# Inventory and Monitoring of the Vascular Plants of Tasmanian Saltmarsh Wetlands

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## Summary

Tasmanian coastal saltmarsh wetlands are found in sheltered low-energy environments associated with large estuaries, creek mouths, lagoons and embayments. They are mapped as two major plant communities: Succulent Saline Herbland (TASVEG Code: ASS) and Saline Sedgeland/Rushland (TASVEG Code: ARS). In Aug 2013, coastal saltmarsh was the second vegetation community in the State to be listed as a 'threatened ecological community' (category: vulnerable) under the Australian Federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Given this status, it is important to monitor saltmarsh extent and condition. Since plants play the central role in structuring the saltmarsh ecosystem, they require monitoring as a priority. In the present paper we provide the justifications for, and details of, the species and attributes we use in State-wide monitoring of saltmarsh plants. We also outline monitoring methods and a citizen science approach. A *Tasmanian Saltmarsh Wetland Plants Checklist*, *Saltmarsh App* and a *User Guide to Entering Plant Data into the Saltmarsh App* have been designed to assist in this endeavour.

## Plants of saltmarsh wetlands

Saltmarsh wetlands occur in both coastal and inland areas of Tasmania. Coastal saltmarshes are characterised by their tidal connectivity to the sea. The connectivity can be regular (with the daily semidiurnal tidal flows) or intermittent (with episodal spring tides and storm surges), and can also include groundwater connectivity. Coastal saltmarshes occur extensively along sheltered, low energy, shallow intertidal environments in large estuaries, creek mouths, lagoons and embayments, particularly in the south-east, east, north and north-west parts of the State, as well as Flinders Island (see Figure 1). Saltmarsh flora is also common on the outer islands of the Furneaux Group and has been mapped at a detailed level by Harris *et al.* (2001). Inland saltmarshes lack any tidal connectivity but have high

evaporation rates resulting in salinity levels suitable for saltmarsh plants. They occur both on the coastal zone (e.g. Sellars Lagoon, Flinders Island) and in the dry Tasmanian Midlands region (e.g. Township Lagoon, Tunbridge). Inland saltmarshes are therefore functionally different due to lack of tidal exchange and yet floristically similar to their coastal counterparts. The EPBC Act listing only applies to the tidally connected coastal saltmarshes (Threatened Species Scientific Committee 2013).

Tasmanian saltmarshes, both coastal and inland, are mapped by their plant communities as outlined by the Tasmanian Vegetation Monitoring and Mapping Program (TVMMP), to be part of the Digital Vegetation Map of Tasmania (TASVEG, digital map available through www.thelist.tas.gov.au). The two major TASVEG saltmarsh plant communities are (after Kitchener and Harris 2013: *Saltmarsh and wetland* section):

## Succulent Saline Herbland (ASS)

Vegetation dominated by herbaceous species growing on the margins of highly saline, protected, flat estuarine shorelines inundated with sea water during high tides, dominated by halophytic plants, predominantly *Sarcocornia quinqueflora* and/or *Sclerostegia arbuscula* [now *Tecticornia arbuscula*].

## Saline Sedgeland/Rushland (ARS)

Vegetation dominated by sedges, rushes and occasionally tussock grasses growing in highly saline environments, often inundated by tidal water, dominated by halophytic plants commonly *Gahnia filum* and *Juncus kraussii*.

These two TASVEG community types simplify the 15 structural/dominance communities of Kirkpatrick and Glasby (1981). One of these 15 community types is *Spartina anglica* grassland, made up of the exotic and highly invasive *S. anglica* (rice grass), and is mapped separately by TASVEG as *Spartina* marshland (FSM).

Tasmanian saltmarshes are characterised by vascular plants which have developed a range of physiological adaptations to waterlogging, salinity and exposure to sun, waves and wind (Adam 1990; Kirkpatrick and Glasby 1981; Kirkpatrick and Harris 1999). These plants include obligate species that are largely confined to Tasmanian saltmarshes and facultative species that are less confined. The Vegetation Benchmarks defined by TVMMP include a list of 'dominant species' and 'other typical species' for both ASS and ARS communities (Department of Primary Industries, Parks, Water and Environment 2016). These species lists are not fully inclusive or reflective of the dominant life forms found across Tasmanian saltmarshes. There is a need for a more systematic and complete process of developing an updated list of vascular plants of Tasmanian saltmarshes.

Saltmarshes in Tasmania have been under a range of local anthropogenic threats (Prahalad 2014b) as well as being subject to impacts from climate change and relative sea level rise (Prahalad *et al.* 2012, Prahalad *et al.* 2015a). A study of land clearing in north-west Tasmania found that 16% of saltmarsh extent has

been lost since the 1950s, while 65% of the remaining marshes have been subject to impacts, such as draining and grazing (Prahalad 2014b). Another study in south-east Tasmania examining decadal scale vegetation change in saltmarshes reported over 40% change in community composition largely due to climate change and relative sea level rise (Prahalad *et al.* 2012). A national response to these impacts has been the inclusion of *Subtropical and Temperate Coastal Saltmarsh* as a 'threatened ecological community' (category: vulnerable) under the EPBC Act. The conservation advice associated with the listing identifies a need to monitor changes in species composition and distribution (Threatened Species Scientific Committee 2013).

Plants play the central role in structuring the saltmarsh ecosystem and the vegetation structure and composition strongly reflect environmental variation (Adam 1990). Plants are therefore well regarded as excellent indicators for saltmarsh management and are widely used in monitoring programmes (e.g. Neckles *et al.* 2002, Konisky *et al.* 2006). There are a few existing programmes in Tasmania that provide baseline data that can be used to monitor changes in saltmarsh vegetation. However, these programmes are not directed at saltmarshes in particular and have been used sporadically in the past with variable data accuracy and coverage (e.g. Figure 1). Efforts at improving data collection can be enhanced through collaboration between scientists, managers and interested members of the public, facilitated through dedicated 'citizen science' tools and initiatives (Cohn 2008, Prahalad *et al.* 2015b).

The present paper aims to address the following questions:

(1) What is a saltmarsh plant, or, what plants are likely to occur in Tasmanian saltmarshes (i.e. a saltmarsh plants list/ inventory)?

(2) What is the relative likelihood of finding a plant species in Tasmanian saltmarshes, or, what plants are more or less important for a monitoring programme (i.e. a monitoring shortlist)?

(3) What information can be recorded while documenting plants of Tasmanian saltmarshes (i.e. monitoring attributes)?

In answering these questions, we provide the justifications for, and details of, the species and attributes we use in State-wide monitoring of saltmarsh plants. A selected list of these species and attributes are used in the *Tasmanian Saltmarsh Wetland Plants Checklist* and *Saltmarsh App* as part of a citizen science project focussed on saltmarsh monitoring (NRM North 2017, NRM South 2016).

## Methods

### Generating a list of vascular plants

The first step towards developing a Tasmanian saltmarsh wetland plants inventory involved examining five sources (plant records, lists) to produce an updated and thorough list of relevant vascular plants (Appendix 1). Kirkpatrick

and Glasby (1981) documented the distribution of saltmarsh and saltmarsh plant species in Tasmania, including Flinders Island. Bridgewater *et al.* (1981) provided an identification guide for *The Saltmarsh Plants of Southern Australia*. Saintilan (2009a) provided species lists for all States in Australia as part of the book, *Australian Saltmarsh Ecology* (Saintilan 2009b). The TASVEG Version 1.0 *Benchmark for Vegetation Condition Assessment* (Department of Primary Industries, Parks, Water and Environment 2016) includes a plant list derived from expert inputs (Karyl Michaels pers. comm. 2015). The online resource *Key to Tasmanian Vascular Plants* (Jordan *et al.* 2011) lists plants according to their families and genera rather than their habitat associations, i.e. saltmarsh in the present case. However, species habitats are noted for several of the plants. These sources were used to develop an initial list of Tasmanian saltmarsh plants.

The list thus produced was further curated by the authors with inputs from Greg Jordan (pers. comm. 2014) and Richard Schahinger (pers. comm. 2014), to produce the final list presented in Appendix 2. Photographic records from various field visits by the senior author (VP) were also reviewed in this process. Where there were isolated incidences of species (< 3 occurrences), they were omitted from the list.

## Habitat occupancy coding

The plants listed were assigned a habitat occupancy code to rank the relative likelihood of finding a plant species in Tasmanian saltmarshes. The codes were based on a rating scheme adapted from the U.S. *National Wetland Plant List* (Table 1, based on Lichvar *et al.* 2012, Reed 1988). The modified rating scheme uses five classes based on the probability of occurrence in Tasmanian saltmarsh wetlands. We applied this scheme to the list of Tasmanian saltmarsh plants using expert knowledge based on extensive field observations, written and photographic records (VP, drawing from Prahalad 2009, Mount *et al.* 2010, Prahalad and Mount 2011, Prahalad 2012, Prahalad and Pearson 2013, Prahalad 2014c; JK, drawing from Kirkpatrick and Glasby 1981, Kirkpatrick and Harwood 1983). Expert knowledge was used here in lieu of the distribution data available from Tasmanian Natural Values Atlas (NVA) and intersecting it with saltmarsh mapping on ArcGIS platform (as shown in Figure 1). The spatial distribution data were found to be unreliable for this task, with several records occurring over water bodies and vegetation community types known to be unsuitable habitat. Another limitation with using the NVA records here was the lack of data coverage for many parts of the State (Figure 1).

## Selecting attributes for monitoring

Current field identification and recording of plant species occurrence is facilitated through three main interfaces: Atlas of Living Australia (ALA, www.ala.org.au), Natural Values Atlas (NVA, www.naturalvaluesatlas.tas.gov.au) and Vegetation Condition Assessment (VCA, Michaels 2006). Data entry for ALA and NVA are done online, while

**Table 1.** The modified rating scheme used here in relation to the parent scheme used by the U.S. National Wetland Plant List based on Lichvar et al. (2012) and Reed (1988). * The code also includes a suffix letter to identify the provenance of the species: .n for natives; .e for endemics; and .i for introduced species

| Rating | Code | Description | Modified rating | Code* |
|---|---|---|---|---|
| Obligate Wetland | OBL | Occur almost always (estimated probability > 99%) under natural conditions in saltmarsh wetlands | Obligate Saltmarsh | Obl. |
| Facultative Wetland | FACW | Usually occur in saltmarsh wetlands (estimated probability 67%-99%), but occasionally found in other habitats | Common in Saltmarsh | Com. |
| Facultative | FAC | Equally likely to occur in saltmarsh wetlands and other habitats (estimated probability 34%-66%) | Occasional in Saltmarsh | Occ. |
| Facultative Upland | FACU | Only occasionally found in saltmarsh wetlands (estimated probability 1%-33%), usually occur in other habitats | Uncommon in Saltmarsh | Unc. |
| Upland | UPL | Occur almost always (estimated probability > 99%) under natural conditions in other upland habitats | Upland to Saltmarsh | Ter. |

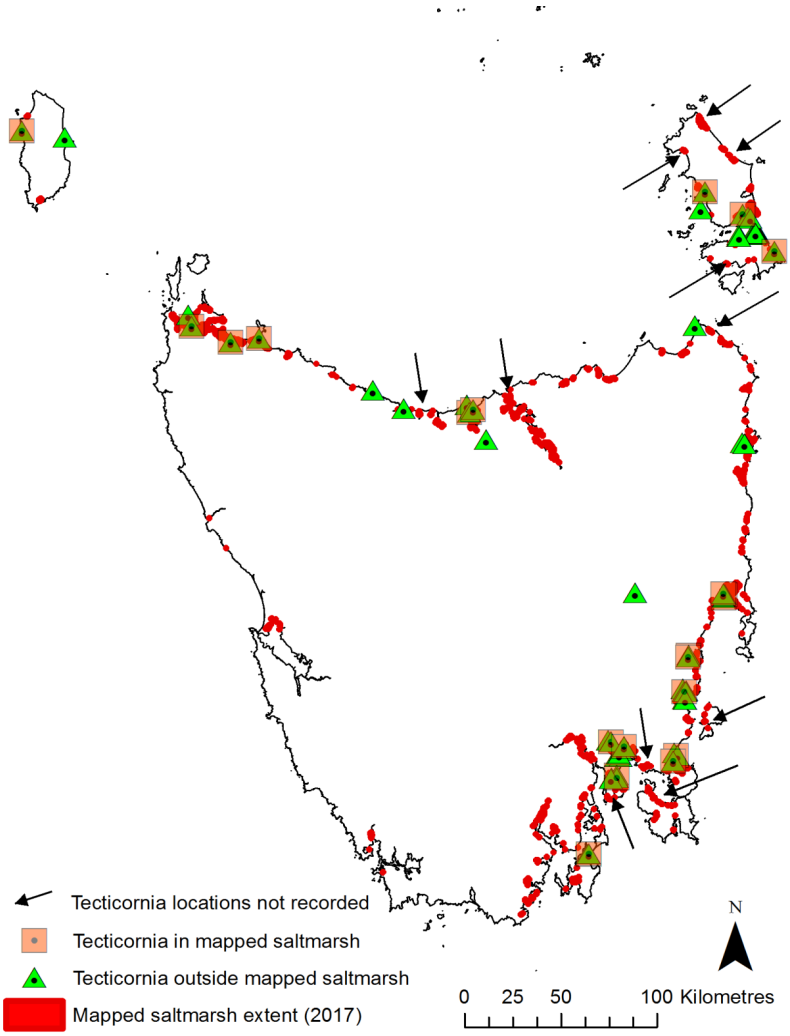


**Figure 1.** *Tecticornia arbuscula* distribution records obtained from the Tasmanian Natural Values Atlas (NVA) showing either, the inaccuracy of some of the data points (e.g. the one in central eastern Tasmania, over 50 kms away from the nearest coastline), and the lack of coverage for areas pointed to with arrows (e.g. east coast of Flinders Island).

VCA is completed in paper form and then used to create a VCA Report. ALA is a national database supported by the Australian Government, while NVA and VCA are specific to Tasmania. The attributes collected for each of these three monitoring systems are listed in Table 2. From these attributes, a list of default, essential and optional attributes have been identified for monitoring of the plants of Tasmanian saltmarsh wetlands. The essential attributes are designed specifically to allow for the survey to develop a saltmarsh site specific plant species list that can be compared to lists from other saltmarshes around the State.

## Results and Discussion

### List of vascular plants

The list consists of 132 species (not counting subspecies in some cases) from 34 families (presented in Appendix 2). Of the 132 species, 76 (58%) are dicots and 56 (42%) monocots. The saltmarsh dicots are made up of 26 families compared to 8 families of saltmarsh monocots. The largest family of dicots is the Chenopodiaceae with 15 species, including the dominant and widespread *Sarcocornia* spp. and *Tecticornia arbuscula*. The largest monocot family is the Poaceae with 25 species. There are 14 species (11%) that are listed as rare under the Tasmanian *Threatened Species Protection Act 1995* (accessed 2014). Of these, 10 species were dicots and 4 monocots. Only two taxa were endemic to Tasmania, namely *Limonium australe* var. *baudinii* and *Puccinellia harcusiana*. The list also includes 32 introduced (non-native) species (24%), of which 19 are dicots and 13 monocots.

### Habitat occupancy coding

There were 21 obligate species (16%) and 18 common species (14%), with the majority of the rest being either occasional (23%) or uncommon (45%) in saltmarsh (Figure 2). Two species were assigned to the terrestrial class and are almost always found upland to saltmarsh.

The obligate species (Code: Obl.) include taxa that are invariably restricted to saltmarshes, such as *Wilsonia* spp. and *Limonium australe*, and taxa that also occur rarely in the coastal spray zone, such as *Sarcocornia* spp., *Suaeda australis*, *Selliera radicans*, *Lawrencia spicata* (e.g. Plate 1), *Juncus kraussii* and *Puccinellia stricta*. Common species (Code: Com.) include *Disphyma crassifolium* and *Austrostipa stipoides*, for example, found frequently in the coastal spray zone. The rare *Frankenia pauciflora* is identified as common due its occurrence on two saltmarsh islands in north-west Tasmania (Threatened Species Unit n.d.). The species is otherwise more common on the coastal spray zone (Harris *et al.* 2001). *Mimulus repens*, *Leptinella longipes, Lilaeopsis polyantha*, *Isolepis cernua*, *Triglochin striata* and *Apodasmia brownii* are examples of taxa common to saltmarsh but also occur frequently in coastal heaths, dunes or other wetland environments.

The occasional species (Code: Occ.) include *Tetragonia implexicoma*, *Rhagodia candolleana*, *Ficinia nodosa* and *Poa poiformis*, which are frequent in saltmarshes but are highly facultative and occur commonly

**Table 2.** Attributes collected as part of Atlas of Living Australia, Natural Values Atlas and Vegetation Condition Assessment protocols for recording of plant species occurrence.

| **Atlas of Living Australia** | **Natural Values Atlas** | **Vegetation Condition Assessment** | **Monitoring of the Plants of Tasmanian Saltmarsh Wetlands** |
|---|---|---|---|
| Default attributes (no need to record them as part of the survey) | | | |
| Project Name/ Code | Project Name/ Code | - | Default: 'Saltmarsh Monitoring' |
| Basis of Record | Observation Type | - | Default: 'Field based observation' |
| Essential attributes (need to be recorded to complete the survey) | | | |
| Recorded By | Observer Names | Assessor | Name of the observer(s) |
| - | - | TASVEG Code | Either ARS or ASS (based on % abundance data for key species) |
| Scientific Name | Species Name | Species Name | Record scientific name (essential) |
| Common Name | - | Common Name | Record common name (if known) |
| Accuracy Rating | Data Accuracy | - | Indicate observation as 'doubtful' if unsure of species identification |
| Date | Observation Date | Date | Date and time of day of the survey/observation |
| Locality | Location Description | Location | Location details of the site (including any landmarks) |
| - | - | Site Name | Name of the site |
| Eastings and Northings | Eastings and Northings | Eastings and Northings | Eastings and Northings of the survey location |

**Table 2 continued**

| Atlas of Living Australia | Natural Values Atlas | Vegetation Condition Assessment | Monitoring of the Plants of Tasmanian Saltmarsh Wetlands |
|---|---|---|---|
| Optional attributes (can be recorded, though not essential to complete the survey) | | | |
| Error Margin (metres) in E, N | Position Accuracy | - | Could be noted in additional comments section |
| Individual Count | Individuals Count | - | Count of individual plants (only for listed species or important weeds) |
| - | Coverage Area | - | Coverage area in $m^2$ (only for listed species or important weeds) |
| - | Reproduction Status | - | Flowering status (if known) |
| Associated Media | - | - | Mention in additional comments section if photos were taken |
| - | Land Use | Current Land Use | Could be noted in additional comments section* |
| Additional Notes/ Comments | Observation Notes | Comments | Could be noted in additional comments section |

*A separate survey process and checklist is available for recording human impacts on saltmarshes. In the present case of vegetation monitoring, a section has been included for recording weed species that need priority management.

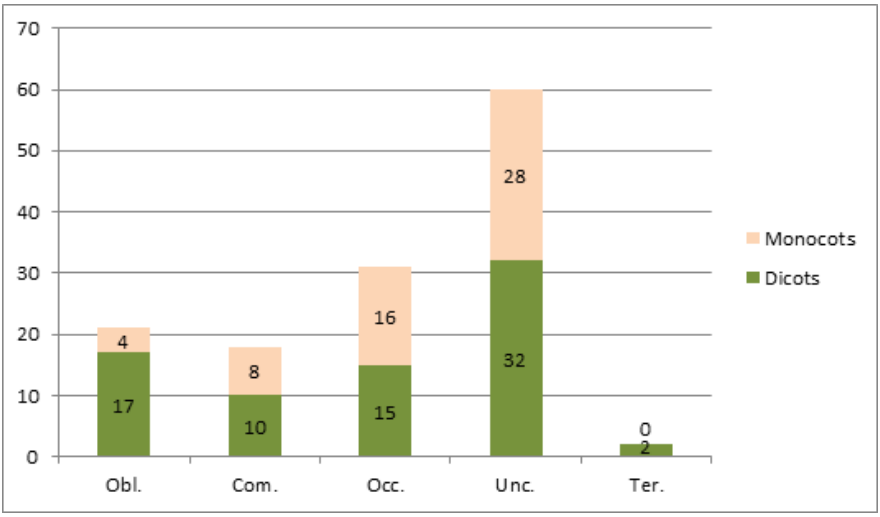


**Figure 2.** Distribution of the 132 plant species across the five classes (see Table 1 for class descriptions). Dicots and monocots were relatively equally represented for uncommon, occasional and common species. Monocots were poorly represented in obligate species.

in other coastal environments. *Melaleuca ericifolia* and *Phragmites australis* are also classed here as occasional species as they regularly occur in the ecotonal boundary between saltmarsh and nearby freshwater wetlands dominated by either of the these two species.

Uncommon species (Code: Unc.) made up the largest proportion (45%) of the five classes. Prominent examples are *Senecio pinnatifolius*, *Melaleuca gibbosa*, *Epilobium billardiereanum*, *Rumex brownii*, *Eleocharis acuta*, *Juncus pallidus*, *Leptocarpus tenax* and *Typha* spp. Uncommon species also notably include 18 of the 32 introduced taxa (56%), such as *Carpobrotus edulis*, *Euphorbia paralias*, *Hordeum marinum* and *Thinopyrum junceiforme*. Photographic material collected during various field visits showed isolated incidences of some native dicots such as *Acaena novae-zelandiae*, *Plantago* spp., *Sebaea ovata*, *Senecio* spp. and *Urtica incisa*. Similarly, introduced dicots such *Centaurium erythraea*, *Lotus corniculatus* and *Trifolium* spp. were also present in the photographic records. Several uncommon monocot species are also likely to have been overlooked largely due to the difficulty in identification.

Only two terrestrial species (Code: Ter.) have been included in this list, namely *Allocasuarina verticillata* and *Myoporum insulare*. These species almost always occur in other nearby upland habitats and on rare occasions, are either on the upland margins of saltmarsh as part of successional change or on small mounds in the marsh. There are also a number of predominantly terrestrial

weeds that do sometimes occur within saltmarsh, such as, *Chrysanthemoides monilifera*, *Cortaderia* spp., *Erica lusitanica*, *Lycium ferocissimum*, *Pinus radiata*, *Rosa rubiginosa*, *Rubus fruticosus* and *Ulex europaeus* (VP pers. obs.). These species are omitted from the list, but included in an optional section of the saltmarsh plants monitoring survey for priority weed management.

## Monitoring attributes

The attributes selected for monitoring include both essential and optional details (see Table 2). The essential attributes include the location of the saltmarsh (site name, landmarks etc.), Eastings and Northings of the survey location, name of the recorder(s) and/or group involved (e.g. Conservation Volunteers Australia), date and time of day of field observations, scientific and common name of the plants recorded and the accuracy of plant species identification (i.e. a confirmed record or doubtful?). For plants that are listed as 'rare' under State legislation, further (optional) details can be noted, including: number of plants/individuals and/or area occupied (in $m^2$). Additional (optional) notes, including flowering status, can be entered for all records, as necessary. Apart from generating species lists, the survey can also include data on species composition by recording % abundance of the structurally dominant plant species and use these data to assign a vegetation community type (either ARS or ASS) to the survey area. The key marker species for ARS community type

**Plate 1.** *Lawrencia spicata* seen well established (>1.5 m high) on a coastal spray zone microhabitat in the north-east corner of Flinders Island (north of Holloway Point).

include *Juncus kraussii*, *Gahnia filum* and *Austrostipa stipoides*. The marker species for the ASS community type include *Sarcocornia* spp. and *Tecticornia arbuscula*. Either ARS or ASS community type is assigned to a saltmarsh area based on the vegetation type that occupies greater than 50% of the area.

Another optional attribute included in the survey relates to invasive species of plants. A separate optional section is allocated to record the presence and % abundance of *Spartina anglica*, considered to be the most deleterious weed in the context of Tasmanian saltmarshes (Mount *et al.* 2010). Other prominent weed species can also be recorded (species listed in previous section) and would help direct management. For example, the local community group Wildcare Deslacs has identified *Erica lusitanica* as their high priority weed for managing the natural values of the Pipe Clay Lagoon saltmarshes, in south-east Tasmania (Prahalad 2016).

## Future work and plants monitoring

The list of vascular plants of Tasmanian saltmarsh wetlands presented in Appendix 2 and their preliminary expert-evidence based ranking are a starting point for refinement with the collection of further data of plant distribution in the State. Existing databases such as NVA and ALA have served a limited purpose in systematically collecting plant distribution data specific to saltmarshes. The scheme proposed here for the State-wide monitoring of saltmarsh plants aims to fill in an important gap in enriching data via site-specific species lists and extending the spatial coverage across Tasmania. The monitoring process aims to involve a broader cross-section of the community, such as Field Naturalists club members, Threatened Plants Tasmania members and volunteers, University of Tasmania staff and students, and other trained volunteers, through citizen science (Cohn 2008), to provide increased capacity for field data collection for improved management outcomes.

Generic site-specific species lists can be used as an important starting point for monitoring the plants of particular saltmarsh sites by recording the plant species present. This could be done through a dedicated survey conducted in specific saltmarsh sites during the flowering season (for easy species level identification), or be linked with citizen science activities such as the BioBlitzes (e.g. Extinction Matters Bioblitz 2016). Species data collected will help improve our understanding of the State-wide distribution of saltmarsh plants, their ecology and biogeography (relating distribution data to local and regional environmental factors), and management needs (Saintilan 2009c). When these data are collected over decadal scales, it can also indicate any species-range shifts that occur as a consequence of climate change. Collected data could also be curated and transferred into ALA and NVA portals, allowing for multiple uses for the same data.

Data collection could follow one of three following methods (cf. Prahalad *et*

*al.* 2015b). A *Tasmanian Saltmarsh Wetland Plants Checklist*, *Saltmarsh App* and a *User Guide to Entering Plant Data into the Saltmarsh App* have been designed to assist in data collection and are available through NRM North (2017), NRM South (2016) and the authors. The data collected through the *Saltmarsh App* can be visualised, analysed and downloaded as a datasheet through QGIS (http://www.qgis.org), a desktop geographic information system. Access is currently open to the senior author (VP) and is also the point of contact for any data requests from contributors, managers and researchers. It is envisaged that the data collected will be periodically curated and published in publically available reports and articles (e.g. Tamar Saltmarsh Monitoring Program 2016-18: Dykman and Prahalad 2018).

## Area search

For saltmarsh sites under 2 ha, the entire site can be surveyed. Use the Checklist (and/or the App) to record observations of all vascular plant species present at the site. These data can be used as a measure of species richness for each saltmarsh site that is comparable across sites and also provides a basis for saltmarsh rehabilitation (Konisky *et al.* 2006, Saintilan 2009c). A TASVEG community type (either ASS or ARS) can then be assigned based on the % abundance of the key marker species (as noted in previous section).

For larger saltmarshes and those with low accessibility (e.g. with deep creeks and muddy sections), a 2 ha area can be selected for the survey (e.g. a rectangle of 100 x 200 m or a circle of 80 m radius). For large marshes (of > 5 ha), multiple 2 ha areas can be surveyed, allowing for a separation between two survey locations by a minimum of 300 m. Selection of total number and distribution of the 2 ha survey locations can done such that they are proportional to the extent of the marsh area (e.g. two 2 ha locations for sites between 5-10 ha) and the diversity in the vegetation types (e.g. a 2 ha survey location each in of the two TASVEG community types, if both are present in the site). The basis of recommending 2 ha survey areas is to link plant species richness/ abundance data with bird species richness/ abundance and behaviour data collected at the same location following the preferred '2-ha Search' method used by BirdLife Australia (BirdLife Australia n.d., Prahalad *et al.* 2015b).

## Fixed-route monitoring

The fixed-route monitoring method is suitable for larger marshes where transect(s) in the form of fixed-route(s) marked by pickets/stakes or other landmarks (such as formed walking tracks, boardwalks) can be established (e.g. Plate 2). All plants encountered along the fixed-route are to be recorded. Any prominent weed species listed in the Checklist can also be noted. A TASVEG community type may or may not be assigned depending on the size of the marsh and the difficulty in determining % abundance scores for the key marker species.

The fixed-route survey could also be linked to a 1 x 1 m quadrat survey undertaken at regular 20-30 m intervals. In addition to presence/absence data, a

**Plate 2.** Henderson Lagoon saltmarsh (near Scamander on the east coast of Tasmania) has a clearly marked walking track with boardwalks suitable for recording all plant species encountered along the fixed-route.

quadrat survey can provide data on the percentage cover of each species (as a measure of relative abundance: Morgan and Short 2002), and indications of saltmarsh health using vegetation height and presence of any bare areas as proxies (Prahalad 2012). The quadrat survey can also be coupled with photo-point monitoring (Michel *et al.* 2010), by taking photographs of the quadrats and developing a temporal photo series for each quadrat/saltmarsh. A quadrat survey coupled with photo-point monitoring provides high resolution baseline data on saltmarsh plants and can be used especially to accompany saltmarsh restoration activities (Neckles *et al.* 2002). Although the transect-based quadrat survey is a commonly used survey method in saltmarsh vegetation monitoring, the method is labour, expertise and material intensive and may not be the preferred option for citizen science projects.

## Incidental search

An incidental search method is suitable for one-off sightings of plants that do not follow one of the two methods discussed above. This method may be particularly suitable for rare species and other species of concern, whose distribution and abundance data (number of individual plants and/or area covered in $m^2$) is essential for species conservation and recovery efforts (e.g. Konisky *et al.* 2006).

## Conclusion

Tasmanian saltmarsh wetlands are under increasing threat from both direct human impacts and global change factors. This threat is coupled with a decreasing capacity of managers to collect baseline data and monitor for changes. In the present paper we identify monitoring methods and a citizen science approach that could help mitigate these threats and lack of capacity by involving a broader cross-section of the community to develop a State-wide database to help inform saltmarsh conservation and rehabilitation. We also envisage that the engagement of these stakeholders/participants in monitoring will confer the benefits of science communication and place attachment usually attributed to such citizen science projects. An enhanced interest in and knowledge of saltmarsh plants and their habitat can therefore potentially help advance science and support nature conservation.

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**Appendix 1.** Collation of existing lists of the vascular plants of Tasmanian saltmarsh wetlands

| Kirkpatrick and Glasby 1981 | Bridgewater, Rosser and de Corona 1981 | Saintilan 2009a | TASVEG Version 1.0 by DPIPWE 2016 | Dicot Key by Jordan *et al.* 2011 |
|---|---|---|---|---|
| **Dicots** | | | | |
| **Aizoaceae** | | | | |
| *Carpobrotus edulis* | - | - | - | - |
| *Carpobrotus rossii* | *Carpobrotus rossii* | *Carpobrotus rossii* | *Carpobrotus rossii* | - |
| *Disphyma blackii* | *Disphyma clavellatum* | *Disphyma crassifolium* | *Disphyma crassifolium* | *Disphyma crassifolium* |
| *Tetragonia implexicoma* | - | - | - | - |
| **Amaranthaceae** | | | | |
| *Hemichroa pentandra* | *Hemichroa pentandra* | *Hemichroa pentandra* | *Hemichroa pentandra* | *Hemichroa pentandra* |
| **Apiaceae** | | | | |
| - | - | - | - | *Apium annuum* |
| *Apium prostratum* | *Apium prostratum* | *Apium prostratum* | *Apium prostratum* | - |
| - | - | - | *Centella cordifolia* | - |
| *Eryngium vesiculosum* | - | - | - | *Eryngium vesiculosum* |
| - | *Hydrocotyle capillaris* | - | - | - |
| *Lilaeopsis brownii* | - | *Lilaeopsis brownii* | - | *Lilaeopsis polyantha* |
| **Asteraceae** | | | | |
| *Angianthus preissianus* (syn. *A. eriocephalus*) | *Angianthus preissianus* | *Angianthus preissianus* | - | *Angianthus preissianus* |
| *Brachycome graminea* | - | - | - | *Brachyscome graminea* |
| *Centipeda minima* | - | - | - | - |
| *Cotula coronopifolia* | *Cotula coronopifolia* | *Cotula coronopifolia* | - | *Cotula coronopifoli*a |

| | | | | |
|---|---|---|---|---|
| - | - | - | - | *Gnaphalium indutum* |
| *Cotula longipes* | - | - | - | - |
| *Cotula reptans* | | *Cotula reptans* | - | - |
| - | - | *Cotula spicatum* | - | - |
| - | *Senecio lautus* | *Senecio lautus* | - | - |
| - | - | *Aster australasica* | - | - |
| - | - | *Aster subulatus* | - | - |
| *Gnaphalium candidissimum* | - | - | - | - |
| **Campanulaceae** | | | | |
| *Lobelia alata* | - | *Lobelia alata* | - | *Lobelia anceps* |
| *Pratia platycalyx* | - | - | - | *Lobelia irrigua* |
| **Caryophyllaceae** | | | | |
| *Spergularia media* | *Spergularia media* | *Spergularia media* | - | *Spergularia tasmanica* |
| **Chenopodiaceae** | | | | |
| - | - | - | - | *Atriplex australasica* |
| *Atriplex cinerea* | *Atriplex cinerea* | *Atriplex cinerea* | *Atriplex cinerea* | *Atriplex cinerea* |
| *Atriplex paludosa* | *Atriplex paludosa* | *Atriplex* padul*osa* | - | *Atriplex paludosa* |
| *Atriplex hastata* | *Atriplex hastata* | - | - | *Atriplex prostrata* |
| - | - | *Atriplex semibaccata* | - | - |
| *Chenopodium glaucum* ssp. *ambiguum* | - | *Chenopodium glaucum* | - | *Chenopodium glaucum* |
| - | *Maireana oppositifolia* | - | - | - |
| *Rhagodia baccata* | *Rhagodia baccata* | *Rhagodia baccata* | *Rhagodia candolleana* | *Rhagodia candolleana* |
| - | *Salsola kali* | - | - | - |
| *Salicornia blackiana* | *Salicornia blackiana* | *Sarcocornia blackiana* | *Sarcocornia blackiana* | *Sarcocornia blackiana* |

| | | | | |
|---|---|---|---|---|
| *Salicornia quinqueflora* | *Salicornia quinqueflora* | *Sarcocornia quinqueflora* | *Sarcocornia quinqueflora* | *Sarcocornia quinqueflora* |
| *Suaeda australis* | *Suaeda australis* | *Suaeda australis* | *Suaeda australis* | *Suaeda australis* |
| - | - | - | - | - |
| *Arthrocnemum arbuscula* | *Arthrocnemum arbusculum* | *Tecticornia arbuscula* | *Sclerostegia arbuscula* | *Tecticornia arbuscula* |
| - | *Arthrocnemum bidens* | - | - | - |
| - | *Arthrocnemum halocnemoides* | *Tecticornia halocnemoides* | - | - |
| **Convolvulaceae** | | | | |
| *Wilsonia backhousei* | *Wilsonia backhousei* | *Wilsonia backhousei* | *Wilsonia backhousei* | *Wilsonia backhousei* |
| *Wilsonia humilis* | *Wilsonia humilis* | *Wilsonia humilis* | *Wilsonia humilis* | *Wilsonia humilis* |
| *Wilsonia rotundifolia* | *Wilsonia rotundifolia* | *Wilsonia rotundifolia* | *Wilsonia rotundifolia* | *Wilsonia rotundifolia* |
| **Cuscutaceae** | | | | |
| *Cuscuta tasmanica* | - | - | - | *Cuscuta tasmanica* |
| **Fabaceae** | | | | |
| - | - | *Lotus australis* | - | - |
| **Frankeniaceae** | | | | |
| - | *Frankenia pauciflora* | *Frankenia pauciflora* | - | *Frankenia pauciflora* |
| **Gentianaceae** | | | | |
| - | *Centaurium pulchellum* | - | - | - |
| - | *Centaurium spicatum* | - | - | - |
| *Sebaea albidiflora* | *Sebaea albidiflora* | - | - | *Sebaea albidiflora* |
| **Goodeniaceae** | | | | |
| *Selliera radicans* | *Selliera radicans* | *Selliera radicans* | *Selliera radicans* | *Selliera radicans* |
| **Malvaceae** | | | | |
| *Lawrencia spicata* | *Lawrencia spicata* | *Lawrencia spicata* | - | *Lawrencia spicata* |

| | | | | |
|---|---|---|---|---|
| - | - | - | - | *Lawrencia squamata* |
| **Myoporaceae** | | | | |
| - | - | *Myoporum insulare* | - | - |
| **Plantaginaceae** | | | | |
| *Plantago coronopus* | *Plantago coronopus* | *Plantago coronopus* | - | - |
| **Plumbaginaceae** | | | | |
| *Limonium australe* | *Limonium australe* | *Limonium australe* | *Limonium australe* | *Limonium australe* |
| - | - | - | - | *Limonium baudinii* |
| **Polygonacea** | | | | |
| *Rumex brownii* | - | - | - | - |
| **Portulacaceae** | | | | |
| - | - | *Portulaca oleracea* | - | - |
| **Primulaceae** | | | | |
| - | *Samolus junceus* | - | - | - |
| *Samolus repens* | *Samolus repens* | *Samolus repens* | *Samolus repens* | *Samolus repens* |
| **Rubiaceae** | | | | |
| *Nertera depressa* | - | - | - | - |
| **Scrophulariaceae** | | | | |
| *Mimulus repens* | - | *Mimulus repens* | *Mimulus repens* | *Mimulus repens* |
| **Monocots** | | | | |
| **Centrolepidaceae** | | | | |
| - | *Centrolepis polygyna* | *Centrolepis polygyna* | *Centrolepis* spp. | - |
| **Cyperaceae** | | | | |
| - | - | *Baumea acuta* | - | - |
| - | - | - | *Baumea arthrophylla* | - |
| *Baumea juncea* | *Baumea juncea* | *Baumea juncea* | *Baumea juncea* | - |
| - | *Scirpus maritimus* | - | - | |
| - | - | - | *Carex appressa* | - |
| *Eleocharis acuta* | - | - | - | - |
| *Scirpus nodosus* | *Scirpus nodosus* | *Isolepis nodosa* (syn. *S. nodosus*) | *Isolepis nodosa* | - |

| | | | | |
|---|---|---|---|---|
| - | *Scirpus marginatus* | - | - | |
| *Gahnia filum* | *Gahnia filum* | *Gahnia filum* | *Gahnia filum* | - |
| *Gahnia trifida* | - | - | *Gahnia trifida* | - |
| *Scirpus cernuus* | - | *Isolepis cernua* | *Isolepis cernua* | - |
| *Scirpus inundatus* | - | - | - | - |
| - | - | - | *Isolepis platycarpa* | - |
| *Scirpus pungens* | - | - | - | - |
| *Schoenus nitens* | *Schoenus nitens* | *Schoenus nitens* | *Schoenus nitens* | - |
| **Juncaceae** | | | | |
| - | - | *Juncus bufonius* | - | - |
| *Juncus kraussii* | *Juncus kraussii* | *Juncus kraussii* | *Juncus kraussii* | - |
| *Juncus pallidus* | - | - | - | - |
| *Juncus planifolius* | - | - | - | - |
| *Juncus revolutus* | *Juncus revolutus* | - | - | - |
| **Juncaginaceae** | | | | |
| *Triglochin minutissima* | - | *Triglochin minutissima* | - | *Triglochin minutissima* |
| - | *Triglochin mucronata* | - | - | *Triglochin mucronata* |
| *Triglochin centrocarpa* | *Triglochin centrocarpa* | - | - | - |
| *Triglochin striata* | - | *Triglochin striata* | *Triglochin striatum* | - |
| **Poaceae** | | | | |
| *Agrostis stolonifera* | - | - | - | - |
| *Stipa stipoides* | *Stipa stipoides* | *Austrostipa stipoides* | *Austrostipa stipoides* | - |
| - | - | *Cynodon dactylon* | - | - |
| - | - | - | - | *Deschampsia cespitosa* |
| *Distichlis distichophylla* | *Distichlis distichophylla* | *Distichlis distichophylla* | *Distichlis distichophylla* | - |
| *Festuca arundinacea* | - | - | - | - |
| - | *Monerma cylindrica* | *Hainardia cylindrical* | - | - |
| - | *Hordeum geniculatum* | - | - | - |
| *Agrostis aemula* | - | - | - | - |

| | | | | |
|---|---|---|---|---|
| *Agrostis billardieri* | *Agrostis billardieri* | *Lachnagrostis billardieri* | - | - |
| *Agrostis avenacea* | - | - | - | - |
| *Parapholis incurva* | *Parapholis incurva* | | - | *Parapholis* spp. |
| - | - | *Phragmites australis* | *Phragmites australis* | - |
| *Poa annua* | - | - | - | - |
| *Poa labillardieri* | - | - | - | - |
| *Poa poiformis* | - | - | *Poa poiformis* | - |
| *Polypogon monspeliensis* | *Polypogon monspeliensis* | *Polypogon monspeliensis* | - | - |
| - | - | - | - | *Puccinellia* spp. |
| *Puccinellia stricta* | *Puccinellia stricta* | *Puccinelliia stricta* | *Puccinellia stricta* | *Puccinellia* spp. |
| *Spartina townsendii* | *Spartina townsendii* | *Spartina anglica* | - | *Spartina anglica* |
| - | *Sporobolus virginicus* | *Sporobolus virginicus* | - | - |
| *Vulpia megalura* | - | - | - | - |
| - | - | *Zoysia macrantha* | *Zoysia macrantha* | - |
| *Zoysia matrella* | - | *Zoysia matrella* | - | - |
| **Restionaceae** | | | | |
| *Leptocarpus brownii* | *Leptocarpus brownii* | *Leptocarpus brownii* | *Apodasmia brownii* | - |
| - | - | - | *Leptocarpus tenax* | - |
| **Ruppiaceae** | | | | |
| - | *Ruppia maritima* | - | - | - |

**Appendix 2.** An updated list of the vascular plants of Tasmanian saltmarsh wetlands

| Scientific names as per de Salas and Baker, 2014 ([i] - introduced; [r] - rare; [e] - endemic) | Common names as per Wapstra et al., 2010 | Book Page No. cf. Prahalad, 2014a | Plant Code (see Table 1 for details of codes used) |
|---|---|---|---|
| **Dicots** | | | |
| **Aizoaceae** | **Pigface Family** | | |
| *Carpobrotus edulis* [i] | yellow pigface | - | Unc.i |
| *Carpobrotus rossii* | native pigface | p. 16 | Occ.n |
| *Disphyma crassifolium* subsp. *clavellatum* | roundleaf pigface | p. 17 | Com.n |
| *Tetragonia implexicoma* | bower spinach | p. 18 | Occ.n |
| *Tetragonia tetragonioides* | new zealand spinach | - | Unc.n |
| **Amaranthaceae** | **Amaranth Family** | | |
| *Hemichroa pentandra* | trailing saltstar | p. 19 | Obl.n |
| **Apiaceae** | **Celery Family** | | |
| *Apium annuum* | annual sea-celery | - | Unc.n |
| *Apium prostratum* subsp. *prostratum* var. *prostratum* | creeping sea-celery | p. 20 | Com.n |
| *Centella cordifolia* | swampwort | - | Unc.n |
| *Eryngium vesiculosum* | prickfoot | p. 21 | Occ.n |
| *Hydrocotyle capillaris* | thread pennywort | - | Unc.n |
| *Hydrocotyle muscosa* | mossy pennywort | - | Unc.n |
| *Lilaeopsis polyantha* | jointed swampstalks | p. 21 | Com.n |
| **Asteraceae** | **Daisy Family** | | |
| *Angianthus preissianus* | salt cupflower | p. 22 | Com.n |
| *Brachyscome graminea* | grass daisy | p. 22 | Occ.n |
| *Centipeda elatinoides* | spreading sneezeweed | - | Unc.n |
| *Cotula coronopifolia* [i] | water buttons | p. 23 | Com.i |
| *Cotula vulgaris* var. *australasica* [r] | slender buttons | - | Unc.n |
| *Gnaphalium indutum* subsp. *indutum* | tiny cottonleaf | - | Unc.n |

| | | | |
|---|---|---|---|
| *Leontodon saxatilis* | hairy hawkbit | - | Unc.i |
| *Leptinella longipes* | coast buttons | p. 24 | Com.n |
| *Leptinella reptans* | creeping buttons | - | Unc.n |
| *Nablonium calyceroides* | spiny everlasting | - | Unc.n |
| *Senecio elegans* | purple groundsel | - | Unc.i |
| *Senecio pinnatifolius* var. *pinnatifolius* | common coast groundsel | p. 25 | Unc.n |
| *Symphyotrichum subulatum* | asterweed | - | Unc.i |
| *Vellereophyton dealbatum* | white cudweed | p. 25 | Occ.i |
| **Campanulaceae** | Bellflower Family | | |
| *Lobelia anceps* | angled lobelia | p. 26 | Com.n |
| *Lobelia irrigua* | salt pratia | p. 26 | Occ.n |
| **Caryophyllaceae** | Starwort Family | | |
| *Spergularia bocconei* | lesser sandspurrey | - | Occ.i |
| *Spergularia marina* | lesser seaspurrey | - | Occ.i |
| *Spergularia rubra* [i] | greater sandspurrey | - | Occ.i |
| *Spergularia tasmanica* | greater seaspurrey | p. 27 | Obl.n |
| **Casuarinaceae** | **Sheoak Family** | | |
| *Allocasuarina verticillata* | drooping sheoak | - | Ter.n |
| **Chenopodiaceae** | **Goosefoot Family** | | |
| *Atriplex australasica* | southern saltbush | - | Unc.i? |
| *Atriplex cinerea* | grey saltbush | p. 28 | Occ.n |
| *Atriplex paludosa* subsp. *paludosa* | marsh saltbush | p. 29 | Obl.n |
| *Atriplex prostrata* | creeping orache | p. 30 | Com.i |
| *Atriplex semibaccata* | berry saltbush | - | Unc.i |
| *Atriplex suberecta* | sprawling saltbush | - | Unc.n |
| *Chenopodium glaucum* | pale goosefoot | p. 31 | Occ.i? |
| *Rhagodia candolleana* subsp. *candolleana* | coastal saltbush | p. 31 | Occ.n |
| *Salsola australis* | prickly saltwort | - | Unc.n |
| *Sarcocornia blackiana* | thickhead glasswort | p. 32 | Obl.n |
| *Sarcocornia quinqueflora* subsp. *quinqueflora* | beaded glasswort | p. 33 | Obl.n |
| *Suaeda australis* | southern seablite | p. 34 | Obl.n |

| | | | |
|---|---|---|---|
| *Suaeda maritima* subsp. *maritima* [i] | annual seablite | - | Unc.i |
| *Tecticornia arbuscula* | shrubby glasswort | p. 35 | Obl.n |
| *Threlkeldia diffusa* | coast bonefruit | - | Unc.n |
| **Convolvulaceae** | **Bindweed Family** | | |
| *Wilsonia backhousei* | narrowleaf wilsonia | p. 36 | Obl.n |
| *Wilsonia humilis* [r] | silky wilsonia | p. 37 | Obl.n |
| *Wilsonia rotundifolia* [r] | roundleaf wilsonia | p. 38 | Obl.n |
| **Cuscutaceae** | **Dodder Family** | | |
| *Cuscuta tasmanica* [r] | golden dodder | p. 39 | Obl.n |
| **Euphorbiaceae** | **Spurge Family** | | |
| *Euphorbia paralias* [i] | sea spurge | p. 40 | Unc.i |
| **Fabaceae** | **Pea Family** | | |
| *Lotus australis* [r] | australian trefoil | - | Unc.n |
| **Frankeniaceae** | **Seaheath Family** | | |
| *Frankenia pauciflora* var. *gunnii* [r] | southern seaheath | p. 41 | Com.n |
| **Gentianaceae** | **Gentian Family** | | |
| *Centaurium tenuiflorum* [i] | slender centaury | - | Unc.i |
| *Schenkia australis* [r] | spike centaury | - | Unc.n |
| *Sebaea albidiflora* | white sebaea | p. 41 | Occ.n |
| **Goodeniaceae** | **Native-primrose Family** | | |
| *Scaevola hookeri* | creeping fanflower | p. 42 | Unc.n |
| *Selliera radicans* | shiny swampmat | p. 43 | Obl.n |
| **Malvaceae** | **Mallow Family** | | |
| *Lawrencia spicata* | *candle saltmallow* | p. 44 | Obl.n |
| *Lawrencia squamata* [i?] | *thorny saltmallow* | - | Obl.i? |
| **Myoporaceae** | **Boobialla Family** | | |
| *Myoporum insulare* | *common boobialla* | - | Ter.n |
| **Myrtaceae** | **Myrtle Family** | | |
| *Melaleuca ericifolia* | coast paperbark | p. 45 | Unc.n |
| *Melaleuca gibbosa* | slender honeymyrtle | - | Unc.n |

| **Onagraceae** | **Willowherb Family** | | |
|---|---|---|---|
| *Epilobium billardiereanum* subsp. *billardiereanum* | robust willowherb | p. 46 | Unc.n |
| **Plantaginaceae** | **Plantain Family** | | |
| *Plantago coronopus* subsp. *coronopus* | slender buckshorn plantain | p. 47 | Occ.i |
| **Plumbaginaceae** | **Leadwort Family** | | |
| *Limonium australe* var. *australer* | yellow sea-lavender | p. 48 | Obl.n |
| *Limonium australe* var. *baudinii* | tasmanian sea-lavender | - | Obl.e |
| **Polygonacea** | **Dock Family** | | |
| *Rumex brownii* | slender dock | - | Unc.n |
| *Rumex crispus* | curled dock | - | Unc.i |
| **Portulacaceae** | **Purslane Family** | | |
| *Portulaca oleracea* | common purslane | - | Unc.n |
| **Primulaceae** | **Primrose Family** | | |
| *Samolus repens* var. *repens* | creeping brookweed | p. 49 | Obl.n |
| **Rubiaceae** | **Madder Family** | | |
| *Nertera granadensis* | orange cushionbeads | - | Unc.n |
| **Scrophulariaceae** | **Snapdragon Family** | | |
| *Mimulus repens* | creeping monkeyflower | p. 50 | Com.n |
| **Monocots** | | | |
| **Centrolepidaceae** | **Bristlewort Family** | | |
| *Centrolepis polygyna* | wiry bristlewort | p. 54 | Occ.n |
| **Cyperaceae** | **Sedge Family** | | |
| *Baumea acuta* | pale twigsedge | - | Unc.n |
| *Baumea arthrophylla* | fine twigsedge | - | Unc.n |
| *Baumea juncea* | bare twigsedge | p. 54 | Occ.n |
| *Bolboschoenus caldwellii* | sea clubsedge | - | Unc.n |
| *Carex appressa* | tall sedge | - | Unc.n |
| *Eleocharis acuta* | common spikesedge | p. 55 | Unc.n |
| *Ficinia nodosa* | knobby clubsedge | p. 55 | Occ.n |
| *Gahnia filum* | chaffy sawsedge | p. 56 | Com.n |

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| *Gahnia trifida* | coast sawsedge | - | Occ.n |
| *Isolepis cernua* | nodding clubsedge | p. 57 | Com.n |
| *Isolepis inundata* | swamp clubsedge | - | Unc.n |
| *Isolepis platycarpa* | flatfruit clubsedge | - | Unc.n |
| *Schoenoplectus pungens* | sharp clubsedge | p. 57 | Occ.n |
| *Schoenus nitens* | shiny bogsedge | p. 58 | Com.n |
| **Juncaceae** | **Rush Family** | | |
| *Juncus acutus* [i] | sharp rush | p. 58 | Occ.i |
| *Juncus bufonius* | toad rush | - | Unc.n |
| *Juncus kraussii* subsp. *australiensis* | sea rush | p. 59 | Obl.n |
| *Juncus pallidus* | pale rush | - | Unc.n |
| *Juncus planifolius* | broadleaf rush | - | Unc.n |
| *Juncus revolutus* | creeping rush | - | Unc.n |
| **Juncaginaceae** | **Water-ribbon Family** | | |
| *Triglochin minutissimar* | tiny arrowgrass | - | Unc.n |
| *Triglochin mucronatar* | prickly arrowgrass | - | Unc.n |
| *Triglochin nana* | dwarf arrowgrass | - | Unc.n |
| *Triglochin striata* | streaked arrowgrass | p. 60 | Com.n |
| **Poaceae** | **Grass Family** | | |
| *Agrostis stolonifera* [i] | creeping bent | - | Unc.i |
| *Austrostipa stipoides* | coast speargrass | p. 61 | Com.n |
| *Cynodon dactylon* var. *dactylon* [i] | couchgrass | - | Occ.i |
| *Deschampsia cespitosa* | tufted hairgrass | p. 62 | Occ.n |
| *Distichlis distichophylla* | australian saltgrass | p. 63 | Com.n |
| *Festuca arundinacea* [i] | tall fescue | p. 64 | Occ.i |
| *Hainardia cylindrica* [i] | thintail barbgrass | - | Unc.i |
| *Hordeum marinum* [i] | sea barleygrass | - | Unc.i |
| *Lachnagrostis aemula* | tumbling blowngrass | - | Unc.n |
| *Lachnagrostis billardierei* subsp. *billardierei* | coast blowngrass | p. 65 | Occ.n |
| *Lachnagrostis filiformis* | common blowngrass | - | Unc.n |
| *Parapholis incurva* | coast barbgrass | p. 65 | Occ.i |
| *Phragmites australis* | southern reed | p. 66 | Occ.n |

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| *Poa annua* | winter grass | - | Unc.i |
| *Poa labillardieri* var. *labillardieri* | silver tussockgrass | p. 67 | Occ.n |
| *Poa poiformis* var. *poiformis* | coastal tussockgrass | - | Occ.n |
| *Polypogon monspeliensis* | annual beardgrass | p. 67 | Occ.i |
| *Puccinellia harcusianae* | island saltmarshgrass | - | Obl.e |
| *Puccinellia stricta* | australian saltmarshgrass | p. 68 | Obl.n |
| *Spartina anglica* | common cordgrass | p. 69 | Obl.i |
| *Sporobolus virginicus* [r] | salt couch | p. 70 | Com.n |
| *Thinopyrum junceiforme* | sea wheatgrass | - | Unc.i |
| *Vulpia fasciculata* | dune fescue | - | Unc.i |
| *Vulpia myuros* | foxtail or ratstail fescue (depending on respective forma) | - | Unc.i |
| *Zoysia macrantha* subsp. *walshii* | prickly couch | p. 71 | Occ.n |
| **Restionaceae** | **Cord-rush Family** | | |
| *Apodasmia brownii* | coarse twinerush | p. 72 | Com.n |
| *Leptocarpus tenax* | slender twinerush | - | Unc.n |
| **Ruppiaceae** | **Sea-tassel Family** | | |
| *Ruppia polycarpa* | manyfruit seatassel | - | Unc.n |
| **Typhaceae** | **Cumbungi Family** | | |
| *Typha domingensis* | slender cumbungi | p. 73 | Unc.n |
| *Typha latifolia* | great reedmace | - | Unc.i |
| *Typha orientalis* | broadleaf cumbungi | - | Unc.n |