

Yalata – Fowlers Bay Bush Blitz

**Vascular plants, bryophytes, lichens, macrofungi and
marine macroalgae**

*Yalata Indigenous Protected Area, including Fowlers Bay Conservation Park,
Wahgunyah Conservation Park and Nuyts Archipelago Marine Park,
South Australia*

Survey conducted: 22.11.2021 – 3.12.2021

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Cover photo:

Spinifex hirsutus, coastal dune at Mexican Hat, Fowlers Bay Conservation Park. Photo: T.M. Spokes.

Nomenclature and taxonomy used in this report is consistent with: The Australian Plant Name Index (APNI) <http://www.anbg.gov.au/databases/apni-about/index.htm>; The Australian Plant Census (APC) <http://www.anbg.gov.au/chah/apc/about-APC.htm>; AusMoss <http://data.rbg.vic.gov.au/cat/mosscatalogue>; The Catalogue of Australian Liverworts and Hornworts http://www.anbg.gov.au/abrs/liverwortlist/liverworts_intro.html; and AlgaeBase <https://algaebase.org>

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List of contributors

Table 1. List of contributors to this report.			
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P.J. Lang and E. Leitch at Standard Survey Site 1. Samphire salt swamp, west side of Tallala Well Road, Fowlers Bay CP. Photo: T.M. Spokes.

Abstract

The 2021 Bush Blitz Survey to the far west of South Australia on Yalata Indigenous Protected Area, including Fowlers Bay Conservation Park, Wahgunyah Conservation Park and Nuyts Archipelago Marine Park, provided an opportunity to access a remote region of South Australia and greatly increase the knowledge of the flora of the area.

Vascular plants, bryophytes, lichens, fungi and marine algae from this region are under-represented in herbarium collections. The survey resulted in the collection of 856 vouchered specimens comprising 654 vascular plants, 17 bryophytes, 83 lichens, 1 fungus and 101 marine algae. A total of 334 unique taxa were recorded on the survey, comprising 232 vascular plants, 6 bryophytes, 20 lichens, 1 fungus and 75 marine algae species.

1. Introduction

In 2021, a Bush Blitz survey was conducted in an area of south western South Australia (SA) that incorporated the Yalata Indigenous Protected Area (IPA), Wahgunyah Conservation Park (CP), Fowlers Bay CP and the coastal and near coastal waters of the Nuyts Archipelago Marine Park. This area had an east-west extent of 150 km, and a maximum north-south extent of 145 km along a coastal-inland gradient.

The region is semi-arid with a warm summer and a cold winter, and a mean annual rainfall of 300 mm falling predominantly in winter (BOM 2022). Major vegetation types are low woodlands, mallee, saltmarsh low shrublands, coastal shrublands and grasslands (Brandle 2010). Major landforms include extensive beach sand dunes and stranded beach ridges intermittently capped by calcrete, coastal saline lakes and saline swamps, sandplains and interdune claypans and limestone plains. The marine near-coastal and coastal region are a mix of sandy beaches with extensive seagrass meadows, rocky shores and offshore reefs with associated marine algae.

Previous surveys covering portions of the current survey area have been published as McKenzie & Robinson (1987), Oppermann (1999), Neagle (2009), Brandle (2010) and Fotheringham (2010). The most extensive of these is Neagle (2009), which reports surveys of 132 vegetation sites across the Yalata IPA.

Prior to the expedition, target survey areas were identified that utilised the opportunity made available through Bush Blitz and included:

- Access to sites in a remote region under-represented in herbarium collections, and where there was opportunity with sufficient time to collect extensively. The following activities were prioritised for investigation:
 - vascular plant biodiversity
 - the current status of rare and vulnerable species
 - the extent of exotic species encroachment
 - reviewing and updating species distributions, including extensions to known species ranges as compared to AVH collection records.
- Access to marine near-shore habitats to collect marine macroalgae in a region with very few historical collections. Previous collections from this region were made in the 1950s and more recently in 1994, 2008 and 2010. In addition, the marine macroalgae have been underrepresented in collections nationally. The Yalata-Fowlers Bay Bush Blitz was a combined terrestrial and marine expedition providing an opportunity to collaborate across institutions and organismal groups to investigate marine rocky shore and near-shore marine habitat biodiversity.

Key target groups that were made a focus during site selection for the expedition were:

- Samphires (*Tecticornia* and *Salicornia* spp.) were sought out for more detailed collections to enhance knowledge about population diversity and species distributions along an east-west transect. The Yalata-Fowlers Bay Bush Blitz covered the region between Western Australia (WA) and the Eyre Peninsula (EP) and recently several WA samphire species have been collected in SA as outlying populations on Eyre Peninsula. The survey aimed to fill gaps in their distribution or even identify new species in SA. The extensive Yalata Swamp near the Head of the Bight was identified as a potentially important area for samphires, from previous observations made during the Yalata Swamp survey (Fotheringham 2010). Samphires require fertile collections to clarify nomenclature and would enable the unusual specimens found during the 2010 survey to be evaluated as new species, or at least new records to SA.
- *Santalum* collections across the region are of interest for population diversity studies and can contribute to a database of genetic diversity which will assist in identifying sandalwood (*S. spicatum*) sources in the sandalwood trade and facilitate the detection of illegal harvesting.
- Collections of galls growing on *Samphires* and other chenopods to contribute to ongoing research into the taxonomy and biology of gall midges (Diptera: Cecidomyiidae), which involves State Herbarium mycologist Teresa Lebel. This research is evaluating associations and levels of taxonomic specificity between different midge species and their host plant species, the gall types produced, the micro-fungi species lining the inside of the galls, and the parasitoid wasp species that attack them (Rixon *et al.* 2021).
- Species listed as rare or vulnerable in SA and/or nationally that were known to occur in the survey region. The survey provides an opportunity to investigate the health of populations and to search for new ones in similar habitat.
- There were also specific requests to search for specimens for taxonomic research projects being undertaken at the State Herbarium and elsewhere. These included a potential new taxon allied to *Hibiscus krichauffianus*, another allied to *Maireana lobiflora*, plants in the *Lawrenzia glomerata* complex associated with gypseous salt swamps, *Gunniopsis calcarea* and *Carpobrotus* species. The potential occurrence of some of these was supported by historical collections in the vicinity, while others were inferences based on habitat preferences. The collection of fresh material would also be advantageous for genetic studies.

2. Methods

2.1 Site selection

Initial site selection prior to the expedition was based on a combination of vegetation type, lithology and satellite imagery to identify locations that would maximise likelihood of encountering a diversity of habitats and species. The main goal in site selection was to sample as many different landform and vegetation community types as possible, covering a variety of slopes, aspects and moisture gradients, while taking into account location accessibility. Another priority was to identify locations, where listed rare and vulnerable plant species had previously been recorded in order to check the status of those populations. Potential sites with similar habitat where new records of these species might be found were flagged.

Site access was an important factor and would be dependent upon weather, road conditions, and travel time to and from base camp. Where possible, two potential sites representing similar criteria were provisionally selected to provide flexibility. A subset of sites was then categorized as high priority to assist decision-making in the field. Pre-expedition site selection planning identified 70 proposed sites of interest: 34 in the Yalata IPA, 18 in Wahgunyah CP and 18 in Fowlers Bay CP.

Once onsite, during the evenings on the expedition, planning for the following day's site visits occurred in discussion with the rangers and land managers. Survey coverage benefited from local knowledge of the conditions of the roads and tracks across the survey area. Additionally, permission from local aboriginal leadership acting as advisors to the Bush Blitz expedition was given to take opportunistic collections along the roads and tracks, beyond the scope of our initial documented site selection.

Anticipating some vascular plant vouchers by other expeditioners, who would be interested to know the identity of host plants for their invertebrate collections, we prepared kits to encourage collection of good quality voucher specimens, tissue samples and associated data, and to facilitate transfer of information. The kits contained abbreviated collection data sheets, paper and plastic carry bags together with instructions about the essential details required and how to collect good voucher specimens. This was well received and resulted in the acquisition of additional plant collections, which expanded the coverage of sites beyond that of our initial planning and direct team coverage on the ground. Collections made by the marine invertebrate expeditioners also increased the number of sites covered in coastal near-shore areas. From an initial pre-expedition site selection process identifying 70 sites, we finished the survey with vouchered vascular plant and marine algae collections from 128 sites (Fig. 1–3).

2.2 Survey techniques

Each site was represented by a central GPS location point and collections were always made within a 400 m radius around that point, in most cases within a 100 m radius. More precise location coordinates up to 1 m in accuracy were also recorded for most vouchered specimens within a site. For beach-accessed marine algae sites, collections were made up to 300 m east and west of the GPS location point along the shoreline. At each site, a standardised site data form was completed to provide consistent and comparative site information, comprising date, collector's name, GPS coordinates, locality description and habitat (including dominant vegetation, associated taxa, soil and topography).

Terrestrial survey sites were traversed on foot. Coloured plastic survey markers were placed adjacent to smaller annuals, herbs, grasses, and mosses to assist in relocating them for collection following the initial scan of the site. When making collections, preference was given to material that was flowering or fruiting and had ample foliage at different stages of growth. These attributes improve the prospects for collections to be identified to species (or infraspecific) level with certainty, and they often provide useful data for taxonomic research in the future. For vouchered specimens (excluding lichens and mosses), a fresh subsample of

foliage was placed into silica gel desiccant in a separate bag to optimize preservation and storage for future DNA or tissue analysis.

Marine algae survey sites for drift collections were traversed on foot during the period 1–2 hours either side of a high tide when habitat was exposed and available for collections to be readily made. This also minimised drying out and sun exposure of algae. Specimens were hand collected and kept in fresh seawater prior to processing at the base camp. A small portion of each specimen was placed in silica gel desiccant in a separate bag for future DNA or tissue analysis. Small specimens requiring microscopic examination for identification had a section preserved in 70% ethanol to maintain cell wall integrity.

Additional marine algae specimens collected by expeditioners from Flinders University and the South Australian Museum were subject to survey techniques described in their respective Yalata-Fowlers Bay Bush Blitz reports. State Herbarium expeditioners received these collections in fresh seawater and processed them using the same method as described for the drift material.

2.2.1 Methods used at standard survey sites

Three terrestrial standard survey sites were selected during the expedition in consultation with other terrestrial expedition teams. The purpose was to achieve sampling of all biotic groups being surveyed in three of the more characteristic and well-represented habitat types of the region. The chosen standard survey sites represent major habitat types as follows:

- Standard Survey Site 1 (SSS1): a gypseous samphire salt swamp with occasional shallow sandy rises
- SSS2: open mallee on low undulating dunes of light brown calcareous sandy loam
- SSS3: tussock grassland with scattered shrubs and forbs on open plain.

The selection aimed to maximize difference between the chosen sites. Coastal shrubland was considered as an alternative for SSS3, and although it is a widespread major habitat type in the region it was rejected because of similarities to the understorey of SSS2 (open mallee vegetation).

Site quadrats were positioned to cover relatively uniform and representative vegetation for an area of 100 × 100 m. A star dropper and flag were inserted in the centre of the site, and a second flag placed on the adjacent roadside to assist other surveying expeditioners in finding the site. Collections were made using the same method as described for non-standard survey sites. The three standard survey sites were also surveyed independently by the TERN (Terrestrial Ecosystem Research Network) group using AusPlots standard methodology (White *et al.* 2012). This group also made voucher collections of all species present and it is anticipated that a significant proportion will be incorporated in the State Herbarium of South Australia (AD) collections.

The time of year had an effect on the collection of many grass species. At SSS2 senescent annual grasses were observed, but were unsuitable for inclusion as vouchered specimens and at SSS3 many of the grasses had dispersed their seeds and were either unsuitable for collections as vouchered specimens or lacked the necessary fertile material for definitive identification.

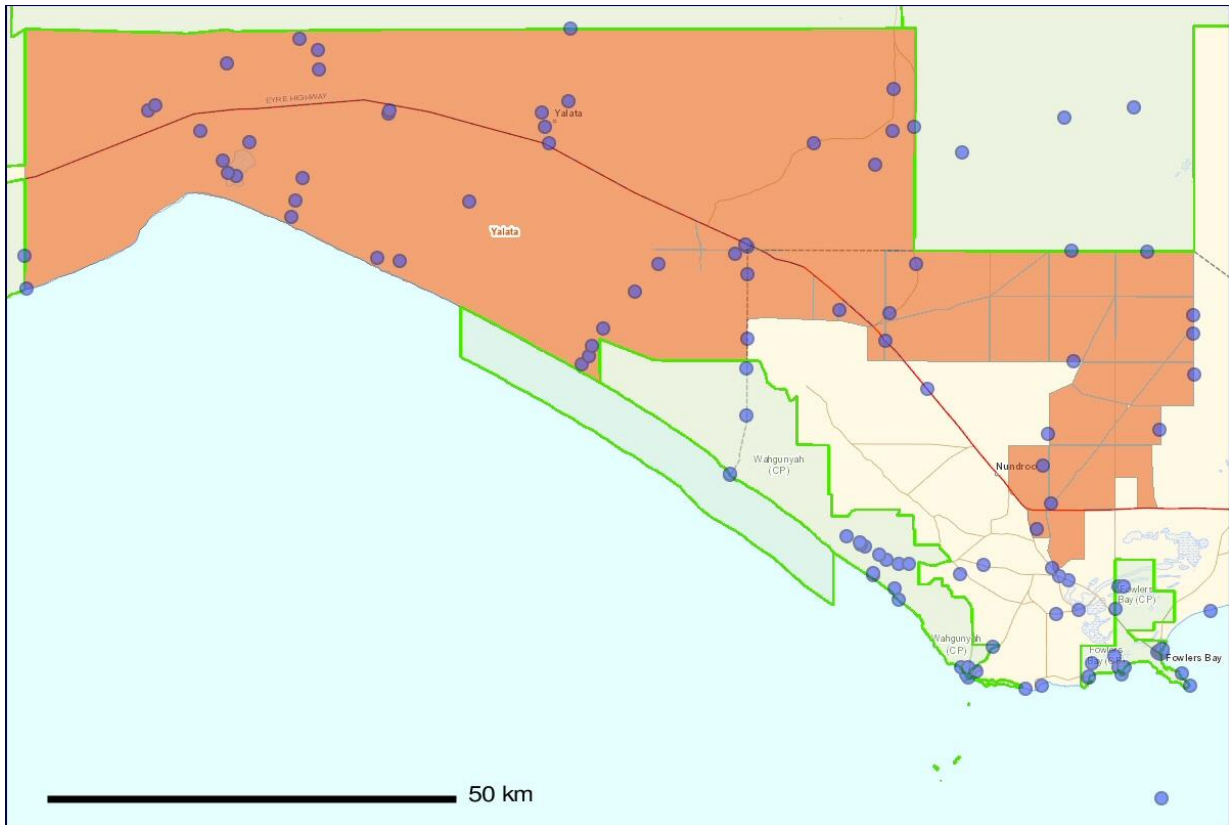


Fig. 1. Distribution of survey sites in the study area.



Fig. 2. Distribution of survey sites near the Fowlers Bay township.

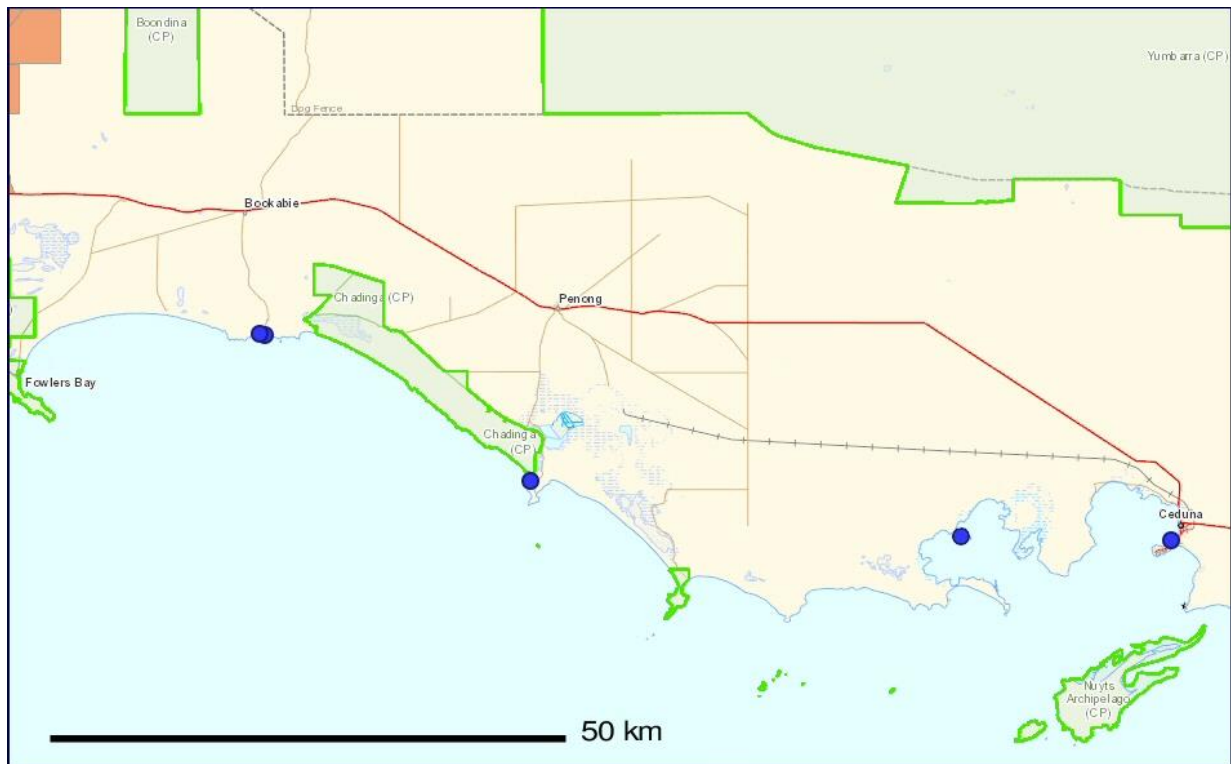


Fig. 3. Distribution of survey sites east of the study area (only marine survey sites).

2.3 Identifying the collections

All vouchered specimens were lodged at the State Herbarium of South Australia, where field identification details were either confirmed or re-determined by expert taxonomists (see Table 1 & 2). Collection data and determination details are recorded in a specimen database which is periodically uploaded to the Atlas of Living Australia and the Australasian Virtual Herbarium.

Main published literature used in the identification of the collections include: *Flora of South Australia* (edition 4) by Jessop & Toelken (1986), updated in edition 5 treatments, edited by Kellermann (2011–), and the online Census of South Australian plants, algae and fungi (State Herbarium of South Australia 2022), for general vascular flora; Wilson & Chinnock (2013) for general Chenopodiaceae, as well as Wilson (1980), Datson (2002) and Coleman (2018) for samphires; Vickery *et al.* (1986) for *Austrostipa*; Nicolle (2013) for *Eucalyptus*; Chinnock (2007) for *Eremophila*; and Halford & Harris (2012) for *Euphorbia*. For marine algae: Womersley (1984–1998), Guiry & Guiry (2022) and Baldock (2010–2019).

Table 2. Individuals engaged to identify specimens. See Table 1 for affiliations.	
Name	Taxonomic Group
Peter Lang	Vascular plants
Martin O'Leary	Vascular plants
Helen Vonow	Vascular plants
Bob Baldock	Marine Algae
Teresa Lebel	Lichens and fungi
Andrew Thornhill	Mosses

3. Results and Discussion

A total of 334 unique taxa (excluding hybrids and intergrades) were collected across the survey area during the Yalata-Fowlers Bay Bush Blitz. This total comprises 232 vascular plants, 20 lichens, 1 fungus, 6 mosses and 75 marine algae. They are represented by a total of 856 separate collections made during the survey, which are detailed in Appendix 1. These specimens will be incorporated into the public collections at the State Herbarium of South Australia, and an equivalent number of records added to publicly accessible databases including the Australasian Virtual Herbarium (avh.ala.org.au).

3.1 Un-named or not formalised taxa

Table 3. Putatively un-named or not formalised taxa	
Taxon	Comment
<i>Acacia brachybotrya</i> 'West coast variant'	Potential new taxon with a distinctive hair type and differing from both typical <i>A. brachybotrya</i> and forms corresponding to <i>A. dictyocarpa</i> .

One specimen (BS1290-385) (Table 3) was determined by Martin O'Leary of the State Herbarium of South Australia as *Acacia brachybotrya*, qualified by the determination note: 'West coast variant'. Although not listed in the SA Census, and lacking a formal phrase name, this is an entity which has been known for some time. It differs from the more easterly occurring typical *A. brachybotrya* by its hair type, as well as from forms matching *A. dictyocarpa*, and it will most likely be recognised as a new taxon in the future (O'Leary, *pers. comm.*, 2022).

All other specimens collected on the survey that were identifiable by botanists at the State Herbarium to species level have been assigned to described species and are listed in the Australian Plant Census. No other specimens are known to fit clearly defined or recognized taxa that have not yet been formally described (with or without an assigned phrase name). However, it is known that potentially new taxa do exist within some other species that might be elucidated by further taxonomic research.

For example, all nine collections made of *Euphorbia multifaria* fitted the 'Nullarbor form' of Halford & Harris (2012), based on the whitish seeds with irregular impressions. Halford & Harris describe this form as "one of the more recognizable variants" in a "morphologically variable complex [that] with further collections and study may be subdivided into a number of taxa".

Another example is the marked variation observed on survey in the samphire species identified as *Tecticornia halocnemoides* subsp. *halocnemoides*. This is part of a species complex which is known to incorporate a number of currently unrecognized variants. Forms encountered on the survey are discussed in Section 4, below.

3.2 Putative new species (new to science)

No new species are known to have been collected for the first time during this Bush Blitz survey at this time.

3.3 Exotic and pest species

A total of 51 introduced species were recorded on the survey (Table 4). Most of these are of low priority for control either because they have minimal impact or because they are already

well established in the area and their control is not practically achievable. A selection of species that are mainly found associated with roads, tracks and other disturbed areas with high visitation have been flagged as being of high priority for control within conservation areas: *Asphodelus fistulosus* (onion weed), *Asteriscus spinosus* (spiny starwort or golden pallensis), *Carthamus lanatus* (saffron thistle), *Centaurea melitensis* (Malta thistle), *Diplotaxis tenuifolia* (Lincoln weed), *Dittrichia graveolens* (stinkweed), *Euphorbia terracina* (false caper), *Limonium companyonis* (sea-lavender), *Limonium hyblaicum* (Sicilian sea-lavender), *Mesembryanthemum crystallinum* (common iceplant), *Mesembryanthemum nodiflorum* (slender iceplant) and *Scabiosa atropurpurea* (pincushion).

Two species recorded on this survey are of moderate concern: *Asteriscus spinosus* and *Gazania linearis*. *Asteriscus spinosus* (spiny starwort or golden pallensis) is common along roadsides in disturbed sites in patches and likely to increase. During this survey it was collected on the roadside at Coorabie, and it has previously been collected on the roadside about 200 m past the roadhouse at Nundroo. It warrants monitoring to ensure it does not establish in conservation areas. *Gazania linearis* (gazania or treasure flower) was observed in relatively small numbers self-establishing on road verges in the township of Fowlers Bay. This popular garden ornamental has spread invasively in many coastal areas elsewhere in SA, where it forms dense areas that exclude other plant species. It requires monitoring to ensure that it does not spread along roadsides and beaches beyond the township area. It is recommended that any such occurrences be controlled.

The two most serious pests encountered on the survey are listed under the *Landscape South Australia Act 2019* as declared plants in SA: *Lycium ferocissimum* (African boxthorn) and *Marrubium vulgare* (horehound). Control is mandated, with Section 192(2) of the Act requiring land owners to control these plants on their properties.

Exotic/pest species	Location sighted/observed	Indication of abundance	Comments (on observed status)
<i>Arctotheca calendula</i>	Fowlers Bay township, near North Tce-West Tce intersection.	<i>Locally frequent</i>	Only detected in township area, unlikely to become more widely established.
<i>Arctotheca populifolia</i>	Fowlers Bay, north of town at start of Fowlers Bay Conservation Park; east edge of dune. Windmills, c. 5km east of Fowlers Bay.	<i>Locally frequent</i> <i>Rare</i>	A coastal species, a widespread colonizer of unconsolidated sand, already well established across the region. Very difficult to control.
<i>Asphodelus fistulosus</i>	West Terrace, vicinity of Fowlers Bay Hall. Track to Yalata Swamp from Red Gate Track.	<i>Unknown</i> <i>Locally frequent</i>	Mainly a weed of disturbed and degraded sites. Needs management in conservation areas.
<i>Asteriscus spinosus</i>	Coorabie township roadside.	<i>Locally frequent</i>	Common along roadsides in disturbed sites in patches and likely to increase. This weed species is of moderate concern. It needs monitoring to ensure it does not establish in conservation areas.
<i>Avena barbata</i>	West Terrace, vicinity of Fowlers Bay Hall.	<i>Uncommon</i>	Mainly found on roadsides and other disturbed areas and of low concern.

<i>Brassica tournefortii</i>			A widespread weed, well established in agricultural areas, particularly where there are sandy soils.
<i>Bromus diandrus</i>	West Terrace, vicinity of Fowlers Bay Hall.	<i>Uncommon</i>	Mainly found on roadsides and other disturbed areas and is of low concern.
<i>Bupleurum semicompositum</i>	West Terrace, vicinity of Fowlers Bay Hall.	<i>Uncommon</i>	Widely distributed and of low concern.
<i>Cakile maritima</i> subsp. <i>maritima</i>	Sand dune on west end of Fowlers Bay township. Mexican Hat, Fowlers Bay CP. Wahgunyah Conservation Park.	<i>Occasional</i> <i>Frequent</i> <i>Unknown</i>	Widespread and well established in the region. Confined to beach margins and not of concern.
<i>Carrichtera annua</i>	Yalata Rd, c. 5km south of intersection with Ooldea Rd. Ooldea Road, depression on west side of road. Yalata IPA, western margin adjoining Nullabor National Park. Yalata IPA, Pintumba area at east boundary.	<i>Rare</i> <i>Locally frequent</i> <i>Frequent</i> <i>Frequent</i>	Very widespread and well established in the region. A very invasive and smothering annual, however control is impractical.
<i>Carthamus lanatus</i>	Fowlers Bay between North Terrace and Fowlers Bay Rd on edge of town. Yalata IPA, north of Eyre Hwy.	<i>Occasional</i> <i>Unknown</i>	Mainly a weed of disturbed and degraded sites. Needs management in conservation areas.
<i>Centaurea melitensis</i>	West Terrace, vicinity of Fowlers Bay Hall. Yalata IPA, Old Eyre Highway.	<i>Unknown</i> <i>Rare</i>	Mainly a weed of disturbed and degraded sites. Needs management in conservation areas.
<i>Chenopodium murale</i>	Fowlers Bay Hall, near rainwater tank.	<i>Occasional</i>	Of low concern. Associated with disturbance around buildings. A new occurrence record for the Fowlers Bay area.
<i>Conyza bonariensis</i>	Fowlers Bay Hall, near rainwater tank.	<i>Rare</i>	Mainly a weed of disturbed and degraded sites. Based on recent expansion in the state it is likely to increase in this area. It is glyphosate-resistant and difficult to eradicate.
<i>Diploaxis tenuifolia</i>	Fowlers Bay Hall, near rainwater tank.	<i>Occasional</i>	Mainly found on roadsides and other disturbed areas. Warrants management if it spreads into conservation areas.

<i>Dittrichia graveolens</i>	Fowlers Bay, south side of Third St, near West Tce and south of town hall.	<i>Locally frequent</i>	Has potential to spread to disturbed roadsides where runoff occurs. Warrants management if it spreads into conservation areas.
<i>Eucalyptus gomphocephala</i>	Coorabie township roadside.	<i>Occasional</i>	Highly localized and limited establishment of seedlings and saplings from a roadside planting. Not of concern.
<i>Euphorbia paralias</i>	Sand dune on west end of Fowlers Bay township. Mexican Hat, Fowlers Bay CP. Southern end of Dog Proof fence, Wahgunyah CP.	<i>Frequent</i> <i>Frequent</i> <i>Locally frequent</i>	A coastal species and widespread colonizer of unconsolidated sand. Already well established across the region. Very difficult to control.
<i>Euphorbia terracina</i>	West Terrace, vicinity of Fowlers Bay Hall.	<i>2 plants seen</i>	Well established in the region along roadsides and in disturbed areas. Of moderate concern if located in conservation areas.
<i>Gazania linearis</i>	West Terrace, vicinity of Fowlers Bay Hall.	<i>Locally frequent</i>	Only encountered in the town area. Elsewhere, in coastal regions this is a very invasive species, though slow to spread. Needs monitoring.
<i>Hordeum glaucum</i>	West Terrace, vicinity of Fowlers Bay Hall.	<i>Uncommon</i>	Well established in the region along roadsides and in disturbed areas. Of low concern.
<i>Hordeum leporinum</i>	Fowlers Bay township, corner of Third Street and Esplanade.	<i>Occasional</i>	Well established in the region along roadsides and in disturbed areas. Of low concern.
<i>Leontodon rhagadioloides</i>	c. 5 km south south-east of Coorabie.	<i>Locally frequent</i>	Small annual weed of low concern.
<i>Limonium companyonis</i>	Mexican Hat, Fowlers Bay CP.	<i>Locally frequent</i>	Likely to slowly expand and dominate areas of suitable habitat on limestone-based substrates, given time. Warrants management in conservation areas.
<i>Limonium hyblaenum</i>	Swan Tce; edge of Fowlers Bay township.	<i>Locally frequent</i>	Likely to slowly expand and dominate areas of suitable habitat on limestone-based substrates, given time. May warrant management in conservation areas.
<i>Lolium perenne</i>	Fowlers Bay, Esplanade, at front of the jetty.	<i>Single plant</i>	Uncommon, may become established along roadsides, not of major concern.

<i>Lycium ferocissimum</i>	Coorabie Road, south west side. Yalata IPA, hill north of Coorabie.	<i>Rare</i> <i>Rare</i>	<u>A declared plant in South Australia</u> . Very common on Eyre Peninsula. A serious environmental and agricultural pest which warrants ongoing control.
<i>Lysimachia arvensis</i>	West Terrace, vicinity of Fowlers Bay Hall. South West Fowlers Bay CP. Yalata IPA, Dog Fence Track, west side, rack to Wahgunyah CP.	<i>Uncommon</i> <i>Sparse</i> <i>Occasional</i>	Small annual weed, widely established but of minimal impact and of low concern.
<i>Malva parviflora</i>	West Terrace, vicinity of Fowlers Bay Hall.	<i>Uncommon</i>	A weed of disturbed areas including roadsides and of low concern.
<i>Marrubium vulgare</i>	Yalata IPA, north of Eyre Hwy. Coorabie Road, south west side.	<i>Not recorded</i> <i>Rare</i>	<u>A declared plant in South Australia</u> , which warrants control. Particularly common along roadsides.
<i>Medicago minima</i>	Yalata IPA, north of Eyre Hwy.	<i>Uncommon</i>	A small annual weed that may occur in large numbers. It has the potential to become more widespread.
<i>Medicago polymorpha</i>	West Terrace, vicinity of Fowlers Bay Hall.	<i>Occasional</i>	Annual weed associated with disturbed areas and of low concern.
<i>Medicago truncatula</i>	Coorabie township roadside.	<i>Occasional</i>	Annual weed associated with disturbed areas and of low concern.
<i>Melilotus indicus</i>	Swan Tce; edge of Fowlers Bay township.	<i>Rare</i>	Annual weed associated with disturbed areas and of low concern.
<i>Mesembryanthemum crystallinum</i>	Sand dune on west end of Fowlers Bay township.	<i>Locally frequent</i>	A weed of moderate concern in conservation areas as it can form monocultures in suitable environments.
<i>Mesembryanthemum nodiflorum</i>	Fowlers Bay between North Terrace and Fowlers Bay Rd on edge of town. Yalata IPA, Pintumba area, west boundary track.	<i>Occasional</i> <i>Occasional</i>	A weed of moderate concern in conservation areas as it can form monocultures in suitable environments.
<i>Petroselinum crispum</i>	Fowlers Bay, Esplanade, at front of the jetty.	<i>Single plant</i>	Only recorded in the township, where it has self-established from a known planting nearby. Not of concern.
<i>Plantago coronopus</i> subsp. <i>commutata</i>	West Terrace, vicinity of Fowlers Bay Hall.	<i>Uncommon</i>	Mainly a weed of disturbed and degraded sites, and of low concern.

<i>Polygonum aviculare</i>	Fowlers Bay, Esplanade, at front of the jetty.	2 plants seen	A weed of disturbed areas. This occurrence is a major range extension with the nearest known location on Eyre Peninsula at Port Kenny. It warrants control to prevent further spread in this area.
<i>Reichardia tingitana</i>	Swan Tce; edge of Fowlers Bay township. Oldea Road (bitumen), west side, Yalta IPA. Limestone outcrop and Red Gate Track. Wahgunyah CP, end of dog fence track, west side, cliff top.	Occasional Occasional Occasional Unknown	A widely established annual weed of relatively low impact and low concern.
<i>Rostraria pumila</i>	Fowlers Bay township, near North Tce - West Tce intersection.	Occasional	A widely established small annual grass of low impact and concern.
<i>Salvia verbenaca</i> var. <i>verbenaca</i>	Fowlers Bay between North Terrace and Fowlers Bay Rd on edge of town.	Occasional	Established at scattered locations along roadsides in the area and of low concern.
<i>Scabiosa atropurpurea</i>	Eyre Highway, north side of road, between road and fence.	Locally frequent	Probably more common than collections indicate. Perennial herb with potential to greatly increase alongside roadsides and disturbed areas where run-off occurs. Warrants management in conservation areas.
<i>Schismus barbatus</i>	Cheetima Beach Road, NE corner Wahgunyah CP: 100m west of road.	Occasional	A widely established small annual grass of low impact and concern.
<i>Silene tridentate</i>	South West Fowlers Bay CP.	Sparse	An annual herb of low impact and concern.
<i>Sisymbrium erysimoides</i>	Yalata IPA, Old Eyre Highway.	Locally frequent	Mainly confined to shady areas such as tree canopies, sinkholes and buildings. Very widespread and not of concern.
<i>Sisymbrium irio</i>	Fowlers Bay between North Terrace and Fowlers Bay Rd on edge of town. Oldea Road, depression on west side of road.	Occasional Abundant	Mainly confined to shady areas such as tree canopies, sinkholes and buildings. Very widespread and not of concern.
<i>Solanum nigrum</i>	West Terrace, vicinity of Fowlers Bay Hall.	Occasional	A widespread weed occurring in low frequencies and not of concern.

<i>Sonchus oleraceus</i>	Swan Tce; edge of Fowlers Bay township.	<i>Sparse</i>	A widespread annual weed occurring in low frequencies and not of concern.
<i>Spergularia bocconeii</i>	West Terrace, vicinity of Fowlers Bay Hall.	<i>Occasional</i>	A small annual weed of low concern.
<i>Spergularia diandra</i>	West Terrace, vicinity of Fowlers Bay Hall.	<i>Occasional</i>	A small annual weed of low concern.

3.4 Threatened species

***Austrostipa nullanulla* (club spear-grass)**

This perennial tussock grass is in a group of Spear-grasses with twice-bent awns and glabrous to sparsely-hairy lemmas. It grows on gypseous rises and lunettes associated with salt lakes and clay pans. It is listed as Vulnerable in SA and also occurs in Victoria and New South Wales (NSW). A single occurrence (BS1290-320) was found on the survey at Standard Survey Site 1 (SSS1) on the west side of Tallala Well Rd in Fowlers Bay CP.

Recently Williams (2022) conducted a detailed investigation of morphological variation in *A. nullanulla* and the closely related *A. vickeryana*, which occurs in similar habitats. Williams concluded that the differences between them were only gradational and size-related and consequently placed *A. nullanulla* in synonymy under *A. vickeryana*. To date, this treatment is still under review and has not been adopted for the Australia Plant Census, so the change from *A. nullanulla* to *A. vickeryana* has not been made in this report. However, it is important to note the implications of a new wider circumscription for the conservation status of the combined taxon. As currently understood, *A. vickeryana*, which also occurs in WA, is not listed nationally and has Rare status for SA. Vulnerable status is therefore unlikely to be applicable to the new concept of *A. vickeryana*, although it may still qualify as Rare in SA. Williams describes it as “widespread across the southern inland parts of the continent but not common”.

***Eremophila parvifolia* subsp. *parvifolia* (small-leaf emubush)**

This small divaricate shrub with violet flowers is found in southern areas adjoining the Great Australian Bight in eastern WA and western SA. In some areas it becomes a dominant ground cover plant. It was sampled at four different sites in the Yalata IPA (BS1290-76, -414, -712 & -755).

Eremophila praecox

This is a widely distributed but very rare violet-flowered shrub described by Chinnock (2007) with the type specimen from N of Kalgoorlie in WA. In addition to a number of other occurrences in the goldfields area of WA, it is also known at a few scattered disjunct locations in SA, ranging from the eastern side of the Bight to far western Eyre Peninsula.

On this survey it was collected in the Yalata IPA on the track N of the Eyre Highway 23 km WNW of Yalata community (Fig. 4). Here, a single plant of *E. praecox* (BS1290-705) was found growing alongside *Eremophila scoparia* (BS1290-706) with *E. parvifolia* subsp. *parvifolia* observed in the vicinity, although only sampled c. 4 km further north (as BS1290-712).



Fig. 4. *Eremophila praecox*. Top left and right images: single plant, 23 km WNW of Yalata community, Yalata IPA (BS1290-705). Bottom images: putative parents. Lower left: *Eremophila scoparia* (BS1290-706), collected adjacent to BS1290-705; lower right: *E. parvifolia* subsp. *parvifolia* sampled further north (BS1290-712). Photos by T. Hammer.

Chinnock (2007) noted that *E. praecox* is closely allied to *Eremophila parvifolia* and recorded that it was associated with *E. parvifolia* subsp. *auricampa* at the type locality in WA. Chinnock comments: “There is some suggestion that this species may be of hybrid origin, but since I have been unable to determine this with certainty, I have recognised the species here.” Chinnock also notes that the “possible species combinations which might result in a plant with the features of *E. praecox* do not occur in both Western Australia and South Australia”.

Field observations made over many years (P.J. Lang, pers. obs.) strongly support the hybrid hypothesis, and also suggest that some of the similar-looking SA occurrences referred to *E. praecox* are probably hybrids resulting from crosses of *E. scoparia* and *E. weldii*.

In both States, most occurrences that have been identified as *E. praecox* comprise only one or two individuals, and this is consistent with a putative hybrid origin. The common and widely distributed *E. scoparia* is usually present.



Fig. 5. *Maireana rohrlachii*, roadside 1.2 km NW of Coorabie (BS1290-650). Left: habit; top right: immature fruit; bottom right: mature fruit. Photos by T.M. Spokes.

Also, the unusual trait of precocious anthers, which Chinnock reports as protruding from the buds in some populations (the basis for the species name, *praecox*), is consistent with the sort of developmental imbalance often associated with occasional hybridization.

The entity discovered on the Bush Blitz survey appears to be a hybrid of *E. scoparia* and *E. parviflora* subsp. *parviflora* (Fig. 4). Strictly speaking, as a different subspecies of *E. parviflora* to the one at the type locality appears to be involved, it might be argued that it cannot be ‘true’ *E. praecox*. However, the same could be said for any other disjunct occurrence regardless of parentage, as no evidence has been found of populations spreading or maintaining themselves, and without a common origin *E. praecox* does not warrant being treated as a valid species. Occurrences referred to this name appear to be mostly, at least, morphological F1 hybrids, arising repeatedly and independently without clear evidence of introgression, significant backcrossing or self-establishment, rather than a species that has arisen through hybridisation in the past.

The Bush Blitz collection provides further evidence supporting the hybrid status of *E. praecox* s.lat., and it should be possible to confirm the putative parentage of BS1290-705 by DNA sequencing using the preserved tissue samples taken of it and its two suspected parents nearby.



Fig. 6. *Pomaderris forrestiana*, 28 km ESE of the Head of the Bight, Yalata IPA (BS1290-463). Left: habitat, showing a cluster of shrubs on a limestone rise; right: foliage and remains of old flowers. Photos by T. Hammer.

***Isotoma scapigera* (erect isotome or long-scaped isotome)**

Although this small delicate annual plant is widely distributed in WA and near-coastal western SA, it has a specialized habitat and is usually confined within a narrow zone fringing salt lakes, often in association with gypseous substrates. It has showy, purple-blue, lobelia-like flowers borne on fine wiry stalks above a small rosette of leaves. The species was encountered at a site on the verge of Swan Terrace at the western edge of Fowlers Bay township (BS1290-201) and at Standard Survey Site 1 (SSS1) on the west side of Tallala Well Rd in Fowlers Bay CP (BS1290-318).

***Maireana rohrlachii* (Rohrlach's bluebush)**

This small shrub of typical blue-bush appearance (Fig. 5), often with somewhat sparse foliage, may be easily overlooked. The greater part of its distribution is in semi-arid SA but it is also found in western Victoria and NSW. There are only two collections on the Australian Virtual Herbarium from the western Eyre Peninsula region, although it may be more common here than the number of collections suggest. It generally occurs on fertile grey-brown loams, often with some calcareous content. Although widespread, its area of occupancy has been greatly depleted by preferential clearance of its habitat for agriculture. The two sites where the species was encountered on this survey are both in roadside vegetation of the Coorabie Road: 1.7 km ESE of Coorabie (BS1290-322) and 1.2 km NW of Coorabie (BS1290-650).

Pomaderris forrestiana

This medium-sized shrub has its main distribution in WA, but there are a few occurrences that extend into far-western SA, and it is listed as Rare for that State. In SA the species grows on limestone in coastal and subcoastal areas (Fig. 6). It was encountered at two sites in the Yalata IPA: on a small limestone knoll beside the track to Yalata Swamp, 6 km NE of the Head of the Bight (BS1290-600); and on a small track south of Coombra track, situated 28 km ESE of the Head of the Bight (BS1290-463 & -465). Prior to the Bush Blitz survey, the most easterly known collection was from Koonalda, 121 km west of the Head of the Bight.



Fig. 7. *Prostanthera calycina*, near Coorabie. Left: plant heavily browsed almost to ground level; right: browsed branch with flower. Photos by T.M. Spokes.

Neagle (2009) reports the occurrence of *Pomaderris forrestiana* near the Coomبرا track (in error, a wrong habitat type and soil type is listed in the report), but the specimens of that survey have not yet been accessioned into the State Herbarium of South Australia's collection. The Bush Blitz discoveries extend its known range by 148 km further east into SA, vouchered with specimens, and confirm the account of Neagle (2009).

***Prostanthera calycina* (west coast mintbush)**

This shrub is endemic to the Eyre Peninsula region. It has aromatic leaves and somewhat tubular 'eremophila-like' flowers adapted for bird pollination. The flowers may be red, pink or orange (Fig. 7). It is listed as Vulnerable (in SA and nationally) and the most westerly population occurs near Coorabie, within the Bush Blitz survey area. This population had been visited by one of the team in February 1989 and details had been recorded with herbarium voucher collections from two plants (P.J. Lang D-8753 and 8754) that were lodged at the State Herbarium of South Australia. At that time most of the shrubs comprising the population had a broad rounded habit and the two bushes sampled were both recorded as being 50 cm tall.

An attempt to relocate this population from the vehicle was initially unsuccessful, but a second visit searching on foot showed why: most plants were heavily browsed to within 5 cm of the ground surface, rendering them extremely inconspicuous. Only two individuals (BS1290-349 & -355) that were protected amongst other less palatable plants bore any flowers.

A total of ten *P. calycina* plants were recorded along the roadside and more were visible through the fence on the edge of a much larger area of similar habitat in the adjoining land where many more individuals are likely to be present. From the appearance of other tall shrubs with severe browse lines, it was clear that both the roadside (unfenced on the opposite side) and the adjoining fenced area of private land were subjected to very severe grazing pressure, which if unaddressed could render the population of *P. calycina* inviable in the longer term.



Fig. 8. *Tecticornia flabelliformis*, 0.5 km direct WNW of Fowlers Bay. Above: habit, showing older basal stems in foreground from which live branches have been shed; below: detail of flowering spikes showing stigmas exerted outside the main tissue of the plants stems. Photos by T.M. Spokes.

***Tecticornia flabelliformis* (fan sapphire or bead glasswort)**

This is a very distinctive samphire on account of its small size (up to 30 cm tall, but usually only 10–15 cm tall) and an annual ‘deciduous’ growth cycle, whereby the fleshy parts of its stems are shed over winter and regrow from the bases in spring (Fig. 8). It is also unusual in the construction of its flowering and fruiting spikes, with each pair of bracts supporting the triads of flowers being discrete rather than fused together around the stem. The species is listed as Vulnerable (in SA and nationally) and a national recovery plan (Carter 2010) has been prepared. While also found at a few locations in Victoria and WA, *T. flabelliformis* is most widespread in coastal SA, but its restriction to a very specific ecological niche makes it relatively rare. It grows on the lowest part of the beach or clay pan-profile in places where, according to Coleman (2018), there is wet saline clay above hardened layers of soil impregnated with gypsum. There is often a thin spread of sandy material on the surface but the soil salt concentration is very high.

The occurrences near Fowlers Bay are the westernmost in SA. Documented information about the species’ presence in this area is scant, and at the time of the survey there were no supporting collections at the State Herbarium to validate this.

Pobke (2011) records that T. Schulz observed the species in Fowlers Bay Conservation Park in 2005, and Carter (2010) qualified the 2005 record with the comment: “abundance unknown”. According to Pobke, in 2006 “one line intercept transect was established at Fowlers Bay to monitor impact from off-road vehicles on this population” (DEH Recfind File 40/A248477).

A single small patch (vouchered by two individuals, BS1290-349 & -355) was discovered during the Bush Blitz survey only 0.5 km direct WNW of Fowlers Bay town hall. This site is in a narrow zone abutting the northern edge of tall sand dunes on one side and the south-western verge of Coorabie Road on the other. It is surrounded by Fowlers Bay CP, but actually falls within the road reserve exclusion.

Some off-road vehicle tracks intercepted the population area, and this raises obvious management issues for the site that need addressing. However, to properly formulate management priorities further information is needed. This occurrence was discovered on the last full day of the Bush Blitz survey and there was no opportunity to investigate similar areas of habitat in the vicinity. It is therefore recommended that surveys targeting this species be undertaken in the surrounding areas of Fowlers Bay CP to ascertain the extent and population sizes of any additional occurrences that may be present.

***Templetonia battii* (spiny templetonia)**

This is a small to medium-sized leguminous shrub, somewhat divaricate in habit, leafless and with stiff, spinescent branchlets. Its distribution parallels that of *Eremophila parvifolia* subsp. *parvifolia*, being found in southern areas adjoining the Great Australian Bight in eastern WA and western SA. It occurs on clay-loams in flats and depressions where it sometimes becomes a dominant plant. It was sampled in the Yalata IPA, on a track between the old and new Eyre Hwy (BS1290-716).

Species	Listing status and level (EBPC, State/Territory)	Location sighted/observed	Indication of abundance
<i>Austrostipa nullanulla</i>	Vulnerable in SA	West side of Tallala Well Road, Fowlers Bay CP.	Rare at site
<i>Eremophila parvifolia</i> subsp. <i>parvifolia</i>	Rare in SA	Ooldea Road, Yalata IPA. Yalata IPA, south of Eyre Hwy. Yalata IPA, Pintumba area, northern boundary along the dog fence. Yalta IPA, track north of Eyre Hwy to northern boundary, north of the old well.	Occasional Locally Frequent Frequent Rare
<i>Eremophila praecox</i>	Rare in SA	Yalata IPA, track north of Eyre Hwy, near parking bay.	Rare
<i>Isotoma scapigera</i>	Rare in SA	Swan Tce, edge of Fowlers Bay township. West side of Tallala Well Rd, Fowlers Bay CP.	Frequent Occasional
<i>Maireana rohrlachii</i>	Rare in SA	Coorabie Rd, south-west side <u>and</u> on roadside c. 500 m south	Occasional at both sites

<i>Pomaderris forrestiana</i>	Rare in SA	Small track south of Coombra track. Yalata IPA, track to Yalata Swamp.	Rare Rare
<i>Prostanthera calycina</i>	Vulnerable (EPBC Act & SA)	c. 5 km south south east of Coorabie.	Locally occasional
<i>Tecticornia flabelliformis</i>	Vulnerable (EPBC Act & SA)	Near Fowlers Bay dunes on south side of Coorabie Road.	Locally frequent
<i>Templetonia battii</i>	Rare in SA	Yalata IPA, track north of Eyre Hwy to northern boundary, seldom used track between old and new Eyre Hwy.	Rare

3.5 Range extensions

Table 6. Range extensions or significant infill in distribution records for species.			
Species	Location sighted/observed	Distance from nearest known record (km)	Comments
<i>Antithamnion pectinatum</i>	Point Fowler ledge dive, 8–13 metres depth.	c. 1100 km	A marine algae species and new occurrence record for SA. Other known occurrences are from the SE coast of Australia (Portland to Gabo Is., 1973) and SE Tasmania, (Bicheno, 1994; Huon Estuary, 2010). This is a considerable westerly range extension.
<i>Chenopodium murale</i>	Fowlers Bay Hall, near rainwater tank.	c. 60 km	The nearest recorded occurrence is to the east at Point Sinclair, SA. This is an exotic species.
<i>Chrysomenia brownii</i>	Scott Bay, Fowlers Bay Conservation Park.	c. 700 km	A marine algae species and range infill, the nearest recorded occurrence is c. 700 km to the east at Aldinga Reef (1968) and to the west at Middle Island, WA (2003), c. 850 km.
<i>Dasya cliftonii</i>	Fowlers Bay foreshore, east of the jetty. Drift.	c. 100 km	A marine algae species and range infill between the east in SA and west in WA. Prior to this survey the most westerly occurrence is known from St. Francis Island, Nuyts Archipelago (2002), c. 100 km distance. The most easterly occurrence record is from Middle Island, Recherche Archipelago, WA (2003), c. 900 km west.

<i>Dictyota fenestrata</i>	Cheetima Beach, east of Madge Point, 2 collections.	c. 550 km	A marine algae species and westerly range extension. The nearest known occurrence is Middle Island, Pondalowie Bay (2006).
<i>Ditria expleta</i>	Paddy's Whale, c. 1 km west of Fowlers Bay.	c. 100 km	A marine algae species and range infill, a westerly range extension in SA. The nearest recorded occurrences is Freeling Island, Nuyts Archipelago (2002), and nearest occurrence to the west is south of Rottnest Island, WA (1996), c. 2000 km distance.
<i>Dittrichia graveolens</i>	Fowlers Bay, south side of Third St, near West Tce and south of town hall.	c. 110 km	This is an east-west range infill. The nearest recorded occurrence is to the east at Inila Rock Waters, and to the west along the Eyre Hwy, c. 80 km from the WA border. This is an exotic species.
<i>Gazania linearis</i>	West Terrace, vicinity of Fowlers Bay Hall.	c. 125 km	This is an east-west range infill. The nearest recorded occurrence is to the east near Ceduna. The nearest westerly occurrence is c. 155 km away. This is an exotic species.
<i>Gelidium pusillum</i>	Paddy's Whale, c.1 km west of Fowlers Bay.	c. 120 km	A marine algae species and westerly range extension. The nearest known occurrence is Wittelbee Point, near Ceduna (1951).
<i>Heliotropium europaeum</i>	Fowlers Bay township, corner of Third Street and Esplanade.	c. 175 km	This is a southern and western range extension. The nearest recorded occurrence is to the north near Ooldea (175 km) and to the east near Streaky Bay (230 km). This species is questionably native and possibly naturalized.
<i>Jania rosea</i>	Fowlers Bay foreshore, drift east of jetty.	c. 600 km	A marine algae species and range infill, prior to this survey the most westerly occurrence record for SA is Pennington Bay (1948), c. 600 km east, and Christmas Island (Daw Is), WA (1960) c. 800 km west of Fowlers Bay.
<i>Juncus kraussii</i>	Swan Tce; edge of Fowlers Bay township.	c. 380 km	A major western extension of range. The nearest occurrence is to the south east at Mt Misery south-east of Elliston SA. This is a native species.

<i>Laurencia forsteri</i>	Fowlers Bay foreshore, drift east of jetty.	c. 300 km	A marine algae species and range infill. The nearest occurrence to the east is Elliston (1973), c 300 km, and to the west is Cape Arid (1860's), c. 800 km distant.
<i>Lophosiphonia prostrata</i>	Paddy's Whale, c. 1 km west of Fowlers Bay.	c. 100 km	A marine algae species and range infill, a westerly range extension in SA the nearest recorded occurrences is Freeling Island, Nuyts Archipelago (2002), and nearest occurrence to the west is south of Fremantle Bay WA (2003), c. 2000 km away.
<i>Maireana georgei</i>	Yalata IPA, north of Eyre Hwy.	c. 61 km	A minor south-west range infill. The nearest recorded occurrence is to the north east near Euria Rockhole. This is a native species.
<i>Ochmapexus minimus</i>	Davenport Creek, Tourville Bay, SA.	c. 550 km	A marine algae species and westerly range extension. Prior to this survey the most westerly occurrence record is for Marion Bay, SA.
<i>Polygonum aviculare</i>	Fowlers Bay, Esplanade, at front of the jetty.	c. 290 km	A weed of disturbed areas. This occurrence is a major range extension with the nearest known location on Eyre Peninsula at Port Kenny. It warrants control to prevent further spread in this area. This is an exotic species.
<i>Pomaderris forrestiana</i>	Small track south of Coombra track. Yalata IPA, track to Yalata Swamp.	148 km	A native species listed as Rare in SA. This is a range extension to the east. The nearest known occurrence prior to this survey is to the west at Koonalda.
<i>Pseudolithoderma australe</i>	Paddy's Whale, c. 1 km west of Fowlers Bay.	c. 500 km	A marine algae species and westerly range extension. The nearest known occurrence is Abalone Cove, West Island (1989).
<i>Silene tridentate</i>	South West Fowlers Bay CP.	c. 85 km	A westerly extension of range. The nearest known occurrence is located SE of Penong. This is an exotic species.

<i>Sirophysalis trinodis</i>	Wandilla Bay and Davenport Creek, Tourville Bay, SA.	c. 500 km	A marine algae species and significant range infill. A westerly range extension in SA, the nearest recorded occurrence is at Port Turton, Yorke Peninsula (1973), c. 500 km east, and the nearest occurrence to the west is at Albany, WA (1962), c. 1300 km distant.
<i>Tecticornia flabelliformis</i>	Near Fowlers Bay dunes on south side of Coorabie Road.	c. 180 km	This is a westerly extension of range in SA. While the presence of this species is known in the region, prior to this survey, no vouchered specimens have been collected and lodged in herbarium collections or placed on the SA Census or the AVH or ALA national databases. This species is listed as Vulnerable in SA and nationally.
<i>Tecticornia moniliformis</i>	Fowlers Bay Conservation Park, track through the centre, salt flat near sheet limestone. West side of Tallala Well Road, Fowlers Bay CP. Track through Yalata Swamp.	c. 125 km	An occurrence discovered on this survey in Yalata Swamp represents a westward extension of its known range in SA.
<i>Ulva clathrata</i>	Windmills, c. 5km east of Fowlers Bay and Mexican Hat, Fowlers Bay CP.	c. 1450 km	A marine algae species and a significant range infill, a westerly range extension in SA the nearest recorded occurrence at Point Lonsdale, Vic (1992), c. 1450 km east, and the nearest occurrence to the west is at Garden Island, WA (1946), c. 2000 km.
<i>Veleroa adunca</i>	Windmills, c. 5km east of Fowlers Bay.	c. 500 km	A marine algae species and range infill. Prior to this survey the most westerly occurrence record for SA is for Roxby Island, SA (2009), c. 500 km east, and the only record for WA is King George's Sound (pre 1890), c. 1300 km west.

3.6 Tissue sampling for genetic analysis

For all vouchered vascular plant specimens (excluding lichens and mosses), and a portion of the marine algae collections, a fresh subsample of foliage was placed into silica gel desiccant in a separate bag; this material was preserved for future DNA or other tissue analysis. These samples were then stored as dried material in the herbarium collection associated with the vouchers via the assigned catalogue number.

4. Information on species lists

Vascular plants

Amongst eight samphire collections identified as *Tecticornia halocnemoides* subsp. *halocnemoides* were some distinctive forms (BS1290-91, -211, -311, -879), characterised by a low habit (mostly under 15 cm tall). These superficially resembled the illustrations and description of the Western Australian subsp. *catenulata* provided by Datson (2002) in their compact habit and the often red and very glossy articles, as well as their position in the ecological profile in occupying low-lying, wet and very saline areas. However, while they match the original description of subsp. *catenulata* by Wilson (1980) in their short spikes, c. 1 cm long, they differ in the spikes being undulate rather than smooth in outline, the vegetative articles obovoid (rather than barrel-shaped and forming moniliform branchlets), and in their broadly ovate to suborbicular very dark red-brown seeds, partly granular on the faces (as opposed to the ovate, reddish brown smooth-sided seeds described for subsp. *catenulata*). Furthermore, their seed morphology was shared by the taller more typical forms encountered of *T. halocnemoides* with longer spikes (where present) and less glossy articles.

Marine algae, mosses, fungi and lichens

Data capture for these groups is limited and there are collections made in the past where occurrence records are not yet available in state and national databases. The survey occurrence records have been checked by specialists at the State Herbarium with the following results.

Bryophytes: No noteworthy collections, all species have previously been collected in the survey region.

Lichens & Fungi: There are a number of collections on the survey that are new occurrence records for the region. Donner surveyed this region in the 1980s, but these records are not accessible; this highlights the value of this Bush Blitz survey for making occurrence data available. Two survey collections of particular interest are: *Opheographa* an uncommonly collected lichen genus, but not listed as threatened in the state or nationally, and *Gyalolechia*, a genus of fungi not often seen or collected, but not listed as threatened in the state or nationally. The latter genus was recently collected on Kangaroo Island and is known to occur on sandy coastal soils. Several 'vagrant lichens' were collected: *Xanthoparmelia semiviridis* and *Xanthoparmelia convoluta* both new occurrences for the survey area and range infills for SA. Vagrant lichens are organisms that do not attach to any substrate but are blown around randomly.

Marine Algae: There are new occurrence records for the state and for the region among the collections made on the survey. There have been limited collections made in this region previously, possibly related to the remoteness of the region and the logistics of collecting and preserving specimens. The collections reflect the species diversity in the region (75 unique species among 101 collections). Several collections did not have the necessary fertile material for identification to species level and have been tentatively identified but not confirmed.

Polycerea zostericola, has an occurrence record from Vivonne Bay, Kangaroo Island (1949), c. 700 km east of the survey site, and one from Esperance Western Australia (1935), c. 1000 km west of the survey site. The nearest recorded occurrence of *Lithophyllum corallinae* is from Vivonne Bay, Kangaroo Island (1957), c. 700 km east of the survey site. Further collections for fertile material are recommended.

5. Information for land managers

An area of high-quality intact habitat was observed at a site surveyed in Wahgunyah Conservation Park on 1.12.21 (Fig. 9). This area is open mallee dominated by *Eucalyptus gracilis* and *Melaleuca lanceolata* on sand. The main understorey species are *Acacia hakeoides*, *Atriplex paludosa*, *Pimelea serpyllifolia*, *Myoporum brevipes*, *Maireana brevifolia*, *Olearia axillaris* and *Eutaxia microphylla*. This area was adjacent to a series of large sand dunes with *Olearia axillaris* shrubs growing at the dune base and sides. Additional to the vascular plants, the presence of a diversity of birds, reptiles and invertebrates was noted.

A site surveyed on 26.11.21 at a road verge SSE of Coorabie is of significance as it contains a small roadside population of *Prostanthera calycina*. *Prostanthera calycina* is listed as Vulnerable in South Australia and nationally. The site is of undulating limestone plain bordering a samphire swamp with limestone outcrops present and a vegetation profile of very open low shrubland with *Geijera linearifolia*, *Acrotriche patula* over *Austrostipa eremophila* grassland. This population and its present condition is discussed in detail in Section 5 of this report, attention is drawn for land managers to protect this population from intense roadside grazing pressure, which threatens its long term viability.

A site surveyed on 2.12.21 near the margin of a samphire swamp adjacent the Fowlers Bay dunes located a population of *Tecticornia flabelliformis*. This species is listed as Vulnerable in SA and nationally. *Tecticornia flabelliformis* requires a unique and uncommon substrate of gypsum based sandy soil over a wet saline clay. The population is discussed in Section 5 and attention is drawn of the risks to this population and of the potential to locate other occurrences in the region.



Fig. 9. East Wahgunyah CP, surveyed 1.12.2021. Photo by T.M. Spokes.

6. Other significant findings

As anticipated, samphires were found to be well-presented and floristically diverse, with 10 different taxa recorded on survey. These were well sampled, with the 37 samphire collections made, adding substantially to our knowledge of their distribution and habitats. Notably four collections were made of *Tecticornia moniliformis*, a species which was first recognised as occurring in SA in 2008. The three collections from the Fowlers Bay CP and a fourth from within the Yalata IPA establish the species' occurrence in Yalata Swamp with certainty and represent a major westward extension of its known range in SA.

A collection of a native bedstraw identified as *Galium bulliformis* x *G. leptogonium* (BS1290-573) from a sink hole 23 km NE of the Head of the Bight in the Yalata IPA is a regionally significant find. This collection, with fruitlets that are bulliform and somewhat narrow, matches one made by J.B. Cleland on 12 Nov. 1955 from "Down rockhole W end of Yalata", which was cited by Thompson (2009) in his revision for the *Flora of Australia* as *Galium bulliformis* x *G. leptogonium*. Thompson used the word hybrid (rather than 'intermediate' or 'intergrade') in referring to Cleland's collection, and its status as such (along with another disjunct collection he cites from the Gawler Ranges) raises questions, given the absence of records of either parent in the area. Hypothetically, in representing its parent species, the occurrence here would constitute a major westerly extension for *G. bulliformis* or infill for *G. leptogonium*. Regardless of its taxonomic status, the plant is probably very rare in the region, presuming that its survival is dependent on the specialised niche in which it was found: on a limestone ledge in the rocky overhang of a sink hole, shaded from the western sun, on a substrate with little weed competition and positioned well out of reach of grazing animals.

Chenopods bearing galls made by Cecidomyiidae midge flies were collected at five sites, from four different host species, and a further collection was obtained from the TERN team (Table 7). Collections from *Sclerolaena uniflora* (at three sites) and *Tecticornia pruinosa* probably represent new host plant records, and thus possibly also new midge species. Four of the collections included material preserved in ethanol to enable DNA analysis of midge stages and associated fungi. Several of the galls from *T. pruinosa* were dissected by Dr T. Lebel at AD and confirmed as being made by Cecidomyiidae. They contained either pupal exuviae or very young larvae that were too small to sample, so it would be better for future investigations to be timed earlier or later in the season.

Only one of the target vascular plant species specifically requested by researchers was found on survey. *Gunniopsis calcarea* (BS1290-727) was collected in the Pintumba area at the east boundary of the Yalata IPA. Tissue samples from this plant were sent by R.J. Chinnock to the University of Cape Town (BOL herbarium) for sequencing as part of project investigating phylogenetic relationships of the genus.

Species	Collection no.	Site
<i>Salicornia quinqueflora</i> subsp. <i>quinqueflora</i>	BS1290-22	Fowlers Bay, north of town at start of Fowlers Bay CP; east edge of dune.
<i>Sclerolaena uniflora</i>	BS1290-427	Yalata IPA, Dog Fence Track, c. 3 km S of Eyre Hwy.
<i>Sclerolaena uniflora</i>	BS1290-447	Yalata IPA, half-way down Coombra track to the coast.
<i>Sclerolaena uniflora</i>	SAA0255590	SSS2, Wahgunyah CP, off Cheetima Beach Rd.
<i>Sclerolaena diacantha</i>	BS1290-861	Wahgunyah CP, near Wahgunyah Hut.
<i>Tecticornia pruinosa</i>	BS1290-315	SSS1, Fowlers Bay CP, west side of Tallala Well Rd.



Fig. 10. *Olearia axillaris* (BS1290-867). Left: habit; right: foliage. Photo by P.J. Lang.



Fig. 11. *Olearia exiguifolia* (BS1290-869). Left: habit; right: developing flowers and foliage. Photo by P.J. Lang.



Fig. 12. *Olearia axillaris* × *O. exiguifolia* hybrid (BS1290-868). Left: habit; right: flowers and foliage. Photo by P.J. Lang.

Hybrid swarms between *Olearia axillaris* (coast daisy bush; Fig. 10) and *Olearia exiguifolia* (lobed-leaf daisy-bush; Fig. 11) were discovered at two locations 350 m apart in Wahgunyah Conservation Park, beside the track following the coastline east of Wahgunyah Hut and the Chalgonippi Dunes incursion. Forms typical of both putative parents were present in each case and these were sampled along with the hybrid plants to enable their relationships to be further investigated using DNA sequencing. The hybrids (Fig. 12), represented by collections BS1290-863, -864, -866 & -868, displayed intermediate traits and differed from each of the parents to varying degrees, which is indicative of back-crossing and/or F2 hybridization. This appears to be the first reported case of hybridization between these species.

7. Conclusions

The State Herbarium of South Australia was the host botanical institution for the Yalata-Fowlers Bay Bush Blitz, 2021. Our role during the expedition was to capture data for over the breadth of the survey area for vascular plants, bryophytes, lichens and fungi in the terrestrial areas and for marine algae in the near shore marine zones, as well as to collect representative material for voucher specimens to be incorporated into the state collections — ultimately with the purpose to capture data on the species diversity in the region, identify threatened species and expand our knowledge of the flora of the survey area. Our role post-survey was to process the voucher specimens collected for incorporation into the State Herbarium of South Australia and to deliver the associated digitized data to the ALA and AVH national databases, with the aim to make access to the results of the survey available to all.

Of the total 856 collections (654 vascular plants, 17 bryophytes, 83 lichens, 1 fungus and 101 marine algae), 334 unique taxa were recorded on the survey, comprising 232 vascular plants, 6 bryophytes, 20 lichens, 1 fungus and 75 marine algae. As all these groups are under-represented in herbarium collections of this area, this Bush Blitz expedition greatly increased the knowledge of the flora of the area. Significant collections were range extensions of several species of vascular plants, marine algae and lichens, as well as new records of rare and threatened plants.

The number of collections made, and the results reported in this document (and subsequently the amount of new data produced) would not have been possible without the opportunity made available through Bush Blitz. This program provided the opportunity for survey participants to spend a sufficient amount of time in a remote area with the necessary logistical support. The opportunity to work with researchers across a range of groups enriched the experience for all, created new networks between institutions and provided a collaborative environment for the expeditioners.

Acknowledgements

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Thanks to the team conducting insect surveys for their collections of vascular plants: Ben Parslow, Ethan Beaver and Erinn Fagen-Jeffries.

Thanks to all the expeditioners for their good company, conversation and the great spirit of cooperation and collaboration that they brought to the experience.

List of images included in this report

Table 8. Data for photographs reproduced in this report. BGSB = Board of the Botanic Gardens and State Herbarium; UA = The University of Adelaide.					
Image	Property	Date	Photographer	Copyright	Species name
Cover image	Fowlers Bay CP	24.11.2021	T.M. Spokes	BGSB	<i>Spinifex hirsutus</i>
Page 4	Fowlers Bay CP	25.11.2021	T.M. Spokes	BGSB	SSS1 habitat image
Fig. 1–3	Maps of survey sites			BGSB	
Fig. 4, top left & right images	Yalata IPA	25.11.2021	T.A. Hammer	UA	<i>Eremophila praecox</i>
Fig. 4, bottom left image	Yalata IPA	25.11.2021	T.A. Hammer	UA	<i>Eremophila scoparia</i>
Fig. 4, bottom right image	Yalata IPA	25.11.2021	T.A. Hammer	UA	<i>E. parvifolia</i> subsp. <i>parvifolia</i>
Fig. 5, both images	Roadsite near Coorabie	30.11.2021	T.M. Spokes	BGSB	<i>Maireana rohrlachii</i>
Fig. 6, both images	Yalata IPA	25.11.2021	T.A. Hammer	UA	<i>Pomaderris forrestiana</i>
Fig. 7, both images	Roadsite near Coorabie	26.11.2021	T.M. Spokes	BGSB	<i>Prostanthera calycina</i>
Fig. 8, both images	Fowlers Bay	2.12.2022	T.M. Spokes	BGSB	<i>Tecticornia flabelliformis</i>
Fig. 9	Wahgunyah CP	1.12.2021	T.M. Spokes	BGSB	Habitat image
Fig. 10, both images	Wahgunyah CP	1.12.2021	P.J. Lang	BGSB	<i>Olearia axillaris</i>
Fig. 11, both images	Wahgunyah CP	1.12.2021	P.J. Lang	BGSB	<i>Olearia exiguifolia</i>
Fig. 12, both images	Wahgunyah CP	1.12.2021	P.J. Lang	BGSB	<i>Olearia axillaris</i> × <i>O. exiguifolia</i> hybrid

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Appendices

Appendix 1. List of Vascular Plants, Bryophytes, Marine Algae, Lichen and Fungi recorded during the Fowlers Bay/Yalata Bush Blitz.

Family	Taxon	Common name	Putative new species	Threatened (EPBC Act)	Threatened (State/Territory Act)	Exotic/pest
VASCULAR PLANTS						
Fabaceae	<i>Acacia anceps</i>					
Fabaceae	<i>Acacia brachybotrya</i>	Grey Mulga-bush				
Fabaceae	<i>Acacia cupularis</i>	Cup Wattle				
Fabaceae	<i>Acacia cyclops</i>	Western Coastal Wattle				
Fabaceae	<i>Acacia hakeoides</i>	Hakea Wattle				
Fabaceae	<i>Acacia merrallii</i>	Merrall's Wattle				
Fabaceae	<i>Acacia oswaldii</i>	Umbrella Wattle				
Fabaceae	<i>Acacia papyrocarpa</i>	Western Myall				
Ericaceae	<i>Acrotriche patula</i>	Prickly Ground-berry				
Cymodoceae	<i>Amphibolis griffithii</i>	Griffith's sea nymph				
Loranthaceae	<i>Amyema melaleucaea</i>	Tea-tree Mistletoe				
Loranthaceae	<i>Amyema miquelii</i>	Box Mistletoe				
Loranthaceae	<i>Amyema quandang</i> var. <i>quandang</i>	Grey Mistletoe				
Asteraceae	<i>Angianthus tomentosus</i>	Hairy Angianthus				
Asteraceae	<i>Arctotheca calendula</i>	Cape Weed				Yes
Asteraceae	<i>Arctotheca populifolia</i>	Beach Daisy				Yes
Liliaceae	<i>Asphodelus fistulosus</i>	Onion Weed				Yes
Asteraceae	<i>Asteridea athrixoides</i>	Wirewort				
Asteraceae	<i>Asteriscus spinosus</i>	Golden Pallensis				Yes
Chenopodiaceae	<i>Atriplex cinerea</i>	Coast Saltbush				
Chenopodiaceae	<i>Atriplex paludosa</i> subsp. <i>cordata</i>	Marsh Saltbush				
Chenopodiaceae	<i>Atriplex pumilio</i>	Mat Saltbush				
Chenopodiaceae	<i>Atriplex semibaccata</i>	Berry Saltbush				
Chenopodiaceae	<i>Atriplex stipitata</i>	Bitter Saltbush				

Family	Taxon	Common name	Putative new species	Threatened (EPBC Act)	Threatened (State/Territory Act)	Exotic/pest
Chenopodiaceae	<i>Atriplex suberecta</i>	Lagoon Saltbush				
Chenopodiaceae	<i>Atriplex vesicaria</i>	Bladder Saltbush				
Poaceae	<i>Austrostipa acrociliata</i>	Graceful Spear-grass				
Poaceae	<i>Austrostipa drummondii</i>	Cottony Spear-grass				
Poaceae	<i>Austrostipa eremophila</i>	Rusty Spear-grass				
Poaceae	<i>Austrostipa nitida</i>	Balcarra Spear-grass				
Poaceae	<i>Austrostipa nullanulla</i>	Club Spear-grass			Vulnerable	
Poaceae	<i>Austrostipa puberula</i>	Fine-hairy Spear-grass				
Poaceae	<i>Avena barbata</i>	Bearded Oat				Yes
Avicenniaceae	<i>Avicennia marina</i> subsp. <i>marina</i>	Grey Mangrove				
Euphorbiaceae	<i>Beyeria lechenaultii</i>	Pale Turpentine Bush				
Asteraceae	<i>Brachyscome ciliaris</i> var. <i>ciliaris</i>	Variable Daisy				
Asteraceae	<i>Brachyscome trachycarpa</i>	Smooth Daisy				
Brassicaceae	<i>Brassica tournefortii</i>	Wild Turnip				Yes
Poaceae	<i>Bromus diandrus</i>	Great Brome				Yes
Apiaceae	<i>Bupleurum semicompositum</i>	Hare's Ear				Yes
Brassicaceae	<i>Cakile maritima</i> subsp. <i>maritima</i>	Two-horned Sea Rocket				Yes
Aizoaceae	<i>Carpobrotus rossii</i>	Native Pigface				
Brassicaceae	<i>Carrichtera annua</i>	Ward's Weed				Yes
Asteraceae	<i>Carthamus lanatus</i>	Saffron Thistle				Yes
Lauraceae	<i>Cassytha melantha</i>	Coarse Dodder-laurel				
Lauraceae	<i>Cassytha peninsularis</i>	Peninsula Dodder-laurel				
Casuarinaceae	<i>Casuarina pauper</i>	Black Oak				
Asteraceae	<i>Centaurea melitensis</i>	Malta Thistle				Yes
Chenopodiaceae	<i>Chenopodium murale</i>	Nettle-leaf Goosefoot				Yes
Asteraceae	<i>Chrysocephalum apiculatum</i>	Common Everlasting				
Polygalaceae	<i>Comesperma volubile</i>	Love Creeper				
Convolvulaceae	<i>Convolvulus angustissimus</i>	Narrow-leaf Bindweed				

Family	Taxon	Common name	Putative new species	Threatened (EPBC Act)	Threatened (State/Territory Act)	Exotic/pest
Asteraceae	<i>Conyza bonariensis</i>	Flax-leaf Fleabane				Yes
Asteraceae	<i>Cratystylis conocephala</i>	Bluebush Daisy				
Hemerocallidaceae	<i>Dianella revoluta</i> var. <i>divaricata</i>	Broad-leaf Flax-lily				
Brassicaceae	<i>Diplotaxis tenuifolia</i>	Lincoln Weed				Yes
Aizoaceae	<i>Disphyma crassifolium</i> subsp. <i>clavellatum</i>	Round-leaf Pigface				
Chenopodiaceae	<i>Dissocarpus biflorus</i> var. <i>biflorus</i>	Two-horn Saltbush				
Asteraceae	<i>Dittrichia graveolens</i>	Stinkweed				Yes
Sapindaceae	<i>Dodonaea stenozyga</i>	Desert Hop-bush				
Chenopodiaceae	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	Ruby Saltbush				
Poaceae	<i>Enneapogon nigricans</i>	Black-head Grass				
Scrophulariaceae	<i>Eremophila alternifolia</i>	Narrow-leaf Emubush				
Scrophulariaceae	<i>Eremophila deserti</i>	Turkey-bush				
Scrophulariaceae	<i>Eremophila glabra</i> subsp. <i>glabra</i>	Tar Bush				
Scrophulariaceae	<i>Eremophila parvifolia</i> subsp. <i>parvifolia</i>	Small-leaf Emubush			Rare	
Scrophulariaceae	<i>Eremophila praecox</i>				Rare	
Scrophulariaceae	<i>Eremophila scoparia</i>	Broom Emubush				
Chenopodiaceae	<i>Eriochiton sclerolaenoides</i>	Woolly-fruit Bluebush				
Myrtaceae	<i>Eucalyptus brachycalyx</i>	Gilja				
Myrtaceae	<i>Eucalyptus calcareana</i>	Nundroo Mallee				
Myrtaceae	<i>Eucalyptus gomphocephala</i>	Tuart				Yes
Myrtaceae	<i>Eucalyptus gracilis</i>	Yorrell				
Myrtaceae	<i>Eucalyptus oleosa</i> subsp. <i>ampliata</i>	Red Mallee				
Myrtaceae	<i>Eucalyptus phenax</i> subsp. <i>phenax</i>	White Mallee				
Myrtaceae	<i>Eucalyptus yalatensis</i>	Yalata Mallee				
Euphorbiaceae	<i>Euphorbia multifaria</i>					
Euphorbiaceae	<i>Euphorbia paralias</i>	Sea Spurge				Yes
Euphorbiaceae	<i>Euphorbia terracina</i>	False Caper				Yes
Fabaceae	<i>Eutaxia microphylla</i>	Common Eutaxia				

Family	Taxon	Common name	Putative new species	Threatened (EPBC Act)	Threatened (State/Territory Act)	Exotic/pest
Santalaceae	<i>Exocarpos aphyllus</i>	Leafless Cherry				
Cyperaceae	<i>Ficinia nodosa</i>	Knobby Club-rush				
Frankeniaceae	<i>Frankenia pauciflora</i>					
Frankeniaceae	<i>Frankenia sessilis</i>	Small-leaf Sea-heath				
Cyperaceae	<i>Gahnia lanigera</i>	Black Grass Saw-sedge				
Rubiaceae	<i>Galium bulliformis</i> × <i>G. leptogonium</i>					
Asteraceae	<i>Gazania linearis</i>	Gazania				Yes
Rutaceae	<i>Geijera linearifolia</i>	Sheep Bush				
Goodeniaceae	<i>Goodenia arguta</i>	Toothed Velleia				
Goodeniaceae	<i>Goodenia pinnatifida</i>	Cut-leaf Goodenia				
Goodeniaceae	<i>Goodenia varia</i>	Sticky Goodenia				
Aizoaceae	<i>Gunniopsis calcarea</i>					
Boraginaceae	<i>Halgania andromedifolia</i>	Scented Blue-flower				
Haloragaceae	<i>Haloragis acutangula</i>					
Asteraceae	<i>Helichrysum leucopsidium</i>	Satin Everlasting				
Boraginaceae	<i>Heliotropium europaeum</i>					
Amaranthaceae	<i>Hemichroa diandra</i>	Mallee Hemichroa				
Poaceae	<i>Hordeum glaucum</i>	Blue Barley-grass				Yes
Poaceae	<i>Hordeum leporinum</i>	Wall Barley-grass				Yes
Campanulaceae	<i>Isotoma scapigera</i>	Salt Isotome			Rare	
Juncaceae	<i>Juncus kraussii</i>	Sea Rush				
Asteraceae	<i>Kippistia suaedifolia</i>	Fleshy Kippistia				
Malvaceae	<i>Lawrencia glomerata</i>	Clustered Lawrencia				
Malvaceae	<i>Lawrencia squamata</i>	Thorny Lawrencia				
Asteraceae	<i>Leontodon rhagadioloides</i>	Cretan Weed				Yes
Cyperaceae	<i>Lepidosperma congestum</i>					
Asteraceae	<i>Leucophyta brownii</i>	Coast Cushion Bush				
Limoniaceae	<i>Limonium companyonis</i>	Sea-lavender				Yes

Family	Taxon	Common name	Putative new species	Threatened (EPBC Act)	Threatened (State/Territory Act)	Exotic/pest
Limoniaceae	<i>Limonium hyblaenum</i>					Yes
Linaceae	<i>Linum marginale</i>	Native Flax				
Poaceae	<i>Lolium perenne</i>	Perennial Ryegrass				Yes
Asparagaceae	<i>Lomandra collina</i>	Sand Mat-rush				
Asparagaceae	<i>Lomandra effusa</i>	Scented Mat-rush				
Solanaceae	<i>Lycium australe</i>	Australian Boxthorn				
Solanaceae	<i>Lycium ferocissimum</i>	African Boxthorn				Yes
Loranthaceae	<i>Lysiana exocarpi</i> subsp. <i>exocarpi</i>	Harlequin Mistletoe				
Primulaceae	<i>Lysimachia arvensis</i>	Pimpernel				Yes
Chenopodiaceae	<i>Maireana appressa</i>	Pale-fruit Bluebush				
Chenopodiaceae	<i>Maireana brevifolia</i>	Short-leaf Bluebush				
Chenopodiaceae	<i>Maireana erioclada</i>	Rosy Bluebush				
Chenopodiaceae	<i>Maireana georgei</i>	Satiny Bluebush				
Chenopodiaceae	<i>Maireana oppositifolia</i>	Salt Bluebush				
Chenopodiaceae	<i>Maireana radiata</i>	Radiate Bluebush				
Chenopodiaceae	<i>Maireana rohrlachii</i>	Rohrlach's Bluebush			Rare	
Chenopodiaceae	<i>Maireana sedifolia</i>	Bluebush				
Chenopodiaceae	<i>Maireana trichoptera</i>	Hairy-fruit Bluebush				
Malvaceae	<i>Malva parviflora</i>	Small-flower Marshmallow				Yes
Malvaceae	<i>Malva weinmanniana</i>	Australian Hollyhock				
Lamiaceae	<i>Marrubium vulgare</i>	Horehound				Yes
Fabaceae	<i>Medicago minima</i>	Little Medic				Yes
Fabaceae	<i>Medicago polymorpha</i>	Burr-medic				Yes
Fabaceae	<i>Medicago truncatula</i>	Barrel Medic				Yes
Myrtaceae	<i>Melaleuca lanceolata</i>	Dryland Tea-tree				
Myrtaceae	<i>Melaleuca pauperiflora</i> subsp. <i>mutica</i>	Boree				
Fabaceae	<i>Melilotus indicus</i>	King Island Melilot				Yes
Aizoaceae	<i>Mesembryanthemum crystallinum</i>	Common Iceplant				Yes

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Aizoaceae	<i>Mesembryanthemum nodiflorum</i>	Slender Iceplant				Yes
Asteraceae	<i>Minuria leptophylla</i>	Minnie Daisy				
Scrophulariaceae	<i>Myoporum brevipes</i>	Warty Boobialla				
Scrophulariaceae	<i>Myoporum insulare</i>	Common Boobialla				
Scrophulariaceae	<i>Myoporum platycarpum</i> subsp. <i>platycarpum</i>	False Sandalwood				
Solanaceae	<i>Nicotiana goodspeedii</i>	Small-flower Tobacco				
Zygophyllaceae	<i>Nitraria billardiarei</i>	Nitre-bush				
Asteraceae	<i>Olearia axillaris</i>	Coast Daisy-bush				
Asteraceae	<i>Olearia axillaris</i> × <i>Olearia exiguifolia</i>					
Asteraceae	<i>Olearia calcarea</i>	Crinkle-leaf Daisy-bush				
Asteraceae	<i>Olearia exiguifolia</i>	Lobed-leaf Daisy-bush				
Asteraceae	<i>Olearia magniflora</i>	Splendid Daisy-bush				
Asteraceae	<i>Olearia minor</i>	Heath Daisy-bush				
Asteraceae	<i>Olearia muelleri</i>	Mueller's Daisy-bush				
Oxalidaceae	<i>Oxalis perennans</i>	Native Sorrel				
Apiaceae	<i>Petroselinum crispum</i>	Parsley				Yes
Thymelaeaceae	<i>Pimelea micrantha</i>	Silky Riceflower				
Thymelaeaceae	<i>Pimelea serpyllifolia</i> subsp. <i>serpyllifolia</i>	Thyme Riceflower				
Pittosporaceae	<i>Pittosporum angustifolium</i>	Native Apricot				
Plantaginaceae	<i>Plantago coronopus</i> subsp. <i>commutata</i>	Bucks-horn Plantain				Yes
Plantaginaceae	<i>Plantago drummondii</i>	Dark Plantain				
Asteraceae	<i>Podolepis rugata</i> subsp. <i>rugata</i>	Pleated Podolepis				
Polygonaceae	<i>Polygonum aviculare</i>	Wireweed				Yes
Rhamnaceae	<i>Pomaderris forrestiana</i>				Rare	
Rhamnaceae	<i>Pomaderris paniculosa</i> subsp. <i>paniculosa</i>	Mallee Pomaderris				
Lamiaceae	<i>Prostanthera calycina</i>	West Coast Mintbush		Vulnerable	Vulnerable	
Amaranthaceae	<i>Ptilotus obovatus</i>	Silver Mulla Mulla				
Asteraceae	<i>Reichardia tingitana</i>	False Sowthistle				Yes

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Chenopodiaceae	<i>Rhagodia crassifolia</i>	Fleshy Saltbush				
Chenopodiaceae	<i>Rhagodia spinescens</i>	Spiny Saltbush				
Zygophyllaceae	<i>Roepera ammophila</i>	Sand Twinleaf				
Zygophyllaceae	<i>Roepera angustifolia</i>	Scrambling Twinleaf				
Zygophyllaceae	<i>Roepera aurantiaca</i> subsp. <i>aurantiaca</i>	Shrubby Twinleaf				
Zygophyllaceae	<i>Roepera billardierei</i>	Coast Twinleaf				
Zygophyllaceae	<i>Roepera glauca</i>	Pale Twinleaf				
Poaceae	<i>Rostraria pumila</i>	Tiny Bristle-grass				Yes
Poaceae	<i>Rytidosperma robertsoniae</i>	Robertson Wallaby-grass				
Chenopodiaceae	<i>Salicornia blackiana</i>	Thick-head Samphire				
Chenopodiaceae	<i>Salicornia quinqueflora</i> subsp. <i>quinqueflora</i>	Beaded Samphire				
Chenopodiaceae	<i>Salsola australis</i>	Buckbush				
Lamiaceae	<i>Salvia verbenaca</i> var. <i>verbenaca</i>	Wild Sage				Yes
Primulaceae	<i>Samolus repens</i>	Creeping Brookweed				
Santalaceae	<i>Santalum acuminatum</i>	Quandong				
Dipsacaceae	<i>Scabiosa atropurpurea</i>	Pincushion				Yes
Goodeniaceae	<i>Scaevola bursariifolia</i>	Bursaria Fanflower				
Goodeniaceae	<i>Scaevola crassifolia</i>	Cushion Fanflower				
Goodeniaceae	<i>Scaevola spinescens</i>	Spiny Fanflower				
Gentianaceae	<i>Schenkia australis</i>	Spike Centaury				
Poaceae	<i>Schismus barbatus</i>	Arabian Grass				Yes
Chenopodiaceae	<i>Sclerolaena brevifolia</i>	Small-leaf Bindyi				
Chenopodiaceae	<i>Sclerolaena diacantha</i>	Grey Bindyi				
Chenopodiaceae	<i>Sclerolaena obliquicuspis</i>	Oblique-spined Bindyi				
Chenopodiaceae	<i>Sclerolaena patenticuspis</i>	Spear-fruit Bindyi				
Chenopodiaceae	<i>Sclerolaena uniflora</i>	Small-spine Bindyi				
Asteraceae	<i>Senecio pinnatifolius</i> var. <i>maritimus</i>	Coast Groundsel				
Asteraceae	<i>Senecio spanomerus</i>					

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Fabaceae	<i>Senna artemisioides</i> subsp. <i>petiolaris</i>					
Fabaceae	<i>Senna artemisioides</i> subsp. <i>quadrifolia</i>	Four-leaf Desert Senna				
Fabaceae	<i>Senna artemisioides</i> subsp. × <i>coriacea</i>					
Malvaceae	<i>Sida spodochroma</i>					
Caryophyllaceae	<i>Silene tridentata</i>					Yes
Brassicaceae	<i>Sisymbrium erysimoides</i>	Smooth Mustard				Yes
Brassicaceae	<i>Sisymbrium irio</i>	London Mustard				Yes
Solanaceae	<i>Solanum hystrix</i>	Afghan Thistle				
Solanaceae	<i>Solanum nigrum</i>	Black Nightshade				Yes
Solanaceae	<i>Solanum orbiculatum</i> subsp. <i>orbiculatum</i>	Round-leaf Nightshade				
Asteraceae	<i>Sonchus oleraceus</i>	Common Sow-thistle				Yes
Caryophyllaceae	<i>Spergularia bocconeii</i>	Red Sand-spurrey				Yes
Caryophyllaceae	<i>Spergularia diandra</i>	Lesser Sand-spurrey				Yes
Caryophyllaceae	<i>Spergularia marina</i>	Salt Sand-spurrey				
Poaceae	<i>Spinifex hirsutus</i>	Rolling Spinifex				
Poaceae	<i>Sporobolus virginicus</i>	Salt Couch				
Rhamnaceae	<i>Spyridium phyllicoides</i>	Narrow-leaf Spyridium				
Chenopodiaceae	<i>Suaeda australis</i>	Austral Seablite				
Chenopodiaceae	<i>Tecticornia disarticulata</i>					
Chenopodiaceae	<i>Tecticornia flabelliformis</i>	Bead Samphire		Vulnerable	Vulnerable	
Chenopodiaceae	<i>Tecticornia halocnemoides</i> subsp. <i>halocnemoides</i>	Grey Samphire				
Chenopodiaceae	<i>Tecticornia moniliformis</i>					
Chenopodiaceae	<i>Tecticornia pergranulata</i> subsp. <i>divaricata</i>	Black-seed Samphire				
Chenopodiaceae	<i>Tecticornia pergranulata</i> subsp. <i>pergranulata</i>	Black-seed Samphire				
Chenopodiaceae	<i>Tecticornia pruinosa</i>	Bluish Samphire				
Chenopodiaceae	<i>Tecticornia pterygosperma</i> subsp. <i>pterygosperma</i>	Winged-seed Samphire				
Fabaceae	<i>Templetonia battii</i>	Spiny Templetonia			Rare	
Fabaceae	<i>Templetonia retusa</i>	Cockies Tongue				

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Aizoaceae	<i>Tetragonia implexicoma</i>	Bower Spinach				
Lamiaceae	<i>Teucrium sessiliflorum</i>	Mallee Germander				
Chenopodiaceae	<i>Threlkeldia diffusa</i>	Coast Bonefruit				
Asparagaceae	<i>Thysanotus baueri</i>	Mallee Fringe-lily				
Asteraceae	<i>Trichanthodium skirrophorum</i>	Woolly Yellow-heads				
Poaceae	<i>Triodia scariosa</i>	Spinifex				
Asteraceae	<i>Vittadinia australasica</i> var. <i>australasica</i>	Sticky New Holland Daisy				
Asteraceae	<i>Vittadinia gracilis</i>	Woolly New Holland Daisy				
Asteraceae	<i>Vittadinia megacephala</i>	Giant New Holland Daisy				
Campanulaceae	<i>Wahlenbergia communis</i>	Tufted Bluebell				
Lamiaceae	<i>Westringia rigida</i>	Stiff Westringia				
Convolvulaceae	<i>Wilsonia humilis</i>	Silky Wilsonia				
BRYOPHYTES						
Pottiaceae	<i>Barbula calycina</i>					
Pottiaceae	<i>Desmatodon torquatus</i>					
Pottiaceae	<i>Pseudocrossidium crinitum</i>					
Bryaceae	<i>Rosulabryum</i> sp.					
Pottiaceae	<i>Syntrichia antarctica</i>					
Pottiaceae	<i>Syntrichia ruralis</i>	Star moss				
LICHENS & FUNGI						
Acarosporaceae	<i>Acarospora</i> sp.					
Caliciaceae	<i>Buellia</i> sp.					
Graphidaceae	<i>Diploschistes</i> sp.					
Parmeliaceae	<i>Flavoparmelia rutidota</i>					
Parmeliaceae	<i>Flavoparmelia soledians</i>					
Polyporaceae	<i>Fomes</i> sp. aff. <i>fomentarius</i>					
Teloschistaceae	<i>Gyalolechia cranfieldii</i>					
Lecanoraceae	<i>Lecanora</i> sp.					

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Opegraphaceae	<i>Opegrapha</i> sp.					
Parmeliaceae	<i>Parmotrema</i> sp.					
Pertusariaceae	<i>Pertusaria</i> sp.					
Physciaceae	<i>Physcia</i> sp.					
Polyporaceae	<i>Pycnoporus coccineus</i>					
Ramalinaceae	<i>Ramalina celastrii</i>					
Ramalinaceae	<i>Ramalina glaucescens</i>					
Teloschistaceae	<i>Telioschistes chrysophthalmus</i>	golden-eye lichen				
Agaricaceae	<i>Tulostoma</i> sp.					
Verrucariaceae	<i>Verrucaria</i> sp.					
Parmeliaceae	<i>Xanthoparmelia convoluta</i>	'vagrant lichens'				
Parmeliaceae	<i>Xanthoparmelia semiviridis</i>	'vagrant lichens'				
Teloschistaceae	<i>Xanthoria</i> sp.					
ALGAE						
Rhodomelaceae	<i>Alleynea bicornis</i>					
Corallinaceae	<i>Amphiroa anceps</i>	Flat-branched coralline				
Ceramiales	<i>Antithamnion pectinatum</i>					
Rhodomelaceae	<i>Botryocladia sonderi</i>	Red grapeweed				
Rivulariaceae	<i>Calothrix</i> sp.					
Caulerpaceae	<i>Caulerpa cliftonii</i>					
Caulerpaceae	<i>Caulerpa flexilis</i>	Fern caulerpa				
Caulerpaceae	<i>Caulerpa longifolia</i>	Fine-filament caulerpa				
Caulerpaceae	<i>Caulerpa muelleri</i>	Mueller's fern caulerpa				
Ceramiales	<i>Centroceras clavulatum</i>					
Rhodomelaceae	<i>Chrysmenia brownii</i>	Poseidon's fingers				
Cladophoraceae	<i>Cladophora valonioides</i>					
Cladostephaceae	<i>Cladostephus spongiosus</i>	Bushy brown alga				
Scytosiphonaceae	<i>Colpomenia sinuosa</i>	Sinuuous ballweed				

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Sargassaceae	<i>Cystophora brownii</i>	Brown's cystophora				
Sargassaceae	<i>Cystophora moniliformis</i>	Zigzag cystophora				
Sargassaceae	<i>Cystophora polycystidea</i>					
Sargassaceae	<i>Cystophora siliquosa</i>	Slender cystophora				
Delesseriaceae	<i>Dasya cliftonii</i>					
Dicranemataceae	<i>Dicranema</i> sp.					
Dictyotaceae	<i>Dictyota fenestrata</i>					
Dictyotaceae	<i>Dictyota furcellata</i>					
Dictyotaceae	<i>Dictyota paniculata</i>					
Rhodomelaceae	<i>Ditria expleta</i>					
Lessoniaceae	<i>Ecklonia radiata</i>	Common kelp				
Gelidiaceae	<i>Gelidium pusillum</i>					
Halymeniaceae	<i>Gelinaria ulvoidea</i>	Red leatherstraps				
Gracilariaceae	<i>Gracilaria cliftonii</i>	Clifton's gracilaria				
Hormosiraceae	<i>Hormosira banksii</i>	Neptune's necklace				
Scytosiphonaceae	<i>Hydroclathrus clathratus</i>	Lace ballweed				
Hydrolithaceae	<i>Hydrolithon</i> sp.					
Cystocloniaceae	<i>Hypnea filiformis</i>					
Rhodomelaceae	<i>Janczewskia tasmanica</i>					
Corallinaceae	<i>Jania micrarthrodia</i>	Ball coralline				
Corallinaceae	<i>Jania rosea</i>					
Rhodomelaceae	<i>Laurencia</i> (?) <i>elata</i>					
Rhodomelaceae	<i>Laurencia</i> (?) <i>shepherdii</i>					
Rhodomelaceae	<i>Laurencia filiformis</i>					
Rhodomelaceae	<i>Laurencia forsteri</i>					
Dictyotaceae	<i>Lobophora variegata</i>	Peacockweed				
Rhodomelaceae	<i>Lophosiphonia prostrata</i>					
Ceramiales	<i>Macrothamnion pellucidum</i>					

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Mesophyllumaceae	<i>Mesophyllum</i> sp.					
Porolithaceae	<i>Metagoniolithon radiatum</i>					
Porolithaceae	<i>Metagoniolithon stelliferum</i>	Seagrass coralline				
Mastophoraceae	<i>Metamastophora flabellata</i>	Rosette coralline				
Microcoleaceae	<i>Microcoleus</i> sp.					
Ceramiaceae	<i>Ochmapexus minimus</i>					
Orthogonocladaceae	<i>Orthogonocladia rectangularis</i>					
Oscillatoriaceae	<i>Phormidium</i> sp.					
Plocamiaceae	<i>Plocamium cartilagineum</i>	Cartilaginous plocamium				
Plocamiaceae	<i>Plocamium mertensii</i>	Merten's plocamium				
Plocamiaceae	<i>Plocamium preissianum</i>	Preiss' plocamium				
Chordariaceae	<i>Polycerea</i> (?) <i>zostericola</i>					
Rhodomelaceae	<i>Polysiphonia scopulorum</i>					
Lithodermataceae	<i>Pseudolithoderma australe</i>					
Pterocladaceae	<i>Pterocladia lucida</i>	Agarweed				
Areschougiaceae	<i>Rhabdonia clavigera</i>					
Sargassaceae	<i>Sargassum</i> (?) <i>linearifolium</i>					
Sargassaceae	<i>Sargassum fallax</i>	Broad-leaved sargassum				
Sargassaceae	<i>Sargassum tristichum</i>					
Sargassaceae	<i>Scaberia agardhii</i>	Brown fingerweed				
Seirococcaceae	<i>Scytothalia dorycarpa</i>	Western crayweed				
Wrangeliaceae	<i>Shepleya australis</i>					
Sargassaceae	<i>Sirophysalis trinodis</i>	Three-node seaweed				
Sphacelariaceae	<i>Sphacelaria rigidula</i>					
Spirillaceae	<i>Spirillum</i> sp. (bacteria among algae)					
Sporolithaceae	<i>Sporolithon durum</i>	Large-lobe rhodolith				
Halymeniaceae	<i>Thamnoclonium dichotomum</i>	Branched spongweed				
Delesseriaceae	<i>Thuretia quercifolia</i>	Oak-leaf red alga				

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Ulvaceae	<i>Ulva australis</i>	Southern sea lettuce				
Ulvaceae	<i>Ulva clathrata</i>					
Rhodomelaceae	<i>Veleroa adunca</i>					
Dictyotaceae	<i>Zonaria</i> sp.					
Dictyotaceae	<i>Zonaria spiralis</i>	Spiral fanweed				
Dictyotaceae	<i>Zonaria turneriana</i>	Fanweed				