authors claim that it is native in northern Western Australia.

Worldwide: Introduced to much of Africa, Asia-Temperate, Asia-Tropical, Australasia, Europe, North America, South America and the Pacific Islands.

Distribution in Australia: Listed as native and introduced in WA (APC 2024). Grown around Australia as an ornamental and for its edible rhizome. Naturalised in NSW, NT, Queensland and parts of WA.

Collections in SA: There are two collections both made from the same location in Athelstone, a suburb of Adelaide, growing in the creek line along River Torrens Linear Reserve. The first collection, *C. Ricci sub CJB 9235*, made on 13 Jan. 2020, was from a patch 2.5 m × 2.5 m. The origin was unclear and as such the plant was listed as cultivated. The second collection, *CJB 10788*, made on 23 Nov. 2024 recorded 3 larger patches at the same location. The largest, $10 \text{ m} \times 5 \text{ m}$, and 2 smaller patches, all bigger than 2.5 m × 2.5 m. X 2.5 m. Since 2020 these *C. esculenta* plants have expanded in area, excluding the locally dominant native species *Phragmites australis*.

Status in SA: A new naturalised record for SA and the Green Adelaide Landscape region. Added to the Census for SA and the Southern Lofty (SL) Herbarium region as naturalised, based on *CJB 10788*.

References: Green (1994); APC (2024); AVH (2024); PlantNET (2024); POWO (2024).



Fig. 6. *Colocasia esculenta*. At Athelstone, a north-eastern suburb of Adelaide, on the River Torrens Linear Reserve, access via Linear Park Drive (*CJB 10788*). Images: Chris Brodie.

Family: Proteaceae

Grevillea leucopteris Meisn.

Common name: White Plume Grevillea

Description: A dense rounded shrub, 2–4 m tall, with emergent flowering branches (inflorescences). Leaves are arranged alternately on the stem, grey green with many long white hairs, with the upper and lowers surfaces dissimilar. Leaves are 12–35 cm long, pinnately divided almost to the central axis (midrib) with 11–23 (or 5–10 pairs of) narrow lobes (leaflets), 10–20 cm long, 0.1–0.4 cm wide. The leaflet margins are curved downwards (recurved) enclosing the lower surface of the leaf blade. The young tall, long-arching pubescent (hairy) glandular flowering stems (inflorescences) are held above the leaves, having groups of pinkish flower-buds with pinkish brown floral bracts. Flowering stems are leafless or occasionally with few leaves at the base. Groups of white to cream flowers are produced in cylindrical flowering spikes, 10–15 cm long. The flowering spikes are produced in clusters along the arching main inflorescence. The dry smooth hairless fruit (follicle) is a compressed obolid (3-dimensional equivalent of oblong) to ellipsoidal (3-dimensional shape, elliptic in all sections through long axis), 20–24 mm long, producing a single seed per fruit. **Fig. 7.**

Native to: Western Australia.

Worldwide: Not known to have naturalised elsewhere in the world (POWO 2024). Occasionally grown as a garden ornamental in Mediterranean type climates and warm-temperate areas around the world.

Distribution in Australia: Native to WA. It is not known to have naturalised elsewhere in Australia. It is grown as a garden ornamental in Australia, suited to cultivation in areas with a dry summer climate. Cultivated specimens appear on AVH from NSW, Queensland and SA.

Collections in SA: There are two collections from the same plant, from Kangaroo Island on Stokes Bay Road, with no other plants seen. The first collection, *CJB 9873, L. Williams & S. Berry*, made on 20 June 2022, was vegetative only (in leaf with no reproductive structures present) and identification could not be confirmed. The second collection, *CJB 10412 & A. Murrell*, made on 23 May 2023, with reproductive structures (plant in bud with the previous year's fruits also present), allowed for positive identification. The seed likely spread from cultivated plants in the neighbouring native bush garden aided by the 2019/20 bush fires.

Status in SA: A new questionably naturalised record for SA and the Kangaroo Island Landscape region. Added to the Census for SA and the Kangaroo Island (KI) Herbarium region as questionably naturalised (for adventive), based on *CJB 10412 & A. Murrell*.

References: Makinson (2000); Western Australian Herbarium (1998–); APC (2024); AVH (2024); PlantNET (2024); POWO (2024).



Fig. 7. *Grevillea leucopteris* growing on Stoke Bay Road, Kangaroo Island (*CJB 10412 & A. Murrell*). Images: Chris Brodie.

Hakea petiolaris subsp. trichophylla Haegi

Common name: Sea Urchin Hakea

Description: A large shrub or small narrow tree, 3–9 m tall, without lignotuber. Plants that lack a lignotuber cannot regenerate vegetatively after being burnt in a bushfire and rely on seed for regeneration. The flat elliptic to spathulate leaves, 8–11 cm long including leaf-stem (petiole), petiole 1–1.6 cm long, are widest around the middle, 3.2–6 cm wide, usually with 3 longitudinal veins but sometimes with 1–4 longitudinal veins, with prominent reticulate (secondary) veins seen from above and below. The leaf tip is pointed (abruptly acuminate). Leaf surfaces are evenly appressed-hairy (pubescent) at flowering time. Inflorescences (flowering spikes) are borne in or arising from the base of a leaf (axillary), or at leafless nodes (the part of a stem where leaves or branches arise), with 120–200 cream flowers turning mauve to maroon with age. The hard, woody grey-brown beaked fruit is elliptic to ovate-elliptic, 2.2–2.5 cm long, 1.2–1.6 cm wide, producing a single blackish brown to black winged seed, 1.4–2.2 cm long, with the wing extending broadly down both sides of the seed body (narrower on one side), sometimes narrowly around base. **Fig. 8.**

Native to: Western Australia.

Worldwide: Not known to have naturalised elsewhere in the world (POWO 2024). Rarely grown as a garden ornamental in Mediterranean type climate and temperate areas around the world.

Distribution in Australia: Native to WA. It is not known to have naturalised elsewhere in Australia. It is suited to cultivation in areas with a dry summer climate. A single cultivated specimens appears on AVH from the ACT, growing at the Australian National Botanic Gardens.

Collections in SA: A single collection from Highbury Aqueduct Reserve, adjacent to Valley View Road, *CJB 10506, K.A. Hill & D.B. Frasier*, made on 14 Sep. 2023. Only about 12 large self-established erect slim woody trees to 6–7 metres tall. Many of the small seedlings and saplings have been removed by National Parks and Wildlife Service South Australia staff, as this taxon is a known established weed at this location, i.e. in native vegetation in open *Eucalyptus* woodland with introduced Spotted Gum, Blue Gum, over *Bursaria spinosa* with other weedy grasses and herbs.

Status in SA: A new naturalised record for SA and the Green Adelaide Landscape region. Added to the Census for SA and the Southern Lofty (SL) Herbarium region as naturalised (for sparingly established), based on *CJB 10506, K.A. Hill & D.B. Frasier*.

References: Barker *et al.* (1999); Western Australian Herbarium (1998–); APC (2024); AVH (2024); POWO (2024).



Fig. 8. *Hakea petiolaris* subsp. *trichophylla* at Highbury Aqueduct Reserve, Adelaide (*CJB 10506, K.A. Hill & D.B. Frasier*). Images: Chris Brodie.

Opuntia leucotricha DC.

Common name: Aaron's Beard Prickly Pear

Description: An erect shrub that in its native range can grow 1–3 (–4.5) m high with distinct trunk to 90 cm long, 15–30 cm diameter. Plants in SA recorded to 2 metres tall. Pads (also called stems or cladodes) are branched, dull green to grey-green, oval to circular, obovate (egg-shaped and widest near the apex) to cordate (heart-shaped) in SA specimens, 9–27 cm long, 7–15 cm wide, covered in 30–80 circular areoles, 2.5–3 mm diameter, that are evenly spaced on pads, 2.5–3 cm apart. Spines, glochids, leaves, flowers, fruits, roots and new shoots (pads) all grow out of the areoles. 1–6 white straight spines, 1.2–2 cm long, are produced in each areole on newer pads, with the number of spines reducing in number on older pads on the lower areolas, and sometimes absent on the very lowest. Older pads have spines up to 5–7 cm long (not seen in SA). Many (100s of) brownish bristles, called glochids, to 0.9 cm long, are produced in each areole. Flowers are yellow, sometimes tinged with red, 5–7 cm diameter, usually on the top section of the pads, present in late spring to early Autumn. Fruits are pale yellow sometimes pinkish, barrel-shaped, 2–5 cm long, 2–3 cm wide, with spines and glochids. Small dark seed to 2 mm long are produced but it is unknown if these are viable. NSW WeedWise (2024) state that Aaron's Beard Prickly Pear is not known to produce seeds in Australia. **Fig. 9.**

Native to: Mexico

Worldwide: Naturalised in Southern Africa, Italy, Portugal, Spain and Australia. Also grown as an ornamental around the world, mostly by cactus enthusiasts.

Distribution in Australia: A known weed in Queensland and NSW, and doubtfully naturalised in Victoria.

Collections in SA: There are two historical databased locations both with two collections each. Initial (first) collections from the two sites were made by external collectors with follow-up (second) collections made by Hon. Research Associate R.J. (Bob) Chinnock. The first site and collection, *L. Edmunds s.n.*, made on 4 Mar. 2006, from Wirrealpa Creek, 4 km east of Martins Well / Wirrealpa Road, Flinders Ranges, was from single plant growing in a creek under a River Red Gum. Bob Chinnock returned to the site and made a second collection from the same plant, *R.J. Chinnock 10086*, on 7 Nov. 2006. The second site and collection, *Kym Haebich s.n.*, made in Nov. 2006, was south of Mannum and north of Murray Bridge, 3–4 km from Caloote on Zadow Landing Road, from a small population. Bob Chinnock again returned to the site and made a second collection from the same population, *R.J. Chinnock 10099*, on 3 January 2007. There are some recent un-databased collections made in 2023 and 2024 by other collectors.

Status in SA: A new naturalised record for SA and the South Australian Arid Lands, as well as the Murraylands and Riverlands Landscape regions. Added to the Census for SA and the Flinders Ranges (FR) and Murray (MU) Herbarium regions as naturalised, based on *R.J. Chinnock 10086 & R.J. Chinnock 10099* and the recently submitted un-databased collections.

References: Benson (1982); NSW Weedwise (2024).



Fig. 9. Opuntia leucotricha plants (R.J. Chinnock 10086 & 10099). Images: Bob Chinnock.

Opuntia rufida Engelm.

Common name: Blind Cactus (or Blind Prickly Pear)

Description: A dense low-growing creeping shrub to 40–80 cm high, up to 1.5 m tall, in its native range, with many branched blue-green to grey-green pads (also called stems or cladodes) covered in velvety hairs. The pads are 6–15 cm long, 4–12 cm wide, oval to circular, obovate. Pads lack spines but are covered in circular areoles 3 mm diameter evenly spaced on pads, 0.5–2 cm apart. Each areoles produces dense tufts of 100s of red-brown barbed bristles called glochids, each glochid is 2–3 mm long. Leaves, flowers, fruits, roots and new shoots (pads) all grow out of the areoles. Flowers are yellow, sometimes with a green centre, 6–7 cm long and wide. Fruits are fleshy, prickly-pear-like, also covered in areoles with dense tufts of glochids. Mature fruits are bright red, 2.5 cm long, 1.5–2 cm wide. Not known to produce seeds in Australia. Similar in appearance to *Opuntia microdasys* (Bunny Ears Cactus), which normally has smaller yellow or white, rarely brown glochids. **Fig. 10**.

Native to: Northern Mexico and the southern United States (Texas).

Worldwide: Known to have naturalised in Europe in Spain and Greece. Grown around the world as an ornamental, mostly by cactus enthusiasts.

Distribution in Australia: Introduced into Australia as an ornamental plant. NSW Weedwise (2024) reports infestations in the north-west region of NSW, with (cultivated) plants found in gardens in the Greater Sydney region, but no NSW records are available on AVH (2024). In Queensland, AVH (2024) displays many cultivated records, with no wild weedy records. Not recorded by APC (2024) and AVH (2024) to have naturalised elsewhere in Australia.

Collections in SA: A single collection from Yackara Station, north of Carrieton, about 100 meters from the homestead and Yackara Creek, *CJB 10749 & R.J. Chinnock*, made on 21 Nov. 2023. Three low growing patches present, with the collection made from the smallest but tallest plants with older flowers / fruits that was growing in between *Opuntia puberela*. The two other patches were growing under *Pinus halepensis*, about 1.5–2 m in diameter, no more than 25–40 cm tall, without flowers or fruits.

Status in SA: A new questionably naturalised record for South Australia and the Northern and Yorke Landscape region. Added to the Census for SA and the Flinders Ranges (FR) Herbarium region as questionably naturalised (for sparingly established), based on *CJB 10749 & R.J. Chinnock*.

References: Benson (1982); NSW Weedwise (2024).



Fig. 10. *Opuntia rufida* with blue-green pads growing between a large patch of green pads of *Opuntia puberula*, north of Carrieton on Yackara Station (*CJB 10749 & R.J. Chinnock*). Images: Chris Brodie.

4. Updates to weed distributions in South Australia, weed status and name changes

In addition to the new State species records, 18 weed taxa had updates made in the Census during the last year (reporting period 13 May 2023–22 May 2024). These are changes to **distribution**, **names** or **weed / establishment status** (Table 3) for plants already listed in the Census.

A change in **distribution** includes:

- addition of regions due to new collections, corrected or updated identifications, or reassignment of recorded locations to their correct regions.
- deletions of regions due to corrected or updated identifications, or reassignment of recorded locations to their correct regions.

A name change could be:

- a change in genus, species or infra-specific name (subspecies, variety, form, or cultivar)
- adding or removing an infra-specific name.

These changes may result from the application of new or recently accepted taxonomic classifications adopted in South Australia, or merely through application of the rules of botanical nomenclature to existing taxonomy.

A change of **weed / establishment status** in one or more regions; this can be change from one of the following to another:

- naturalised / established in the wild (*)
- questionably established (?e)
- native (n)
- questionably native (?n).

Table 3: Updates to weed distribution, weed status and name changes.

Update type:

- **'Distribution'** indicates a change in the regional distribution (new regions shown in **bold**, deleted regions with strike through).
- **'Name'** indicates a name change only.
- 'Status' indicates a change in the weed / establishment status applied to each region: * = naturalised (i.e., established in the wild), ^{?e} = questionably naturalised / established^{**}, ⁿ = native, ^{?n} = questionably native, ^{?id} = questionable identification.

Update / comment: State Herbarium regions: A key to the two-letter codes is provided in Appendix 2 Fig. 11.

Collector abbreviations: *CJB* = C.J. Brodie. The collection date is given in brackets.

** Note: the questionably naturalised / established category (?e) as applied in the Census is used very broadly, but is here subdivided into the following three major categories by the addition of further qualifications:

- (1) questionably naturalised (for establishment status uncertain): usually due to lack of data or ambiguity
- (2) questionably naturalised (for doubtfully established): only a very limited extent or small numbers of self-established plants.
- (3) questionably naturalised (for becoming established, or adventive): presumed temporary/transient establishment where longer-term persistence or viability of population occurrence is not apparent or likely.

Taxon	Update type	Update / comment
<i>Allium triquetrum</i> L. Three-cornered Garlic	Distribution	EP*, NL *, MU ^{?e} , SL*, KI*, SE* Added NL as naturalised, based on <i>CJB 5092</i> (25 Sep.2013), supported by <i>CJB 5794</i> (2 Oct. 2014).
<i>Alyogyne huegelii</i> (Endl.) Fryxell	Name	EP ^{?n,*} , SL* Name change from <i>Alyogyne</i> sp. Walkers Rocks (<i>M.L. Evans 259</i>) P.J. Lang to <i>Alyogyne huegelii</i> (Endl.) Fryxell, following Lang <i>et al.</i> (2023).
<i>Convolvulus sabatius</i> Viv. subsp. <i>mauritanicus</i> (Boiss.) Mirb. Mauritian Bindweed	Status	SL* Changed status for SL region from questionably naturalised to naturalised, based on <i>CJB 10791</i> (29 Nov. 2023).
<i>Cosmos bipinnatus</i> Cav. Garden Cosmos	Distribution	EP ^{?e} , NL ^{?e} , SL ^{?e} , SE ^{?e} Added NL as questionably naturalised, based on <i>CJB</i> <i>10781</i> (22 Nov. 2023).
<i>Dietes iridioides</i> (L.) Sweet ex Klatt	Name	SL ^{?e} Corrected spelling from "iridoides" to "iridioides" and corrected authorship from "Sweet" to "(L.) Sweet ex Klatt".
<i>Erigeron bilbaoanus</i> (J.Remy) Cabrera Fleabane	Name	Name change from <i>Conyza bilbaoana</i> J.Remy to <i>Erigeron bilbaoanus</i> (J.Remy) Cabrera, following APC (2024).

Taxon	Update type	Update / comment
<i>Erigeron bonariensis</i> L. Flax-leaf Fleabane	Name	Name change from <i>Conyza bonariensis</i> (L.) Cronquist to <i>Erigeron bonariensis</i> L., following APC (2024).
<i>Erigeron canadensis</i> L. Canadian Fleabane	Name	Name change from <i>Conyza canadensis</i> (L.) Cronquist var. <i>canadensis</i> to <i>Erigeron canadensis</i> L., following APC (2024).
<i>Erigeron sumatrensis</i> Retz. Tall Fleabane	Name	Name change from <i>Conyza sumatrensis</i> (Retz.) E.Walker to <i>Erigeron sumatrensis Retz.</i> , following APC (2024).
<i>Eucalyptus</i> <i>conferruminata</i> D.J.Carr & S.G.M.Carr subsp. <i>recherche</i> D.Nicolle & M.E.French Bald Island Marlock	Distribution	SL*, KI ^{?e} Added KI as questionably naturalised, based on <i>CJB 10395</i> (22 May 2023).
<i>Euphorbia prostrata</i> Aiton Prostrate Spurge	Distribution	FR *, EP*, SL* Added FR as naturalised, based on <i>CJB 10888</i> (7 Feb. 2024).
<i>Hippeastrum zephyranthum</i> Byng & Christenh.	Name	Name change from <i>Zephyranthes candida</i> (Lindl.) Herb. to <i>Hippeastrum zephyranthum</i> Byng & Christenh., following APC (2024).
<i>Iris pseudacorus</i> L. Yellow Flag Iris	Distribution	MU *, SL* Added MU as naturalised, based on <i>CJB 10619</i> (31 Oct. 2023).
<i>Leonotis leonurus</i> (L.) R.Br. Lion's Tail	Distribution	SL ^{?e} , KI ^{?e} Added KI as questionably naturalised, based on <i>CJB 10422</i> (24 May 2023).
<i>Melinis repens</i> (Willd.) Zizka Red Natal Grass	Distribution	NW*, FR*, EP*, NL*, SL * Added SL as naturalised, based on <i>CJB 10472 & J. Smith</i> (3 July 2023).
<i>Prunus persica</i> (L.) Batsch subsp. <i>nucipersica</i> (L.) Dippel Nectarine	Name	Name change from <i>Prunus persica</i> var. <i>nectarina</i> (Aiton) Maxim. to <i>Prunus persica</i> (L.) Batsch subsp. <i>nucipersica</i> (L.) Dippel, following APC (2024).
<i>Sabulina mediterranea</i> (Ledeb. ex Link) Rchb. Slender Sandwort	Name	Name change from <i>Minuartia mediterranea</i> (Link) K.Maly to <i>Sabulina mediterranea</i> (Ledeb. ex Link) Rchb., following APC (2024).
<i>Sixalix atropurpurea</i> (L.) Greuter & Burdet Pincushion or Scabious	Name	Name change from <i>Scabiosa atropurpurea</i> L. to <i>Sixalix atropurpurea</i> (L.) Greuter & Burdet, following APC (2024).

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Appendix 1: Activities of the Weeds Botanist

Surveillance based on field observations and collections.

Table 4: Summary of field surveys and collections

Activities of the Weeds Botanist, Chris Brodie (CJB), State Herbarium of South Australia (SHSA), with other participants listed individually. **No.** = Number of collections.

Date(s)	Landscape Region	Participants	No.	General Location	Significant weed collections
3 July 2023	Green Adelaide	CJB; Jerry Smith (BGSH)	3	Adelaide, Edwardstown, South Road	New regional record for Green Adelaide Landscape region of <i>Melinis repens</i> (CJB 10472)
2 Aug. 2023	Hills & Fleurieu	СЈВ	3	Adelaide Hills, Crafers	Garden escapees including Scrophularia auriculata
10 Aug. 2023	Green Adelaide	CJB; Sam Ryan (City of Marion Council)	1	Bedford Park, Warriparinga Garden beds	An unknown self-sown sedge. Was this a weed or native? It was a native <i>Cyperus exaltatus</i>
25 Aug. 2023	Green Adelaide	CJB; Simon Harper & Jeff Dinham (City of West Torrens Council)	10	Lockleys, River Torrens Linear Park	Identification of garden escapee for Council staff: <i>Euphorbia lathyris, Cestrum</i> <i>parqui</i> and other weeds
30 Aug. 2023	Hills & Fleurieu	СЈВ	3	Teringie, Old Norton Summit Road	Common roadside weeds
5 Sep. 2023	Green Adelaide	CJB	2	Morphett Vale, by Sturt River	Collection & identification of garden escapee: <i>Passiflora caerulea</i>
8 Sep. 2023	Green Adelaide	CJB; Doug Fotheringham (SHSA); Danny Millbanks (City of Port Adelaide Enfield Council)	3	Adelaide Botanic Gardens & Port Gawler Beach	New regional record for Green Adelaide Landscape region of Ornithopus compressus and the under-collected coastal plant <i>Glaucium flavum</i>
14 Sep. 2023	Hills & Fleurieu / Green Adelaide	CJB; Katherine Hill and David Bruce Frasier (NPWSA)	9	Filsell Hill Conservation Park; Mount Osmond Reserve; Highbury Aqueduct Reserve	Collection of mostly introduced interstate Australian plants including an unknown Philotheca species (<i>CJB 10499</i>); new State record of Hakea petiolaris subsp. trichophylla (<i>CJB 10506</i>)
19 Sep. 2023	Green Adelaide	СЈВ	3	Adelaide, St Kilda	Common weeds
20 Sep. 2023	Hills & Fleurieu	СЈВ	2	Teringie, Old Norton Summit Road.	Fresh material required to confirm identity of existing collections of <i>Hyacinthoides</i> non-scripta
22 Sep. 2023	Hills & Fleurieu	CJB; Susan Ivory (Hills & Fleurieu)	1	Adelaide Hills, Stirling	Prunus avium

Date(s)	Landscape Region	Participants	No.	General Location	Significant weed collections
27 Sep. 2023	Green Adelaide / Hills & Fleurieu	СЈВ	2	Adelaide Botanic Gardens, Norton Summit	Dahlia imperialis in fruit
29 Sep. 2023	Hills & Fleurieu	СЈВ	1	Teringie, Old Norton Summit Road	Geranium purpureum
3–4 Oct. 2023	Limestone Coast	CJB; Bill Barker (SHSA)	29	Gum Lagoon, Keith, Main Highway	Common and roadside weeds
9 Oct. 2023	Green Adelaide	СЈВ	3	Adelaide, Teringie, Magill Road	<i>Robinia pseudoacacia</i> and <i>Populus alba</i> in flower
17 Oct. 2023	Hills & Fleurieu	СЈВ	7	Teringie, Old Norton Summit Road	Roadside weeds
18 Oct. 2023	Green Adelaide	CJB, Shannon Robertson & Julie Schofield (Green Adelaide)	2	Adelaide, St Peters Billabong	<i>Vallisneria</i> species
20 Oct. 2923	Green Adelaide / Hills & Fleurieu	CJB; Peter Lang (SHSA)	19	Adelaide Hills, Cleland National Park, Crafers, Belair Conservation Park	Collection of introduced Australian plants, including a new regional record for Green Adelaide Landscape region of Calothamnus quadrifidus subsp. angustifolius (CJB 10572)
23 Oct. 2023	Green Adelaide	СЈВ	1	Adelaide Botanic Gardens	Nothiscordum borbonica
26 Oct. 2023	Hills & Fleurieu	СЈВ	1	Norton Summit, Lobethal Road	Roadside weed, Torilis arvensis
27 Oct. 2023	Green Adelaide	CJB; Shannon Robertson & Julie Schofield (Green Adelaide)	4	Adelaide, Waterfall Gully, Stonyfell Hallet Reserve, Elizabeth.	Nassella neesiana, Torilis arvensis, Arum species
30 Oct. – 3 Nov. 2023	Murraylands and Riverland	CJB; Scott Hutchins (Murraylands and Riverlands)	134	Murray River area including Berri, Murray Bridge, Blanchetown, Swan Reach	Variety of native and weedy plants. A new regional record for Murraylands and Riverland Landscape region of <i>Iris</i> <i>pseudacorus</i> (<i>CJB</i> 10619).
13 Nov. 2023	Hills & Fleurieu	СЈВ	2	Norton Summit, Lobethal Road	Native <i>Rytidosperma</i> sp., unknown purple fungi
15 Nov. 2023	Green Adelaide	CJB; Simon Harper & Jeff Dinham (City of West Torrens Council); Julie Schofield (Green Adelaide)	6	Adelaide, Glenelg North, Lockleys	Several collections of Nothiscordum borbonica
17 Nov. 2023	Green Adelaide	CJB; Monica Seiler & Julie Schofield (Green Adelaide)	12	Adelaide's northern suburbs, Main North Road.	Nassella neesiana, Hyparrhenia hirta, Ecballium elaterium.

Date(s)	Landscape Region	Participants	No.	General Location	Significant weed collections
20–22 Nov. 2023	Northern and Yorke (N&Y)	CJB; Bob Chinnock (SHSA); N&Y Landscape SA staff	52	Orroroo and surrounds	A new State record of an opuntiod cactus Opuntia rufida and the unknown cactus Echinopsis sp. (<i>CJB</i> 10755). New regional record for N&Y region of Cosmos bipinnatus (<i>CJB</i> 10781).
23 Nov. 2023	Green Adelaide	CJB; Sour-Sob Bob (weed contractor)	2	Adelaide, Athelstone	A new State record of Colocasia esculenta (CJB 10788).
29 Nov. 2023	Hills & Fleurieu	CJB; Ron Taylor (SHSA volunteer collector)	33	Encounter Bay, Goolwa	Under-collected weeds, including naturalised <i>Convolvulus sabatius</i> subsp. <i>mauritanicus</i>
31 Dec. 2023	Northern and Yorke (N&Y)	CJB & Katherine Hill (NPWSA)	6	Balgowan	Regional weeds and confirming if some <i>Eucalyptus</i> species were native or weedy
2 Feb. 2024	Green Adelaide	CJB; Shannon Robertson & Julie Schofield (Green Adelaide)	14	Adelaide's northern suburbs	Collection and mapping of Green Adelaide priority weed <i>Alternanthera pungens</i> (Khaki Weed)
5–7 Feb. 2024	South Australian Arid Lands (SAAL)	CJB	51	Port Augusta, Quorn	General weed collection including declared grasses and cacti. A new regional record for SAAL region of Euphorbia prostrata (CJB 10888).
9 Feb. 2024	Green Adelaide	CJB; Shannon Robertson (Green Adelaide)	7	Aldinga Eco Village and surrounds	General weed collection
16 Feb. 2024	Green Adelaide	CJB; Shannon Robertson (Green Adelaide)	9	Known Buffel Grass locations, Bowden, Mile End, Netley, Virginia.	General weed collection, Alternanthera pungens and Cenchrus ciliaris
20 Feb. 2024	Green Adelaide	CJB; Danny and Tyla (ABG)	2	Adelaide Botanic Gardens, First Creek	Weeds unknown to garden staff
8 Mar. 2024	Green Adelaide	СЈВ	1	Walkerville	Previously unknown and overgrown garden plant, <i>Bosea amherstiana</i>
26 Mar. 2024	Hills & Fleurieu	СЈВ	1	Adelaide Norton Summit, Lobethal Road	Roadside weed, Erigeron sumatrensis
8–12 Apr. 2024	Northern and Yorke (N&Y)	CJB; Northern and Yorke Landscape SA staff	77	North of Port Wakefield and south of Port Augusta	Buffel Grass (<i>Cenchrus ciliaris</i>) survey, many records, and a new regional record for <i>Bidens</i> <i>pilosa</i>
16 Apr. 2024	Green Adelaide	CJB; City of Port Adelaide Enfield staff	6	Largs Bay	Unknown <i>Acacia</i> species and general weeds
23 Apr. 2024	Hills & Fleurieu, Green Adelaide	Mount Loft Botanic Gardens & Walkerville	6	Mount Lofty Botanic Gardens & Walkerville Linear Park	Garden Escapees including Vincetoxicum barbatum, Maytenus boaria & Lilium formosanum

Date(s)	Landscape Region	Participants	No.	General Location	Significant weed collections
29 May 2024	Green Adelaide	CJB; Shannon Robertson (Green Adelaide)	2	Private Gardens	Cenchrus species

Community engagement

Table 5: Summary of community and professional engagement activities.

Weeds Botanist, Chris Brodie (CJB), State Herbarium of South Australia (SHSA), with other participants as listed.

Date(s)	Other participants	Location	Presentation title / subject	Audience / Society	# of Att.
10 Aug. 2023	Sam Ryan, City of Marion Council	Bedford Park, Warrtippinga Reserve	Verbal presentation: Introduction to Weeds and the State Herbarium, followed by weed walk	Friends of Warriparinga	10
21 Sep. 2023	Sam Ryan (City of Marion Council); Pip Robinson (Green Adelaide); Sam Buxton- Stewart (City of Holdfast Bay)	Bedford Park, Warriparinga Reserve	PowerPoint: An introduction to the State Herbarium of South Australia and Weeds, Weeds, Weeds, followed by weed walk	Green Adelaide groups, Friends of Warriparinga	20
1 Dec. 2023	Audience participation	Goodman Building, Adelaide Botanic Gardens	PowerPoint: New and familiar weedy friends (enemies) in South Australia	Weed Management Society of South Australia	12
5 Feb. 2024	South Australian Arid Lands Landscape Board staff	Quorn, main street & railway track	Weeds walk and talk: The State Herbarium and Weeds	Community members	20
7 Feb. 2024	South Australian Arid Lands (SAAL) Landscape Board staff	Port Augusta Old Court House, 1 Jervois Street, Port Augusta	PowerPoint: An introduction to the State Herbarium of South Australia and collection of Weeds for identification	SAAL staff	25
29 Mar. 2024	Green Adelaide community	State Herbarium, Adelaide Botanic Gardens	Webinar: The Wonderful World of Weeds	Green Adelaide's online community	30
16 Apr. 2024	Green Adelaide staff and volunteers	Goodman Building, Adelaide Botanic Gardens	<i>PowerPoint:</i> The State Herbarium and the Wonderful World of Weeds in South Australia , followed by a garden and Herbarium tour	Green Adelaide volunteers	30
14 May 2024	Coastal Officers	Sellicks Beach Community Hall – Riviera Road, Sellicks Beach	PowerPoint: MANCAP Weeds update and re-prioritisation	Green Adelaide's coastal officers and associated coastal staff	30



Appendix 2: State Herbarium regions

Fig. 11. State Herbarium regions for South Australia. Map from J.P. Jessop & H.R. Toelken, *Flora of South Australia* (1986), endpapers.

NORTHERN TERRITORY QUEENSLAND Alinytjara Wilurara South Australian Arid Lands Eyre Peninsula Northern and Yo Northern and Yorke Green Adelaide C Ð Hills and Fle Landscape Management Regions NRM Regions Northern & Yorke de & Mt Lofty Ranges South Australian Arid Lands Alinytjara Wilurara South Australian Murray-Darling Basin Eyre Peninsula South East Kangaroo Island

Appendix 3: Landscape South Australia regions

Fig. 12. Landscape Management regions for South Australia. Map from the Department for Environment and Water, South Australia (DEW).