Characterisation of the in stream and riparian plant communities in the Barossa Prescribed Water Resources Area

Data and methods report

Jason Nicol

SARDI Publication No. F2013/000413-1
SARDI Research Report Series No. 745

SARDI Aquatic Sciences
PO Box 120 Henley Beach SA 5022

November 2013
Characterisation of the in stream and riparian plant communities in the Barossa Prescribed Water Resources Area
Data and methods report

Jason Nicol

SARDI Publication No. F2013/000413-1
SARDI Research Report Series No. 745

November 2013
This Publication may be cited as:

South Australian Research and Development Institute
SARDI Aquatic Sciences
2 Hamra Avenue
West Beach SA 5024

Telephone: (08) 8207 2400
Facsimile: (08) 8207 5406
http://www.sardi.sa.gov.au

DISCLAIMER
The authors warrant that they have taken all reasonable care in producing this report. The report has been through the SARDI internal review process, and has been formally approved for release by the Research Chief, Aquatic Sciences. Although all reasonable efforts have been made to ensure quality, SARDI does not warrant that the information in this report is free from errors or omissions. SARDI does not accept any liability for the contents of this report or for any consequences arising from its use or any reliance placed upon it. The SARDI Report Series is an Administrative Report Series which has not been reviewed outside the department and is not considered peer-reviewed literature. Material presented in these Administrative Reports may later be published in formal peer-reviewed scientific literature.

© 2013 SARDI
This work is copyright. Apart from any use as permitted under the Copyright Act 1968 (Cth), no part may be reproduced by any process, electronic or otherwise, without the specific written permission of the copyright owner. Neither may information be stored electronically in any form whatsoever without such permission.

Printed in Adelaide: November 2013

SARDI Publication No. F2013/000413-1
SARDI Research Report Series No. 745

Author(s): Jason Nicol
Reviewer(s): Susan Gehrig, Kate Frahn and Doug Green
Approved by: Dr Qifeng Ye
Science Leader – Inland Waters & Catchment Ecology
Signed: 
Date: 20 November 2013
Distribution: DEWNR, AMLRNRM Board and SARDI Aquatic Sciences Library
Circulation: Public Domain
# Table of Contents

Table of Contents.................................................................................................................. i
List of Figures ......................................................................................................................... i
List of Appendices .................................................................................................................. i
Acknowledgements .................................................................................................................. 1
Executive Summary.................................................................................................................... 2
1. Introduction and context ........................................................................................................ 4
2. Methods.................................................................................................................................. 4
   2.1. Vegetation surveying protocol ........................................................................................ 4
   2.2. Data analysis .................................................................................................................... 7
   2.3. Plant identification and nomenclature ............................................................................ 7
3. Results..................................................................................................................................... 7
4. Discussion............................................................................................................................... 16
5. References............................................................................................................................. 19
6. Appendices............................................................................................................................. 22

# List of Figures

**Figure 1:** Plan view of an idealised survey site........................................................................ 5
**Figure 2:** Aerial photo of the Barossa Prescribed Water Resources Area showing the location of survey sites......................................................................................................................... 6
**Figure 3:** Cluster analysis comparing the understorey plant community of permanent and temporary pools........................................................................................................................................ 9
**Figure 4:** Cluster analysis comparing the overstorey plant community of permanent and temporary pools.......................................................................................................................... 11
**Figure 5:** Cluster analysis comparing the understorey plant community of riffles, runs and cascades........................................................................................................................................ 13
**Figure 6:** Cluster analysis comparing the overstorey plant community of riffles, runs and cascades........................................................................................................................................ 15

# List of Appendices

**Appendix 1:** GPS coordinates (UTM format; map datum WGS 84) for survey sites and the habitat types present at each site........................................................................................................ 22
Appendix 2: Species list and functional group classification (*denotes exotic species, **denotes proclaimed pest plant in South Australia, ***denotes weed of national significance; Tdr=Terrestrial dry, Tda=Terrestrial damp, ATe=Amphibious Fluctuation Tolerator emergent, AFTw=Amphibious Fluctuation Tolerator woody, AFTI=Amphibious Fluctuation Tolerator low growing, AFRp=Amphibious Fluctuation Responder plastic, AFRf= Amphibious Fluctuation Responder floating, E=Emergent, Sr=Submergent r-selected).
Acknowledgements

The author thanks Doug Green, Sally Maxwell and Michael Stephens for field assistance, Kate Frahn and Arron Strawbridge for data entry and collation and Susan Gehrig, Kate Frahn, Sally Maxwell, Jason Vanlaarhoven and Doug Green for constructive comments on early drafts of this report. This study was funded by the Department of Environment, Water and Natural Resources through the Adelaide and Mount Lofty Ranges Natural Resources Management Board.
Executive Summary

The Barossa Prescribed Water Resources Area is located 40 km north of Adelaide and (with the exception of upper Stockwell Creek, which is part of the Light River Catchment) is a sub-catchment of the Gawler River (the area includes all of the North Para River catchment and parts of the South Para River, Greenock Creek and Stockwell Creek catchments). The catchment is highly modified with very little remnant native vegetation and extensive surface and groundwater resource development, primarily for viticulture. There is no information regarding the in stream and riparian plant communities and the aim of this project was to gain information regarding the in stream and riparian plant communities in the Barossa Prescribed Water Resources Area.

Vegetation surveys of streams in the area were undertaken in February 2013 and used the same techniques used in the Mount Lofty Ranges environmental flows project, where the whole pool and adjacent upstream riffle was surveyed and the percentage cover of each species present recorded. The surveys were undertaken after one of the driest recorded springs on record, resulting in all of the pools being hydrologically disconnected and no flow through riffles, runs and cascades, with the exception of three areas where there was groundwater fed base flow. A total of 264 sites were surveyed, including 159 permanent pools, three cascades, 33 riffles, 51 runs and 18 temporary pools. Data were analysed using PERMANOVA, cluster and indicator species analyses.

A total of 99 taxa (55 exotics, nine species declared noxious in South Australia, including five weeds of national significance) were recorded at the survey sites. The most abundant species (in decreasing order of abundance) were Phragmites australis, Typha domingensis, Eucalyptus camaldulensis, Bolboschoenus caldwellii and Schoenoplectus pungens and are all native. Cynodon dactylon was the sixth most abundant species and the most abundant exotic species. Despite the large number of exotic species recorded, percentage cover scores were generally low. Plant communities were significantly different in all habitat types, except riffles and runs with permanent pools dominated by open water; temporary pools by bare substrate, Eragrostis australasica and Juncus pallidus and cascades by bed rock, Asparagus asparagoïdes, Aster subulatus, Fraxinus angustifolia and Polypogon monspeliensis. The most abundant species were highly abundant across all different habitat types and widespread throughout the study area.

Cluster analyses comparing the understorey and overstorey plant communities identified definite communities; however, they showed no relationship to location within the prescribed water resources area except the understorey plant community in temporary pools which formed two
related groups from sites generally in tributaries of the North Para River. The absence of a relationship between location and plant community was due to the most abundant species being widespread throughout the study area.
1. Introduction and context

The Barossa Prescribed Water Resources Area is located 40 km north of Adelaide and (with the exception of upper Stockwell Creek, which is part of the Light River Catchment) is a sub-catchment of the Gawler River (the area includes all of the North Para River catchment and parts of the South Para River, Greenock Creek and Stockwell Creek catchments). The catchment is highly modified with very little remnant native vegetation and extensive surface and groundwater resource development, primarily for viticulture. Nevertheless, all of the water resource development is farm dams and bores with no large reservoirs such as those on the South Para, Torrens, Onkaparinga or Myponga rivers.

There is little information regarding the in stream and riparian plant communities, which are needed to aid in the determination of environmental water requirements, in the Barossa Prescribed Water Resources Area. Water allocation planning requires that the environmental water requirements of water dependent ecosystems are identified; therefore, the aim of this project is to gain information regarding the in stream and riparian plant communities in the Barossa Prescribed Water Resources Area. This information will be used, in the longer-term, to aid in the development of environmental water requirement of streams in the Barossa Prescribed Water Resources Area.

2. Methods

2.1. Vegetation surveying protocol

The in stream and riparian vegetation were characterised using two methods; the first method will use the same technique used for the western Mount Lofty environmental flows monitoring project. Sites (where possible) consisted of a reach comprising a pool and the adjacent upstream riffle (run or cascade). The understorey of entire pools and riffles/runs/cascades was surveyed separately in February 2013. The percentage cover of each species (including bare soil, bedrock and open water, which were recorded as taxa and included in the multivariate analyses) were visually estimated by two observers in the pool and riffle/run/cascade below the spring high water mark (Figure 1). In addition, the percentage cover of overhanging overstorey was recorded separately, where present. A total of 264 sites were surveyed (Figure 2; Appendix 1) including 159 permanent pools, three cascades, 33 riffles, 51 runs and 18 temporary pools. GPS coordinates of the survey sites are presented in Appendix 1.
Figure 1: Plan view of an idealised survey site.
Figure 2: Aerial photo of the Barossa Prescribed Water Resources Area showing the location of survey sites.

The second technique recorded the species distributions at individual sections of stream where cross section measurements were taken, by recording the distribution of species across the cross
section was measured at each site, using a point intercept method. A measuring tape was extended horizontally across the stream at the site of the cross section measurement and the horizontal extent of species present recorded. The data collected in this manner will not be presented in this report due to difficulties in displaying the data; however, uses of these data and improvements in the methods used to collect vegetation data at cross sections will be discussed.

2.2. Data analysis

Data were analysed using indicator species analysis (Dufreene and Legendre 1997), PERMANOVA (Anderson 2001; Anderson and Ter Braak 2003) and group average cluster analysis (McCune et al. 2002). Single factor PERMANOVA and indicator species analysis were used to compare the entire plant community between habitat types (permanent pools, temporary pools, riffles, runs and cascades). In addition to comparing the plant communities, indicator species analysis was also used to compare the abundances of different plant functional groups (sensu Casanova 2011) between habitats (permanent pools, temporary pools, riffles, runs and cascades).

Individual group average cluster analyses were undertaken on the understorey and overstorey plant community in pools (temporary and permanent) and riffles, runs and cascades to identify the dominant plant communities in the different habitats (McCune et al. 2002) throughout the Barossa Prescribed Water Resources Area. Species that characterised the major groups detected by cluster analysis were identified by indicator species analysis. Bray-Curtis (1957) similarities were used to construct the similarity matrices for the PERMANOVA and cluster analyses and \( \alpha = 0.05 \) for all statistical analyses.

2.3. Plant identification and nomenclature

Plants present were identified to species where possible using keys in Sainty and Jacobs (1981), Jessop and Tolken (1986), Prescott (1988), Dashorst and Jessop (1998), Romanowski (1998), Sainty and Jacobs (2003) and Jessop et al. (2006). In some cases due to immature individuals or lack of floral structures, plants were identified to genus only. Nomenclature follows the Centre for Australian National Biodiversity Research and Council of Heads of Australasian Herbaria (2013).

3. Results

A total of 99 taxa (55 exotics, nine species declared noxious in South Australia, including five weeds of national significance) were recorded at the survey sites (Appendix 2). The most
abundant species was *Phragmites australis*, followed by *Typha domingensis*, *Eucalyptus camaldulensis*, *Bolboschoenus caldwellii* and *Schoenoplectus pungens*. These five most abundant species were native emergent and amphibious species. *Cynodon dactylon* was the sixth most abundant species and the most abundant exotic species. Despite the large number of exotic species recorded (Appendix 2), the percentage cover scores were generally low for exotics, which was probably due to the surveys being undertaken in February 2013, when winter annuals were absent. When cross sections were surveyed in May 2013 there was extensive cover of exotic grasses (probably immature *Avena* spp., *Bromus* spp., *Lolium* spp. *Holcus lanatus*, *Ehrharta longiflora*, *Briza* spp. and *Hordeum* spp.) and exotic forbs (primarily *Oxalis pes-caprae* and *Fumaria* spp.) in the riparian zone.

PERMANOVA analysis comparing the plant community between different habitats (permanent pools, temporary pool, riffles, runs and cascades) throughout the study area showed there was a significant difference (PERMANOVA: *Pseudo F*$_{4,263}$ =21.15; *P*<0.001) between habitats. Bonferroni corrected multiple comparisons showed that the plant community was significantly different between each habitat type, except for runs and riffles. Indicator species analysis showed that permanent pools were characterised by open water; temporary pools were characterised by bare substrate, *Eragrostis australasica* and *Juncus pallidus*; and cascades by bed rock *Asparagus asparagoideus*, *Aster subulatus*, *Frascinus angustifolia* and *Polypogon monspeliensis*. There were no significant indicators for riffles or runs. The most abundant species (*Phragmites australis*, *Typha domingensis*, *Eucalyptus camaldulensis*, *Bolboschoenus caldwellii* and *Schoenoplectus pungens*) were widespread throughout the study area and highly abundant across all different habitat types. Indicator species analysis comparing the abundance of plant functional groups across the different habitat types detected no significant indicators and examination of the data showed that all functional groups present were widespread across the different habitat types, except the submergent r-selected group, which were only present in permanent pools with very low cover.

Cluster analysis comparing the understorey plant community of the permanent and temporary pools detected five groups at a similarity of 25% (Figure 3). Sites classified into Group 1 were all permanent pools, predominately from the North Para River dominated by open water and the native emergent species *Typha domingensis*. Sites in Groups 2 and 3 were also all permanent pools, predominately from the North Para River with Group 2 dominated by the native emergent species, *Phragmites australis* and Group 3 dominated by exposed bed rock. Groups 4 and 5 were predominantly temporary pools located on tributaries of the North Para River (generally Lyndoch, Tanunda and Angaston creeks). Group 4 sites were dominated by *Eucalyptus camaldulensis* and *Rumex bidentis* and terrestrial weeds (*Chenopodium album*, *Chenopodium glaucum*, *Cynodon dactylon*, *Foeniculum vulgare*, *Lactuca serriola*, *Polygonum aviculare* and *Prunus* sp.) and Group 5 sites by bare soil and *Eragrostis australasica*. 
Figure 3: Group average cluster analysis comparing the understory plant community of permanent and temporary pools.
Cluster analysis comparing the overstorey plant community of the permanent and temporary pools detected four groups at a similarity of 25% (Figure 4). In contrast to the understorey plant community, where the main division on the dendrogram was between permanent and temporary pools (with one exception), the overstorey plant community showed little relationship with respect to pool permanency. Sites in Group 1 were dominated by the native riparian tree *Eucalyptus camaldulensis* and sites in Group 3 by the exotic terrestrial tree *Fraxinus angustifolia*. There were no significant indicators for Groups 2 and 4.
Figure 4: Group average cluster analysis comparing the overstorey plant community of permanent and temporary pools.
Cluster analysis comparing the understorey plant community of the riffles, runs and cascades detected three groups at a similarity of 25% (Figure 5). Group 1 was dominated by the native emergent species Typha domingensis and Phragmites australis; Group 2 by the native emergent Bolboschoenus caldwellii, exotic terrestrial Cynodon dactylon and concrete; and Group 3 by the amphibious exotic species Paspalum distichum and Juncus acutus.
Figure 5: Group average cluster analysis comparing the understorey plant community of riffles, runs and cascades.
Cluster analysis comparing the overstorey plant community of the riffles, runs and cascades also detected three groups at a similarity of 25% (Figure 6). Sites in Group 1 were dominated by the native riparian tree *Eucalyptus camaldulensis* and sites in Group 3 by the exotic terrestrial tree *Fraxinus angustifolia*. There were no significant indicators for Group 2.
Figure 6: Group average cluster analysis comparing the overstorey plant community of riffles, runs and cascades.
4. Discussion

The vegetation surveys undertaken as part of this project provided good spatial coverage of streams in the prescribed water resources area, except for Jacobs Creek, which was largely inaccessible due to access issues. The survey method employed, which did not use fixed area quadrats but estimated cover of all of the species present in a pool or riffle, run or cascade resulted in a more representative species list because all of the species in a survey area were recorded. This technique worked well for small pools and riffles (or runs); however, in some large, deep pools where there was difficulty in accessing some parts of the pool that may have resulted in species being missed. Furthermore, small or inconspicuous species may have been missed; however, due to their low cover, these species would have had little effect on the outcomes of the statistical analyses but may be of conservation significance. This method also allows for relationships between plants and other biota (e.g. fish, macroinvertebrates) to be investigated because that data are collected at the same spatial scale and a similar approach was used to determine fish habitat associations in the River Murray (Bice et al. 2013)

Almost all of the pools surveyed were hydrologically disconnected; hence the riffles, runs or cascades were not flowing. However, there were two reaches in the North Para River (one reach between Tanunda and Lyndoch and another north of Angaston) and one in Jacobs Creek (at the gauging station) where there was groundwater fed base flow. Spring and early summer 2012 in the Barossa region was one of the driest on record (Bureau of Meteorology 2013) and several landholders indicated that some pools on their properties had dried for the first time in living memory. Therefore, all of the pools designated as permanent for this project are perennial waterbodies, but this survey probably represents an extremely dry state for the streams in the prescribed water resources area. Despite the dry conditions just prior to the vegetation surveys, there were species present such as Typha domingensis, Phragmites australis, Schoenoplectus validus and Bolboschoenus caldwellii that have high water requirements (i.e. permanent shallow water or waterlogged soils) (Roberts and Marston 2000; Casanova 2011; Roberts and Marston 2011). The aforementioned species were widespread throughout the prescribed water resources area in pool, riffle and run habitats. However, submergent taxa were rare with the charophyte Nitella sp. and filamentous green alga Cladophora aegagropila (Appendix 2) the only submergent species recorded.

It is unclear why submergent species were rare because there were numerous permanent pools and the extended period of very low flow has provided the clear, still water conditions required for recruitment and persistence of many submergent species (e.g. Chambers and Kalff 1987; Hudon et al. 2000)
There was widespread evidence of ongoing recruitment of *Eucalyptus camaldulensis* on stream edges and in riparian zones, especially in areas that were protected from grazing (pers. obs.). The presence of trees of varying sizes, ranging from large individuals (probably several hundreds of years old) to trees decades old through to saplings (<10 cm; diameter) and seedlings suggests a balanced proportion of growth stages, indicating that there are a sufficient number of medium sized to large floods to facilitate recruitment in the channels and on stream edges. Hence, it is likely that recruitment of *Eucalyptus camaldulensis* in channels and close proximity to stream edges is more restricted by land management practices, primarily grazing, than by hydrological factors.

*Eucalyptus camaldulensis* seedlings and saplings were generally not observed away from stream channels despite the presence of large trees considerable distances from stream edges. The absence of recent recruitment in these areas may be due to grazing; however, many of the streams in the Barossa Prescribed Water Resources Area are deeply incised due to erosion. Stream incision would result in less frequent inundation of the historical floodplains due to the larger volumes required for overbank flows and less opportunities for recruitment of *Eucalyptus camaldulensis*.

The exotic terrestrial tree *Fraxinus angustifolia* was widespread on stream edges and riparian zones of streams in the prescribed water resources area. Similar to *Eucalyptus camaldulensis*, there is evidence of ongoing recruitment with large adult trees, seedlings and saplings present. *Fraxinus angustifolia* trees were planted extensively throughout the Barossa for ornamental purposes due to their vivid displays of colour during autumn. Mature trees produce large numbers of seeds with winged fruits that facilitate wind dispersal short distances (100s of metres to several kilometres) (Muyt 2001). Other exotic trees include *Populus deltoides*, *Olea europaea* (which were locally abundant in places along the edges of the North Para River), *Prunus sp.*, *Pyrus communis*, *Pinus halepensis*, *Pinus radiata*, *Salix babylonica* and *Salix nigrum* (all of which were with low cover) (pers. obs.). The impact of exotic trees on the ecology of the streams in the Barossa region is unclear. They probably displace native riparian species but there is no information regarding the historical vegetation of Barossa watercourses or the possible interactions between native and exotic species. Furthermore, *Fraxinus angustifolia*, *Populus deltoides*, *Salix babylonica* and *Salix nigrum* are deciduous species and the seasonal leaf fall and subsequent pulse of organic matter probably has implications for stream trophodynamics (*sensu* Janssen and Walker 1999; Cremer 2000).

Exotic understorey taxa were less abundant and widespread than native species. The most abundant native species (*Typha domingensis* and *Phragmites australis*) were rhizomatous perennials that can rapidly colonise large areas of stream bank or shallow reaches such as rifles and runs often forming dense monospecific stands that can prevent other species from colonising (Sainty
and Jacobs 1981; Romanowski 1998; Sainty and Jacobs 2003). Nevertheless, *Cynodon dactylon* was widespread around the edges of riffles and runs where some exotic species were locally abundant. For example, *Paspalum distichum* and *Juncus acutus* were common in Duck Pond Creek and *Rorippa nasturtium-aquaticum* was only present in areas with base flow (pers. obs.).

Cluster analysis detected clear groups of pools, riffles, runs and cascades based on the understorey and overstorey plant community; however, (with the exception of the division that separated the permanent and temporary pools) the groups showed very little relationship with respect to stream order or location in the catchment. There were permanent pools dominated by open water and *Typha domingensis* throughout the catchment. Similarly, pools dominated by *Phragmites australis* and bedrock were also widespread throughout the catchment. Riffles and runs dominated by *Typha domingensis*, *Eucalyptus camaldulensis* and *Phragmites australis* were also widespread throughout the catchment.

Stream channelisation and bank erosion were also widespread throughout the prescribed water resources area particularly in Greenock, Duck Pond, Angaston and Lyndoch creeks (pers. obs.). The channelisation is probably due to clearing of native riparian vegetation most of which would have occurred in the 1800s shortly after the area was settled by Europeans. However, there were many stream reaches throughout the prescribed water resources area where domestic stock were able to access stream banks further exacerbating the risk of erosion and channelisation.

The cross section data provided information regarding the distribution of species across a stream cross section; however, there were problems in displaying the data and at some sites the vegetation cross section was unable to be undertaken at the same points as the hydrological cross section (e.g. when a cross section was undertaken at gauging weir and devoid of vegetation). However, the data provided information regarding the distribution of plant species and communities at the site scale and (due to the surveys being undertaken in May after the opening rains) an indication of the abundance of winter annuals. In the future these types of data would be best collected using a differential GP system (e.g. Trimble RTK™) that can accurately plot positions in three dimensions (Trimble 2013). Using such a system, it would be possible to obtain the positions of plant species and communities in three dimensions, which would include elevation. When elevation information is obtained where there is stream gauging information available, it can then be used to determine the flow magnitude that will inundate a community and the frequency of inundation. This information can then be used to develop or refine eco-hydrological models.
5. References


### 6. Appendices

**Appendix 1:** GPS coordinates (UTM format; map datum WGS 84) for survey sites and the habitat types present at each site.

<table>
<thead>
<tr>
<th>Site</th>
<th>Habitat Type</th>
<th>Easting</th>
<th>Northing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry season pool 003</td>
<td>Permanent pool and riffle</td>
<td>309444</td>
<td>6180519</td>
</tr>
<tr>
<td>Dry season pool 003A</td>
<td>Permanent pool and riffle</td>
<td>309609</td>
<td>6180543</td>
</tr>
<tr>
<td>Dry season pool 006</td>
<td>Permanent pool and riffle</td>
<td>309791</td>
<td>6180656</td>
</tr>
<tr>
<td>Dry season pool 007</td>
<td>Permanent pool and run</td>
<td>306743</td>
<td>618672</td>
</tr>
<tr>
<td>Dry season pool 008</td>
<td>Permanent pool and riffle</td>
<td>308091</td>
<td>6180290</td>
</tr>
<tr>
<td>Dry season pool 008A</td>
<td>Permanent pool and riffle</td>
<td>308113</td>
<td>6180353</td>
</tr>
<tr>
<td>Dry season pool 009</td>
<td>Permanent pool and riffle</td>
<td>308170</td>
<td>6180456</td>
</tr>
<tr>
<td>Dry season pool 010</td>
<td>Permanent pool and riffle</td>
<td>309034</td>
<td>6182538</td>
</tr>
<tr>
<td>Dry season pool 011</td>
<td>Permanent pool and riffle</td>
<td>309045</td>
<td>6182011</td>
</tr>
<tr>
<td>Dry season pool 018</td>
<td>Permanent pool and riffle</td>
<td>318685</td>
<td>6174835</td>
</tr>
<tr>
<td>Dry season pool 029</td>
<td>Permanent pool and run</td>
<td>310808</td>
<td>6170441</td>
</tr>
<tr>
<td>Dry season pool 030</td>
<td>Permanent pool and riffle</td>
<td>311030</td>
<td>6180345</td>
</tr>
<tr>
<td>Dry season pool 033</td>
<td>Permanent pool and riffle</td>
<td>321863</td>
<td>6184877</td>
</tr>
<tr>
<td>Dry season pool 033A</td>
<td>Permanent pool and riffle</td>
<td>321912</td>
<td>6184861</td>
</tr>
<tr>
<td>Dry season pool 033B</td>
<td>Permanent pool and run</td>
<td>31963</td>
<td>6184927</td>
</tr>
<tr>
<td>Dry season pool 034</td>
<td>Permanent pool</td>
<td>323077</td>
<td>6184249</td>
</tr>
<tr>
<td>Dry season pool 035</td>
<td>Permanent pool</td>
<td>323729</td>
<td>6183948</td>
</tr>
<tr>
<td>Dry season pool 035A</td>
<td>Permanent pool</td>
<td>322962</td>
<td>6184424</td>
</tr>
<tr>
<td>Dry season pool 044</td>
<td>Permanent pool and riffle</td>
<td>323962</td>
<td>6182226</td>
</tr>
<tr>
<td>Dry season pool 044A</td>
<td>Permanent pool and riffle</td>
<td>323933</td>
<td>6182148</td>
</tr>
<tr>
<td>Dry season pool 046</td>
<td>Permanent pool</td>
<td>323554</td>
<td>6180197</td>
</tr>
<tr>
<td>Dry season pool 047</td>
<td>Permanent pool</td>
<td>323496</td>
<td>6180006</td>
</tr>
<tr>
<td>Dry season pool 048</td>
<td>Permanent pool</td>
<td>323476</td>
<td>6180126</td>
</tr>
<tr>
<td>Dry season pool 049</td>
<td>Permanent pool</td>
<td>323376</td>
<td>6178532</td>
</tr>
<tr>
<td>Dry season pool 050</td>
<td>Permanent pool</td>
<td>324158</td>
<td>6176804</td>
</tr>
<tr>
<td>Dry season pool 051</td>
<td>Permanent pool and run</td>
<td>324212</td>
<td>6176478</td>
</tr>
<tr>
<td>Dry season pool 053</td>
<td>Permanent pool and run</td>
<td>324153</td>
<td>6176270</td>
</tr>
<tr>
<td>Dry season pool 053A</td>
<td>Permanent pool</td>
<td>324200</td>
<td>6176326</td>
</tr>
<tr>
<td>Dry season pool 054</td>
<td>Permanent pool and run</td>
<td>324069</td>
<td>6175640</td>
</tr>
<tr>
<td>Dry season pool 055</td>
<td>Permanent pool</td>
<td>324124</td>
<td>6175471</td>
</tr>
<tr>
<td>Dry season pool 056</td>
<td>Permanent pool</td>
<td>324020</td>
<td>6174831</td>
</tr>
<tr>
<td>Dry season pool 057</td>
<td>Permanent pool</td>
<td>323902</td>
<td>6174773</td>
</tr>
<tr>
<td>Dry season pool 063</td>
<td>Permanent pool and run</td>
<td>322997</td>
<td>6170268</td>
</tr>
<tr>
<td>Dry season pool 064</td>
<td>Permanent pool and run</td>
<td>323005</td>
<td>6170138</td>
</tr>
<tr>
<td>Dry season pool 065</td>
<td>Permanent pool and run</td>
<td>323001</td>
<td>6170038</td>
</tr>
<tr>
<td>Dry season pool 066</td>
<td>Permanent pool and riffle</td>
<td>323005</td>
<td>6169928</td>
</tr>
<tr>
<td>Dry season pool 068</td>
<td>Permanent pool and run</td>
<td>323041</td>
<td>6169303</td>
</tr>
<tr>
<td>Dry season pool 069</td>
<td>Permanent pool and run</td>
<td>323043</td>
<td>6169218</td>
</tr>
<tr>
<td>Dry season pool 074</td>
<td>Permanent pool</td>
<td>322940</td>
<td>6174322</td>
</tr>
<tr>
<td>Dry season pool 075</td>
<td>Permanent pool</td>
<td>322875</td>
<td>6174371</td>
</tr>
<tr>
<td>Dry season pool 076</td>
<td>Permanent pool</td>
<td>322725</td>
<td>6174386</td>
</tr>
<tr>
<td>Dry season pool 077</td>
<td>Permanent pool</td>
<td>322684</td>
<td>6174378</td>
</tr>
<tr>
<td>Dry season pool 086</td>
<td>Permanent pool</td>
<td>322807</td>
<td>6185949</td>
</tr>
<tr>
<td>Dry season pool 086A</td>
<td>Permanent pool</td>
<td>322968</td>
<td>6186109</td>
</tr>
<tr>
<td>Dry season pool 087</td>
<td>Permanent pool and run</td>
<td>326448</td>
<td>6185969</td>
</tr>
<tr>
<td>Dry season pool 087A</td>
<td>Permanent pool and run</td>
<td>326347</td>
<td>6186065</td>
</tr>
<tr>
<td>Dry season pool 089</td>
<td>Permanent pool and riffle</td>
<td>324808</td>
<td>6186194</td>
</tr>
<tr>
<td>Dry season pool 089A</td>
<td>Permanent pool</td>
<td>324742</td>
<td>6186174</td>
</tr>
<tr>
<td>Dry season pool 091</td>
<td>Permanent pool</td>
<td>325497</td>
<td>6186443</td>
</tr>
<tr>
<td>Dry season pool 093</td>
<td>Permanent pool</td>
<td>325212</td>
<td>6166351</td>
</tr>
<tr>
<td>Dry season pool 093A</td>
<td>Permanent pool and riffle</td>
<td>325258</td>
<td>6186389</td>
</tr>
<tr>
<td>Dry season pool 095</td>
<td>Permanent pool</td>
<td>326618</td>
<td>6185405</td>
</tr>
<tr>
<td>Dry season pool 097</td>
<td>Permanent pool and riffle</td>
<td>328370</td>
<td>6184213</td>
</tr>
<tr>
<td>Dry season pool 098</td>
<td>Permanent pool and riffle</td>
<td>328396</td>
<td>6184232</td>
</tr>
<tr>
<td>Dry season pool 100</td>
<td>Permanent pool and run</td>
<td>305008</td>
<td>6172122</td>
</tr>
<tr>
<td>Site</td>
<td>Habitat Type</td>
<td>Easting</td>
<td>Northing</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>--------------------------</td>
<td>----------</td>
<td>-----------</td>
</tr>
<tr>
<td>Dry season pool 101</td>
<td>Permanent pool</td>
<td>305029</td>
<td>6172115</td>
</tr>
<tr>
<td>Dry season pool 101 A</td>
<td>Permanent pool</td>
<td>305078</td>
<td>6172140</td>
</tr>
<tr>
<td>Dry season pool 102</td>
<td>Permanent pool and riffle</td>
<td>305092</td>
<td>6172125</td>
</tr>
<tr>
<td>Dry season pool 103</td>
<td>Permanent pool</td>
<td>305130</td>
<td>6172183</td>
</tr>
<tr>
<td>Dry season pool 103A</td>
<td>Permanent pool and run</td>
<td>305127</td>
<td>6172213</td>
</tr>
<tr>
<td>Dry season pool 105</td>
<td>Permanent pool</td>
<td>307246</td>
<td>6172712</td>
</tr>
<tr>
<td>Dry season pool 106</td>
<td>Permanent pool and riffle</td>
<td>306431</td>
<td>6172616</td>
</tr>
<tr>
<td>Dry season pool 107</td>
<td>Permanent pool and run</td>
<td>307366</td>
<td>6172824</td>
</tr>
<tr>
<td>Dry season pool 108</td>
<td>Permanent pool and run</td>
<td>308601</td>
<td>6171912</td>
</tr>
<tr>
<td>Dry season pool 112</td>
<td>Permanent pool and cascade</td>
<td>308515</td>
<td>6171916</td>
</tr>
<tr>
<td>Dry season pool 115</td>
<td>Permanent pool and run</td>
<td>308686</td>
<td>6172008</td>
</tr>
<tr>
<td>Dry season pool 116</td>
<td>Permanent pool and run</td>
<td>308804</td>
<td>6171346</td>
</tr>
<tr>
<td>Dry season pool 118</td>
<td>Permanent pool and riffle</td>
<td>309767</td>
<td>6172428</td>
</tr>
<tr>
<td>Dry season pool 130</td>
<td>Permanent pool</td>
<td>310607</td>
<td>6173891</td>
</tr>
<tr>
<td>Dry season pool 131</td>
<td>Permanent pool and riffle</td>
<td>310652</td>
<td>6174014</td>
</tr>
<tr>
<td>Dry season pool 132</td>
<td>Permanent pool</td>
<td>310650</td>
<td>6174055</td>
</tr>
<tr>
<td>Dry season pool 133</td>
<td>Permanent pool</td>
<td>310648</td>
<td>6174079</td>
</tr>
<tr>
<td>Dry season pool 134</td>
<td>Permanent pool</td>
<td>310811</td>
<td>6174306</td>
</tr>
<tr>
<td>Dry season pool 135</td>
<td>Permanent pool</td>
<td>311043</td>
<td>6174494</td>
</tr>
<tr>
<td>Dry season pool 135 A</td>
<td>Permanent pool</td>
<td>311022</td>
<td>6174382</td>
</tr>
<tr>
<td>Dry season pool 136</td>
<td>Permanent pool</td>
<td>311062</td>
<td>6174538</td>
</tr>
<tr>
<td>Dry season pool 137</td>
<td>Permanent pool</td>
<td>311086</td>
<td>6174567</td>
</tr>
<tr>
<td>Dry season pool 138</td>
<td>Permanent pool</td>
<td>311184</td>
<td>6174791</td>
</tr>
<tr>
<td>Dry season pool 138 A</td>
<td>Permanent pool</td>
<td>311326</td>
<td>6174943</td>
</tr>
<tr>
<td>Dry season pool 138 B</td>
<td>Permanent pool</td>
<td>311312</td>
<td>6174964</td>
</tr>
<tr>
<td>Dry season pool 138 C</td>
<td>Permanent pool</td>
<td>311178</td>
<td>6174691</td>
</tr>
<tr>
<td>Dry season pool 142</td>
<td>Permanent pool</td>
<td>313756</td>
<td>6180801</td>
</tr>
<tr>
<td>Dry season pool 143</td>
<td>Permanent pool and run</td>
<td>313772</td>
<td>6180846</td>
</tr>
<tr>
<td>Dry season pool 144</td>
<td>Permanent pool and run</td>
<td>314031</td>
<td>6181082</td>
</tr>
<tr>
<td>Dry season pool 145</td>
<td>Permanent pool and run</td>
<td>314315</td>
<td>6181720</td>
</tr>
<tr>
<td>Dry season pool 146</td>
<td>Permanent pool and run</td>
<td>314289</td>
<td>6181740</td>
</tr>
<tr>
<td>Dry season pool 147</td>
<td>Permanent pool and run</td>
<td>314262</td>
<td>6181762</td>
</tr>
<tr>
<td>Dry season pool 148</td>
<td>Permanent pool and run</td>
<td>314198</td>
<td>6181921</td>
</tr>
<tr>
<td>Dry season pool 156</td>
<td>Permanent pool</td>
<td>319028</td>
<td>6184770</td>
</tr>
<tr>
<td>Dry season pool 157</td>
<td>Permanent pool and run</td>
<td>306984</td>
<td>6161386</td>
</tr>
<tr>
<td>Dry season pool 159</td>
<td>Permanent pool and riffle</td>
<td>307583</td>
<td>6161077</td>
</tr>
<tr>
<td>Dry season pool 160</td>
<td>Permanent pool and riffle</td>
<td>308132</td>
<td>6161298</td>
</tr>
<tr>
<td>Dry season pool 161</td>
<td>Permanent pool and run</td>
<td>308169</td>
<td>6161330</td>
</tr>
<tr>
<td>Dry season pool 162</td>
<td>Permanent pool and run</td>
<td>308147</td>
<td>6161498</td>
</tr>
<tr>
<td>Dry season pool 164</td>
<td>Permanent pool and run</td>
<td>308664</td>
<td>6161976</td>
</tr>
<tr>
<td>Dry season pool 165</td>
<td>Permanent pool and run</td>
<td>308804</td>
<td>6161902</td>
</tr>
<tr>
<td>Gawler Park Rd Ford Pool</td>
<td>Permanent pool</td>
<td>323592</td>
<td>6180603</td>
</tr>
<tr>
<td>Greenock Creek @ Roenfeldt Rd</td>
<td>Permanent pool</td>
<td>308992</td>
<td>6183846</td>
</tr>
<tr>
<td>Greenock Creek 01</td>
<td>Permanent pool</td>
<td>310503</td>
<td>6185943</td>
</tr>
<tr>
<td>Jacobs Creek gauging station 01</td>
<td>Permanent pool</td>
<td>313248</td>
<td>6171428</td>
</tr>
<tr>
<td>Jacobs Creek gauging station 02</td>
<td>Permanent pool</td>
<td>312998</td>
<td>6181623</td>
</tr>
<tr>
<td>Jacobs Creek headwater 01</td>
<td>Temporary pool</td>
<td>313859</td>
<td>6165628</td>
</tr>
<tr>
<td>Jacobs Creek headwater 02</td>
<td>Temporary pool</td>
<td>315487</td>
<td>6166422</td>
</tr>
<tr>
<td>Jacobs Creek headwater 03</td>
<td>Temporary pool</td>
<td>315808</td>
<td>6166773</td>
</tr>
<tr>
<td>Jacobs Creek Tributary 01</td>
<td>Temporary pool</td>
<td>310235</td>
<td>6169480</td>
</tr>
<tr>
<td>Jacobs Creek Tributary 02</td>
<td>Temporary pool</td>
<td>312654</td>
<td>6168294</td>
</tr>
<tr>
<td>Jacobs Creek Tributary Dam</td>
<td>Permanent pool</td>
<td>312681</td>
<td>6167945</td>
</tr>
<tr>
<td>LC Lyndoch Creek @ Kreig Rd</td>
<td>Temporary pool</td>
<td>306831</td>
<td>6167009</td>
</tr>
<tr>
<td>Lindsay Park 02</td>
<td>Permanent pool</td>
<td>323166</td>
<td>6179177</td>
</tr>
<tr>
<td>Lyndoch Creek headwater</td>
<td>Temporary pool</td>
<td>309902</td>
<td>6167088</td>
</tr>
<tr>
<td>Lyndoch Creek @ Lyndoch Valley Rd</td>
<td>Temporary pool</td>
<td>307048</td>
<td>6165553</td>
</tr>
<tr>
<td>Lyndoch Creek @ Williamstown Rd</td>
<td>Temporary pool</td>
<td>306317</td>
<td>6162920</td>
</tr>
<tr>
<td>Lyndoch Creek confluence</td>
<td>Temporary pool</td>
<td>306817</td>
<td>6163869</td>
</tr>
<tr>
<td>North Para River @ Flaxman Rd</td>
<td>Temporary pool</td>
<td>323725</td>
<td>6172885</td>
</tr>
<tr>
<td>North Para River @ Jenke Rd</td>
<td>Permanent pool</td>
<td>308615</td>
<td>6180441</td>
</tr>
<tr>
<td>North Para River @ Lindsay Park Rd</td>
<td>Permanent pool</td>
<td>323111</td>
<td>6178830</td>
</tr>
<tr>
<td>Site</td>
<td>Habitat Type</td>
<td>Easting</td>
<td>Northing</td>
</tr>
<tr>
<td>---------------------------------------------------------------------</td>
<td>-------------------------------------</td>
<td>----------</td>
<td>-----------</td>
</tr>
<tr>
<td>North Para River @ Seppeltsfield</td>
<td>Permanent pool and riffle</td>
<td>308890</td>
<td>6181936</td>
</tr>
<tr>
<td>North Para River @ Thorne Clark Vineyard 01</td>
<td>Permanent pool</td>
<td>323446</td>
<td>6179772</td>
</tr>
<tr>
<td>North Para River @ Thorne Clark Vineyard 02</td>
<td>Permanent pool</td>
<td>323487</td>
<td>6179933</td>
</tr>
<tr>
<td>Permanent Pool North Para River 001</td>
<td>Permanent pool and run</td>
<td>305323</td>
<td>6172200</td>
</tr>
<tr>
<td>Permanent Pool North Para River 002</td>
<td>Permanent pool and riffle</td>
<td>305463</td>
<td>6172227</td>
</tr>
<tr>
<td>Permanent Pool North Para River 003</td>
<td>Permanent pool and riffle</td>
<td>305550</td>
<td>6172222</td>
</tr>
<tr>
<td>Permanent Pool North Para River 004</td>
<td>Permanent pool and riffle</td>
<td>305665</td>
<td>6172228</td>
</tr>
<tr>
<td>Permanent Pool North Para River 005</td>
<td>Permanent pool and run</td>
<td>307023</td>
<td>6172900</td>
</tr>
<tr>
<td>Permanent Pool North Para River 006</td>
<td>Permanent pool and run</td>
<td>306964</td>
<td>6172880</td>
</tr>
<tr>
<td>Permanent Pool North Para River 007</td>
<td>Permanent pool</td>
<td>307078</td>
<td>6172814</td>
</tr>
<tr>
<td>Permanent Pool North Para River 008</td>
<td>Permanent pool and run</td>
<td>309099</td>
<td>6171121</td>
</tr>
<tr>
<td>Permanent Pool North Para River 009</td>
<td>Permanent pool</td>
<td>309109</td>
<td>6171011</td>
</tr>
<tr>
<td>Permanent Pool North Para River 010</td>
<td>Permanent pool</td>
<td>309150</td>
<td>6171015</td>
</tr>
<tr>
<td>Permanent Pool North Para River 011</td>
<td>Permanent pool</td>
<td>309221</td>
<td>6171042</td>
</tr>
<tr>
<td>Permanent Pool North Para River 012</td>
<td>Permanent pool and run</td>
<td>309259</td>
<td>6171064</td>
</tr>
<tr>
<td>Permanent Pool North Para River 013</td>
<td>Permanent pool</td>
<td>309537</td>
<td>6171101</td>
</tr>
<tr>
<td>Permanent Pool North Para River 014</td>
<td>Permanent pool</td>
<td>309638</td>
<td>6171175</td>
</tr>
<tr>
<td>Permanent Pool North Para River 015</td>
<td>Permanent pool and run</td>
<td>309999</td>
<td>6173163</td>
</tr>
<tr>
<td>Permanent Pool North Para River 016</td>
<td>Permanent pool and cascade</td>
<td>309972</td>
<td>6173320</td>
</tr>
<tr>
<td>Permanent Pool North Para River 017</td>
<td>Permanent pool and cascade</td>
<td>310125</td>
<td>6173547</td>
</tr>
<tr>
<td>Permanent Pool North Para River 018</td>
<td>Permanent pool</td>
<td>310148</td>
<td>6173604</td>
</tr>
<tr>
<td>Permanent Pool North Para River 019</td>
<td>Permanent pool</td>
<td>308648</td>
<td>6172068</td>
</tr>
<tr>
<td>Permanent Pool North Para River 020</td>
<td>Permanent pool and run</td>
<td>308708</td>
<td>6171668</td>
</tr>
<tr>
<td>Permanent Pool North Para River 021</td>
<td>Permanent pool and run</td>
<td>308826</td>
<td>6171513</td>
</tr>
<tr>
<td>Permanent Pool North Para River 026</td>
<td>Permanent pool and run</td>
<td>324070</td>
<td>6174292</td>
</tr>
<tr>
<td>Permanent Pool North Para River 027</td>
<td>Permanent pool and run</td>
<td>324006</td>
<td>6174335</td>
</tr>
<tr>
<td>Permanent Pool North Para River 028</td>
<td>Permanent pool and run</td>
<td>313786</td>
<td>6180926</td>
</tr>
<tr>
<td>Permanent Pool North Para River 029</td>
<td>Permanent pool and run</td>
<td>314324</td>
<td>6181706</td>
</tr>
<tr>
<td>Permanent Pool North Para River 030</td>
<td>Permanent pool and run</td>
<td>314206</td>
<td>6181811</td>
</tr>
<tr>
<td>Permanent Pool North Para River 031</td>
<td>Permanent pool and run</td>
<td>314197</td>
<td>6181949</td>
</tr>
<tr>
<td>Permanent Pool North Para River 032</td>
<td>Permanent pool</td>
<td>312703</td>
<td>6178881</td>
</tr>
<tr>
<td>Permanent Pool North Para River 033</td>
<td>Permanent pool</td>
<td>311971</td>
<td>6178010</td>
</tr>
<tr>
<td>Permanent Pool North Para River 034</td>
<td>Permanent pool and run</td>
<td>311966</td>
<td>6177937</td>
</tr>
<tr>
<td>Permanent Pool North Para River 035</td>
<td>Permanent pool</td>
<td>311941</td>
<td>6177837</td>
</tr>
<tr>
<td>Permanent Pool North Para River 036</td>
<td>Permanent pool</td>
<td>311856</td>
<td>6177795</td>
</tr>
<tr>
<td>Permanent Pool North Para River 101</td>
<td>Permanent pool and riffle</td>
<td>323760</td>
<td>6172801</td>
</tr>
<tr>
<td>Permanent Pool North Para River 102</td>
<td>Permanent pool and riffle</td>
<td>323814</td>
<td>6172772</td>
</tr>
<tr>
<td>Permanent Pool North Para River 103</td>
<td>Permanent pool and riffle</td>
<td>323860</td>
<td>6172725</td>
</tr>
<tr>
<td>Permanent Pool North Para River 104</td>
<td>Permanent pool</td>
<td>323750</td>
<td>6176980</td>
</tr>
<tr>
<td>Permanent Pool North Para River 105</td>
<td>Permanent pool</td>
<td>323671</td>
<td>6177030</td>
</tr>
<tr>
<td>Permanent Pool North Para River 106</td>
<td>Permanent pool</td>
<td>323559</td>
<td>6177597</td>
</tr>
<tr>
<td>Permanent Pool North Para River 108</td>
<td>Permanent pool</td>
<td>323542</td>
<td>6178222</td>
</tr>
<tr>
<td>Permanent Pool North Para River 109</td>
<td>Permanent pool</td>
<td>323542</td>
<td>6178218</td>
</tr>
<tr>
<td>Permanent Pool South Para River 001</td>
<td>Permanent pool</td>
<td>308988</td>
<td>6161831</td>
</tr>
<tr>
<td>Permanent Pool South Para River 002</td>
<td>Permanent pool and run</td>
<td>308948</td>
<td>6161873</td>
</tr>
<tr>
<td>Permanent Pool South Para River 003</td>
<td>Permanent pool and run</td>
<td>308083</td>
<td>6161271</td>
</tr>
<tr>
<td>Permanent Pool South Para River 004</td>
<td>Permanent pool and riffle</td>
<td>307692</td>
<td>6161070</td>
</tr>
<tr>
<td>Permanent Pool South Para River 005</td>
<td>Permanent pool</td>
<td>307819</td>
<td>6161101</td>
</tr>
<tr>
<td>Permanent Pool South Para River 006</td>
<td>Permanent pool and run</td>
<td>307894</td>
<td>6161119</td>
</tr>
<tr>
<td>Stockwell Creek 01</td>
<td>Temporary pool</td>
<td>320916</td>
<td>6188004</td>
</tr>
<tr>
<td>Stockwell Creek 02</td>
<td>Permanent pool</td>
<td>320088</td>
<td>6188010</td>
</tr>
<tr>
<td>Tanunda Creek @ Betheny Reserve</td>
<td>Temporary pool</td>
<td>315037</td>
<td>6175684</td>
</tr>
<tr>
<td>Tanunda Creek headwater 01</td>
<td>Temporary pool</td>
<td>318805</td>
<td>6171501</td>
</tr>
<tr>
<td>Tanunda Creek headwater 02</td>
<td>Temporary pool</td>
<td>318510</td>
<td>6171989</td>
</tr>
<tr>
<td>Temporary Pool North Para River 01</td>
<td>Temporary pool</td>
<td>319008</td>
<td>6184574</td>
</tr>
</tbody>
</table>
### Appendix 2: Species list and functional group classification (sensu Casanova 2011) for streams in the Barossa Prescribed Water Resources Area (*denotes exotic species, **denotes proclaimed pest plant in South Australia, ***denotes weed of national significance; Tdr=Terrestrial dry, Tda=Terrestrial damp, ATe=Amphibious Fluctuation Tolerator emergent, AFR=Amphibious Fluctuation Tolerator floating, E=Emergent, Sr=Submergent r-selected).  

<table>
<thead>
<tr>
<th>Species</th>
<th>Functional Group</th>
<th>Species</th>
<th>Functional Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acacia paradoxa</td>
<td>Tdr</td>
<td>Lycopus australis</td>
<td>ATe</td>
</tr>
<tr>
<td>Allocasuarina verticillata</td>
<td>Tdr</td>
<td>Medicago spp.*</td>
<td>Tdr</td>
</tr>
<tr>
<td>Alternanthera denticulata</td>
<td>Tda</td>
<td>Melilotus albus*</td>
<td>Tdr</td>
</tr>
<tr>
<td>Apium graveolens*</td>
<td>Tda</td>
<td>Mentha piperita*</td>
<td>ATe</td>
</tr>
<tr>
<td>Arundo donax*</td>
<td>ATe</td>
<td>Mimulus repens</td>
<td>AFTl</td>
</tr>
<tr>
<td>Asparagus asparagoides***</td>
<td>Tdr</td>
<td>Myriophyllum vurrucosum</td>
<td>AFRp</td>
</tr>
<tr>
<td>Aster subulatus*</td>
<td>Tda</td>
<td>Nicotiana glauca*</td>
<td>Tdr</td>
</tr>
<tr>
<td>Atrophly prostrata*</td>
<td>Tdr</td>
<td>Nitella sp.</td>
<td>Sr</td>
</tr>
<tr>
<td>Baumea juncea</td>
<td>ATe</td>
<td>Olea europaea**</td>
<td>Tdr</td>
</tr>
<tr>
<td>Berula erecta</td>
<td>ATe</td>
<td>Paspalum distichum</td>
<td>ATe</td>
</tr>
<tr>
<td>Bolboschoenus caldwelli</td>
<td>E</td>
<td>Pennisetum clandestinum*</td>
<td>Tda</td>
</tr>
<tr>
<td>Boudetoula dactyloides*</td>
<td>Tdr</td>
<td>Persicaria lapathifolia</td>
<td>AFRp</td>
</tr>
<tr>
<td>Brassica rapa*</td>
<td>Tdr</td>
<td>Phalaris arundinacea*</td>
<td>Tda</td>
</tr>
<tr>
<td>Callitriche sp.</td>
<td>Tdr</td>
<td>Phragmites australis</td>
<td>E</td>
</tr>
<tr>
<td>Callistemon sp.</td>
<td>Tdr</td>
<td>Picris squarrosa</td>
<td>Tda</td>
</tr>
<tr>
<td>Carex appressa</td>
<td>ATe</td>
<td>Pinus halepensis**</td>
<td>Tdr</td>
</tr>
<tr>
<td>Centaurea calcita*</td>
<td>Tda</td>
<td>Pinus radiata*</td>
<td>Tdr</td>
</tr>
<tr>
<td>Chenopodium album*</td>
<td>Tda</td>
<td>Plantago coronopus*</td>
<td>Tdr</td>
</tr>
<tr>
<td>Chenopodium glaucum*</td>
<td>Tda</td>
<td>Plantago lanceolata*</td>
<td>Tdr</td>
</tr>
<tr>
<td>Cladophora agagropila</td>
<td>Sr</td>
<td>Plantago major*</td>
<td>Tdr</td>
</tr>
<tr>
<td>Convolvulus urbescens*</td>
<td>Tdr</td>
<td>Polygonum aviculare*</td>
<td>Tdr</td>
</tr>
<tr>
<td>Conyza bonariensis*</td>
<td>Tda</td>
<td>Polygong monspeliensis*</td>
<td>ATe</td>
</tr>
<tr>
<td>Cotula coronopifolia*</td>
<td>AFRp</td>
<td>Populus deltoides*</td>
<td>Tdr</td>
</tr>
<tr>
<td>Crassula helmsi</td>
<td>AFTl</td>
<td>Prunus sp.*</td>
<td>Tdr</td>
</tr>
<tr>
<td>Cynara cardunculus**</td>
<td>Tda</td>
<td>Pyrus communis*</td>
<td>Tdr</td>
</tr>
<tr>
<td>Cynodon dactylon*</td>
<td>Tdr</td>
<td>Quercus robur*</td>
<td>Tdr</td>
</tr>
<tr>
<td>Cyperus gymncoaustus</td>
<td>ATe</td>
<td>Ranunculus tribolus*</td>
<td>AFRp</td>
</tr>
<tr>
<td>Cyperus vaginatus</td>
<td>ATe</td>
<td>Rorippa nasturtium-aquaticum*</td>
<td>AFRp</td>
</tr>
<tr>
<td>Distichlis distichophylla</td>
<td>Tda</td>
<td>Rosa canina</td>
<td>Tdr</td>
</tr>
<tr>
<td>Eleocharis acuta</td>
<td>ATe</td>
<td>Rubus fruticosus agg.***</td>
<td>ATe</td>
</tr>
<tr>
<td>Erargrostis australasic</td>
<td>Tda</td>
<td>Rumex bidens</td>
<td>ATe</td>
</tr>
<tr>
<td>Eucalyptus camaldulensis</td>
<td>AFTw</td>
<td>Salix babylonica*</td>
<td>E</td>
</tr>
<tr>
<td>Ficinia nodosa</td>
<td>ATe</td>
<td>Salix nigrum***</td>
<td>E</td>
</tr>
<tr>
<td>Foeniculum vulgare*</td>
<td>Tda</td>
<td>Samolus repens</td>
<td>Tda</td>
</tr>
<tr>
<td>Fraxinus angustifolia*</td>
<td>Tdr</td>
<td>Scaevola sp.</td>
<td>Tdr</td>
</tr>
<tr>
<td>Genista monspessulanana***</td>
<td>Tdr</td>
<td>Scabiosa atropurpurea*</td>
<td>Tdr</td>
</tr>
<tr>
<td>Holcus lanatus*</td>
<td>Tda</td>
<td>Schoenoplectus pungens</td>
<td>ATe</td>
</tr>
<tr>
<td>Hydrocotyle verticillata</td>
<td>AFRp</td>
<td>Schoenoplectus validus</td>
<td>E</td>
</tr>
<tr>
<td>Hypochaeris radicata*</td>
<td>Tdr</td>
<td>Schinus molle</td>
<td>Tdr</td>
</tr>
<tr>
<td>Isoploes platycarp*</td>
<td>AFTl</td>
<td>Solanum nigrum*</td>
<td>Tda</td>
</tr>
<tr>
<td>Juncus acutus*</td>
<td>ATe</td>
<td>Sonchus asper*</td>
<td>Tda</td>
</tr>
<tr>
<td>Juncus pallidus</td>
<td>ATe</td>
<td>Sonchus pleraceus*</td>
<td>Tdr</td>
</tr>
<tr>
<td>Juncus usitatus</td>
<td>ATe</td>
<td>Sporobolus virginicus</td>
<td>Tda</td>
</tr>
<tr>
<td>Lachnagrostis filiformis</td>
<td>Tda</td>
<td>Trifolium spp.*</td>
<td>Tdr</td>
</tr>
<tr>
<td>Lactuca saligna*</td>
<td>Tdr</td>
<td>Trijochin striatum</td>
<td>ATe</td>
</tr>
<tr>
<td>Lactuca serriola*</td>
<td>Tdr</td>
<td>Typha domingensis</td>
<td>E</td>
</tr>
<tr>
<td>Lemma disperma</td>
<td>AFRf</td>
<td>Typha orientalis</td>
<td>E</td>
</tr>
<tr>
<td>Lepidosperma sp.</td>
<td>Tdr</td>
<td>Ulex europaeus***</td>
<td>Tdr</td>
</tr>
<tr>
<td>Ludwigia peleoides</td>
<td>AFRp</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>