May 2010 roadside buffel grass survey

Report to NRM Biosecurity Unit, PIRSA

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1 BACKGROUND

Buffel grass is a potential threat to the environmental and cultural values of arid and semi arid South Australia (Greenfield 2007). Buffel grass ranked highly on a Weed Risk Assessment process carried for each of the seven bioregions in the South Australian Arid Lands (SAAL) region (Greenfield 2007).

Buffel grass is a favoured feed species of many pastoralists who have cultivated it in several parts of central Australia, including, but to a much lesser extent, in northern South Australia. It is recognised as the most valuable introduced grass in arid and semi arid tropical areas (Mclvor 2003). In a phone survey conducted in 2007, forty one percent of pastoralists in SAAL region perceive buffel grass as a resource and forty two percent are not prepared to participate in a coordinated regional program (Greenfield 2007).

Environmentally buffel grass is considered as one of Australia’s worst weeds (Humphries et al. 1991). Buffel grass is an aggressive invader of arid riparian areas due to its ease of establishment, rapid growth rate, fast maturation, prolonged flowering/fruitching periods, prolific seed production, high seed dispersal ability, relatively long seed dormancy and tolerant to drought, fire and grazing (Franks 2002; Franks et al. 2000). It forms dense monocultures, changes fire regimes, threatens refugia and displaces native and endemic plants (Greenfield 2007).

The distribution of buffel grass in South Australia has been recorded in part by government agencies and NRM Boards, however this data set is incomplete for most areas and generally lacks detail regarding impacts. There are also significant gaps in knowledge regarding the distribution and spread of this species in South Australia, making strategic management decisions difficult.

The predominant pathway for spread of buffel grass in South Australia is along roadsides, where road works and vehicles carry seeds and deposit them in disturbed roadside environments. Human activities including stock movement have also spread buffel grass into areas where there are no roads. Buffel grass is also naturally disbursed by wind and water and has successfully spread and established along a limited number of arid drainage lines in the region.

Opportunities may exist to minimise further spread to reduce the potential impacts of buffel grass in South Australia.

In recognition of this opportunity, the NRM Biosecurity Unit of the Department of Primary Industries and Resources SA (PIRSA) developed a project to improve the understanding of the State-wide distribution of buffel grass, and to identify a strategic approach to its management. This project is being done in collaboration with Victoria Marshall, a PhD candidate at University of Adelaide (UA) who is undertaking research on modelling buffel grass distribution, and, Rural Solutions SA Resource Management Consultants (RSSA) experienced...
in weed management in arid South Australia. This project was supported with State NRM Program Competitive Regional Investment 2009-10 funding.

In order to address some gaps in the current knowledge of buffel grass distribution in South Australia Rural Solutions SA (RSSA) conducted a drive-by roadside survey in areas of central and far northern SA in May 2010, as reported below.

2 METHODS

2.1 THE SURVEY ROUTE
After collating buffel grass distribution data from all known sources, Victoria Marshall identified a survey route by prioritising roads that:
   1) lacked records of buffel grass distribution and/or,
   2) crossed several environmental gradients.

The identified survey route covered roads and tracks from Port Augusta northwards to Oodnadatta, and between Yellabinna Regional Reserve in the west to Lake Frome in the east. A large portion of the Stuart Highway was surveyed for buffel grass in 2006 and did not need to be covered in this survey. Map 1 (appendix 1) shows the roads prioritised for the survey as well as the roads previously surveyed in 2006 and the locations where existing government records of buffel grass exist.

2.2 DATA COLLECTION
Tim Reynolds (PIRSA), Victoria Marshall (AU) and Ben Shepherd (RSSA) developed the survey and data capture methods based in a similar survey conducted by RSSA along the Stuart Highway in 2006.

Ben Shepherd and another RSSA consultant, Terry Evans, undertook the survey from the 6th to the 14th of May 2010. Prior to the survey significant summer and autumn rainfall had occurred over most of northern South Australia, see graph 1. This provided ideal conditions (actively growing buffel grass) for the survey.
The survey route was driven at an average speed of 50km/hour with a primary observer mapping the presence and absence of buffel grass from the front passenger seat. Where safe and practical the driver was also observing.

Presence, density and absence of buffel grass were mapped both in the disturbance zone of the roadside and beyond the disturbance zone in the natural zone.

The roadside disturbance zone was defined as:
- The distance between the road and the property fence,
- The area on the roadside verge affected by the road and any road maintenance activity disturbances, tyre marks, culverts, grader marks, gravel, paths, burrow pits, pull out and car park areas etc.
- In the absence of all other indictors the disturbance zone was considered as 0 - 5 metres from the roadside

The natural zone was defined as any area beyond the disturbance zone that is not affected by the soil disturbance, increased run off and other anthropogenic factors associated with the road and other man made structures (mine sites, rail roads, buildings, car parks etc).

Poly line features were used to map the buffel grass and data was collected using Trimble Juno GPS units. Point features where used where isolated occurrences of buffel grass indicated a strategic control opportunity. See table 1 for descriptions of the buffel grass attributes that were collected along the survey route.

Before and during the survey, several landowners whose property the survey route transacted were contacted and asked if they were aware of any buffel grass in their property. At some locations the survey route was altered to capture the buffel grass locations as advised by landowners.
### Table 1 - Attributes that were collected along the survey route

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Density</strong>&lt;br&gt;of buffel grass&lt;br&gt;in the&lt;br&gt;disturbance zone</td>
<td>Absent</td>
<td>Buffel grass is not being observed WITHIN the disturbance zone.</td>
</tr>
<tr>
<td></td>
<td>Sparse</td>
<td>Buffel grass is always in sight, or becomes insight within a few seconds, WITHIN the disturbance zone at very low density where the distance between single or small clumps of plants is 11 - 100 metres.</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>Buffel grass is being observed WITHIN the disturbance zone at low density where the average distance between plants is 3-10 metres.</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>Buffel grass being observed WITHIN the disturbance zone at medium density, where the average distance between plants is 0.5 to 2 metres.</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Buffel grass is being observed WITHIN the disturbance zone at high density where the majority of the buffel grass canopies are touching each other or will be when they are fully grown.</td>
</tr>
<tr>
<td><strong>Density</strong>&lt;br&gt;of buffel grass&lt;br&gt;in the&lt;br&gt;natural zone</td>
<td>Absent</td>
<td>Buffel grass is not being observed BEYOND the disturbance zone</td>
</tr>
<tr>
<td></td>
<td>Sparse</td>
<td>Buffel grass is always in sight, or becomes insight within a few seconds BEYOND the disturbance zone at very low density where the distance between single or small clumps of plants is 11 - 100 metres.</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>Buffel grass is being observed BEYOND the disturbance zone at low density where the average distance between plants is 3-10 metres.</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>Buffel grass is being observed BEYOND the disturbance zone at medium density where the average distance between plants is 0.5 to 2 metres.</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Buffel grass is being observed BEYOND the disturbance zone at medium density where the majority of the buffel grass canopies are touching each other or will be when they are fully grown.</td>
</tr>
<tr>
<td><strong>Extent</strong>&lt;br&gt;of buffel grass&lt;br&gt;in the&lt;br&gt;natural zone&lt;br&gt;(if present)</td>
<td>0- 10 m</td>
<td>Buffel grass is being observed in the natural zone from 0-10 meters out from the disturbance zone.</td>
</tr>
<tr>
<td></td>
<td>0- 50 m</td>
<td>Buffel grass is being observed in the natural zone from 0-50 metres out from the disturbance zone.</td>
</tr>
<tr>
<td></td>
<td>0- &gt;50m</td>
<td>Buffel grass is being observed in the natural zone out to greater than 50m from the disturbance zone.</td>
</tr>
<tr>
<td></td>
<td>Patchy</td>
<td>Buffel grass is being observed in the natural zone widespread but patchy away from the disturbance zone.</td>
</tr>
<tr>
<td><strong>Natural zone</strong>&lt;br&gt;information</td>
<td>Drainage line</td>
<td>Buffel grass is being observed in the drainage line only and the nominated natural zone density and extent refers to the drainage line only.</td>
</tr>
<tr>
<td></td>
<td>Gilgai</td>
<td>Buffel grass is being observed in Gilgai’s and the nominated natural zone density and extent refers to the Gilgai only.</td>
</tr>
<tr>
<td></td>
<td>Other observations (if necessary)</td>
<td>Buffel grass is being observed in a definable land unit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No values inputted into natural zone information (as with most line features) indicates the buffel grass is present in a less definable land unit (not in a drainage line, gilgai, sand dune etc).</td>
</tr>
<tr>
<td>Disturbance zone information</td>
<td>Culvert only</td>
<td>Buffel grass is being observed in a culvert only and the nominated disturbance zone density refers to the density within the culvert only.</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Car park only</td>
<td>Buffel grass is being observed in a car park only and the nominated disturbance zone density refers to the density within the car park only.</td>
<td></td>
</tr>
<tr>
<td>Burrow Pit only</td>
<td>Buffel grass is being observed in a burrow pit only and the nominated disturbance zone density refers to the density within the burrow pit only.</td>
<td></td>
</tr>
<tr>
<td>Other observations</td>
<td>Buffel grass is being observed in a nominated disturbance zone unit and the nominated disturbance zone density refers to the density within the nominated disturbance zone unit only.</td>
<td></td>
</tr>
<tr>
<td>Comments</td>
<td>Single Occurrence</td>
<td>A small line segment with “scattered” density recorded and then ‘single occurrence’ selected in this field indicated the small line segment is a single record. Single or small populations that are observed in isolation represent a strategic control opportunity, for which, separate point features where also taken.</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>Any other observations were typed in if needed.</td>
</tr>
</tbody>
</table>

2.2.1 Density Ratings

Where buffel was present, density ratings were assigned based on the overall density being observed. When the overall density of the observed buffel grass changed a new poly line feature was created to represent the new density being observed.

The following photos provide examples of each of the density ratings.
Sparse - Buffel grass is usually in sight and is observed at very low density where the distance between single or small clumps of plants is 11 - 100 metres.

Low - The average distance between plants is 3-10 metres.

Low density – Leigh Creek Road | Low density – Gawler Rangers NRM district

Medium - The average distance between plants is 0.5 to 2 metres.

Medium density – Strez. Trk. culvert, Mt Lyndhurst Station | Medium density – Mt Vivian Station

High - The majority of the buffel grass canopies are touching each other or will be when they are fully grown.

High Density – Arkaroola Crk, Wooltana Station | High density – Oodnadatta Trk. drainage line, Nilpinna
2.3 SURVEY LIMITATIONS

- While the primary observer attempted to survey both sides of the road and the driver surveyed the right hand side of the road where safe and practical, the left hand side of the road was surveyed more thoroughly than the right, simply because the primary observed was on the left hand side of the vehicle.
- At times the natural zone was unable to be thoroughly viewed due to obstacles such as thick and tall vegetation and low observation points - roads that were cut into the landscape resulted in low observation points.
- When surveying the roads of the cropping country south and south west of the Gawler Ranges National Park, the presence of buffel grass was difficult to decipher due to an absence of rain in this region for many months (it was autumn prior to any rainfall events). Considerable amounts of dry grass were present on the roadsides of this area and because of this, observing buffel grass amongst the other dry grasses was difficult. Buffel grass was not observed anywhere along these roads, however the confidence level of it actually not being there is lower than along other surveyed roads.
- The roadside along approximately 100 km of the Stuart highway north from Pt Augusta had recently been mowed by the Department of Transport Energy and Infrastructure. Determining which mowed clumps of grass where and where not buffel grass was impossible. When surveying this section of road buffel grass was mapped only when it was observed beyond the mowed areas. It is likely that there is more buffel grass along this section of the highway than was actually mapped.
- Small portions of some of the survey route did not get surveyed for various reasons including: overgrown tracks (15km of the track running north from William Creek); fenced off old tracks (a section of track on Curnamona Station); unable to make contact with the landowner to get permission to enter property (30km of the track that runs south of Oodnadatta past Allandale homestead); choosing routes that were more likely to detect buffel grass (on Wooltana Station the pipeline track was surveyed instead of the Balcanoona to Innamincka track because the landowner indicated that that was where the buffel grass was); and the lateness of the day and end of the survey (the survey ended 15km short of Pimba when the sun became too low for accurate observing).
3 RESULTS AND RECOMMENDATIONS

A total of 3812 km of roads were covered over a 9 day period. See Maps 2 and 3 (appendix 2 and 3) for a visual representation of the survey results.

The results have been described under four headings (headings 3.1.1, 3.1.2, 3.1.3, 3.1.4) headings with suggested management recommendations where relevant. Note that observations and recommendations are based on observations along the survey route during the survey and are not based on the actual distribution of buffel grass in northern SA.

Specimens were taken at scattered locations along the survey route and provided to the SA State Herbarium for identification down to species level. Specimen locations can be viewed in Map 3 (appendix 3) and the herbarium identification results are shown in appendix 4.

3.1.1 Locations where buffel grass was common within the disturbance zone

- The road from Glendambo to Tarcoola
- The Stuart Highway

These roads have buffel grass scattered along a large portion of their verges at all density ratings and are obvious pathways of spread. The buffel grass predominantly occurs only in the disturbed verges where increased run off and soil disturbance provide favourable conditions for growth.

Feasibility of control of these populations will be low, with a more realistic option being to prevent further spread along and outward from the current distribution.

3.1.2 Locations where buffel grass was widespread in the natural zone

- Brachina Creek on Edeowie Station where it is crossed by the Leigh Creek Road.
- The northern boundary of Edeowie Station within Commodore Swamp.
- Wooltana Creek, Arkaroola Creek and associated nearby drainage lines that are transacted by the pipeline track on Wooltana Station.
- Edwards Creek and nearby associated drainage lines that are transacted by the Oodnadatta Track on Nilpinna and The Peak Stations.
- Ockenden Creek (near the Neales River) and nearby associated drainage lines transacted by the Oodnadatta Track on Allandale Station.
- Creeklines and Gilgai’s around Oodnadatta Township.
- Frome River, Mt Lyndhurst Creek and nearby associated drainage lines transacted by the Strezelecki Track on Mt Lyndhurst Station.

Although the above mention locations have been described as having widespread occurrences of buffel grass within drainage lines, note that these observations were taken from the survey road that transacted the drainage line. In most cases however, the observed buffel grass at these locations is
likely to suggest that there is more buffel grass present along the drainage line and that the feasibility of control is low. This assumption should be confirmed by further surveys. Arkaroola Creek on Wooltana Station has extensive high density buffel grass along the creek banks and provides a good example of the potential for buffel grass invasion in preferred habitats.

3.1.3 Locations where isolated occurrences of buffel grass may present a strategic control opportunity

Strategic control opportunities were flagged for buffel grass where isolated single plants or small clumps were observed. In this category, only those occurrences that were within the disturbance zone or in some circumstances were out to 50 meters in the natural zone were considered, based on the assumption that the isolated occurrences were there as a result of the road and had not spread beyond or far from the roadside verge. However, any implementation of control on the plants flagged as strategic should occur in conjunction with thorough searches in adjacent areas. Any single or small occurrences within a drainage line were not considered in this category and instead flagged for future survey to determine if more buffel grass was present (along the drainage line beyond the view from the survey vehicle).

Table 2 describes the strategic control opportunities flagged during the survey and the potential long term management objectives of each area. See Map 3 (appendix 3) to view the strategic control locations.

<table>
<thead>
<tr>
<th>Strategic control location</th>
<th>Occurrence as mapped during the survey</th>
<th>Potential long term management objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roadside at Kokatha and Lake Everard Stations (Gawler Ranges)</td>
<td>• 5 small populations and one single occurrence mainly confined to the roadside disturbance zone with 2 locations where the plants extend 1-10 metres into the natural zone. &lt;br&gt; • No other existing records close by.</td>
<td>• Control existing occurrences and aim for eradication at these sites &lt;br&gt; • Prevent roadside spread into the Gawler Ranges (primarily by graders) from the Glendambo to Tarcoola Road populations. &lt;br&gt; • Maintain the Gawler Ranges buffel grass free.</td>
</tr>
<tr>
<td>Roadside at Corunna Station (Gawler Ranges)</td>
<td>• A small population confined to the disturbance zone. &lt;br&gt; • Small sparse populations of buffel grass are likely to be present on the Pt Augusta to Iron Knob road (which was not surveyed). &lt;br&gt; • No other existing records close by.</td>
<td>• Control existing occurrences and aim for eradication at these sites &lt;br&gt; • Prevent spread into the Gawler ranges from Pt Augusta to Whyalla road populations. &lt;br&gt; • Maintain the Gawler Ranges buffel grass free.</td>
</tr>
<tr>
<td>Roadside at Mt Eba and Mt Vivian Stations (north of Glendambo)</td>
<td>• 3 small populations mainly confined to the roadside disturbance zone with 2 locations where the plants extend 1-10 metres into the natural zone. &lt;br&gt; • No other existing records close by.</td>
<td>• Control existing occurrences and aim for eradication at these sites &lt;br&gt; • Prevent roadside spread from the Stuart Highway populations. &lt;br&gt; • Maintain all roads running east from the Stuart Highway buffel grass free.</td>
</tr>
</tbody>
</table>
### Roadside on the William Creek to Coober Pedy Road, 63km from Coober Pedy.

- A small clump of plants confined to the roadside disturbance zone.
- No other existing records close by.
- Control existing occurrences and aim for eradication at these sites
- Prevent roadside spread from the Stuart Highway populations.
- Maintain all roads running east from the Stuart Highway buffel grass free.

### Roadside on the Oodnadatta track at Coward Springs.

- 3 plants confined to the disturbance zone.
- Closest other existing records are 30km south along the Oodnadatta Track and at William Creek.
- Control existing occurrences and aim for eradication at these sites
- Prevent roadside spread along the Oodnadatta Track.
- Maintain the Oodnadatta track, between Marree and William Creek buffel grass free.

### Roadside on the Strezelecki track, 17km east of Lyndhurst.

- A small population confined to a large culvert.
- Closest other existing records are 20km east along the Strezelecki track in a drainage line.
- Control existing occurrences and aim for eradication at these sites
- Prevent roadside spread along the Oodnadatta Track from Frome (and nearby) creek populations.

### Arkaroola visitor centre.

- 6-10 plants around the Arkaroola visitor centre.
- Several other existing records close by.
- Control existing occurrences and aim for eradication at these sites
- Prevent spread by vehicles from high visitation areas.
- Promote awareness and control by the Arkaroola managers.

### Roadside on the Quorn and Parachilna Road - excluding the area around the Brachina Creek and Brachina Gorge turn off.

- 4 small populations confined to the disturbance zone. One population/clump 4.5km north of Quorn the other 3 populations/clumps 2.5, 22 and 30km north of Hawker.
- Larger populations of buffel grass were also mapped at the Brachina Gorge turn off, in the Brachina Creek and in Commodore Swamp. These populations are listed under the heading Locations where buffel grass was widespread in the natural zone.
- Other existing records are on the road between Hawker and Wilpena Pound.
- Control existing occurrences of small populations and aim for eradication at these sites
- Prevent spread in the Flinders Ranges.

### 3.1.4 Locations where more surveys are required to determine if they represent a strategic control opportunity

Single or small clumps of buffel grass observed in isolation that were within a drainage line have been flagged for requiring more surveys. The objective of the surveys will be to determine the true extent of buffel grass along the drainage line and hence determine if the occurrence observed during the survey is a strategic control opportunity or one part of a larger population along the drainage line. Surveys of this nature will also provide useful information regarding the extent of buffel grass in South Australian arid rivers.
and assist to fill more gaps in knowledge. Table 3 and Map 3 (appendix 3) outlines these locations.

**Table 3**

<table>
<thead>
<tr>
<th>Locations where more surveys are required to determine strategic control opportunities</th>
<th>Occurrence as mapped during the survey</th>
<th>Objective of additional survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roadside in a creek on the road from Coober Pedy to Oodnadatta, 75km south of Oodnadatta.</td>
<td>2 plants within a culvert within Raspberry Creek (a tributary of Arckaringa Creek) in a drainage line. Another existing record 9.5 km north in a tributary of Arckaringa Creek.</td>
<td>Determine distribution along Arckaringa creek.</td>
</tr>
<tr>
<td>Roadside in Hamilton creek on Moolawatana Station.</td>
<td>1 plant adjacent to the road within Hamilton Creek. Landowner reported that there is buffel grass on the property but these were not followed up during the survey. Closest existing record is approximately 30 km south on Wooltana Station.</td>
<td>Determine distribution along Hamilton Creek and nearby creeks</td>
</tr>
<tr>
<td>Track running along a creek line in Arkaroola Sanctuary</td>
<td>A few single occurrences adjacent to a tourist track which runs along a tributary of Arkaroola Creek. Several other existing records close by.</td>
<td>Determine distribution in upstream tributaries of Arkaroola Creek.</td>
</tr>
</tbody>
</table>
4 REFERENCES


5 APPENDIX

5.1.1 Appendix 1, Map 1 – Prioritisation of roads to guide a survey for buffel grass

![Buffel grass roadside survey: Priority survey route, May 2010](image)

Legend

- **Essential**
- **Choice**
- **Choice**
- **Choice**
- **Choice**
- **Choice**

*Priority Roads to Survey marked as “Choice” require that at least one of the numbered routes for each to be surveyed. This decision should be made in the field as time permits.*
5.1.2 Appendix 2, Map 2 – Buffel grass density and extent

Buffel grass density & extent from roadsides, regional SA, May 2010

Legend
- Buffel grass absence
- Density within Disturbance Zone
  - Sparse
  - Medium
  - Low
  - High
- Extent of Natural Zone Invasion
  - 0 - 10 m
  - 0 - 50 m
  - 0 - >50 m
- Nil Buffel recorded in Disturbed Zone
- Nil Buffel recorded in Natural Zone
- Towns & cities
- Heritage sites
- Major roads
- Pastoral access roads
- Drainage lines
- Waterbodies
- Parks & reserves

* Inferred from sites surveyed for the Biological Survey of SA where no Buffel grass was recorded
5.1.3 Appendix 3, Map 3 – May 2010 buffel grass survey - Strategic control opportunities, locations where more surveys are required and locations were specimens were taken.

May 2010 buffel grass survey
Strategic control opportunities
Locations where more surveys are required
Locations where specimens were taken
## 5.1.4 Appendix 4, State herbarium buffel grass specimen identification

Sent: Tuesday, 7 September 2010 2:29 PM, STATE HERBARIUM OF SOUTH AUSTRALIA (AD), *** Data to be used only as explicitly permitted by the State Herbarium***

NOTE: Field have been removed from the original State Herbarium data

<table>
<thead>
<tr>
<th>scientific name (without authors)</th>
<th>determiner name(s)</th>
<th>det. date</th>
<th>det. notes</th>
<th>state/province</th>
<th>district/region</th>
<th>locality</th>
<th>collector1 init. surn., coll2 init. surn., ... percoll1 init. surn., ...</th>
<th>coll series abbrev.1 [plus] collector number1</th>
<th>Record number</th>
<th>habitat notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Cenchrus ciliaris</em> D.E. Symon</td>
<td>26 Jul 2010</td>
<td>South Australia</td>
<td>Region Flinders Ranges</td>
<td>Strzelecki Track</td>
<td>B. Shepherd</td>
<td>7</td>
<td>AD237020</td>
<td>Culvert in small drainage line</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Cenchrus ciliaris</em> D.E. Symon</td>
<td>26 Jul 2010</td>
<td>South Australia</td>
<td>Region Lake Eyre</td>
<td>On the Coober Pedy-Oodnadatta track in Raspberry Creek</td>
<td>B. Shepherd</td>
<td>10</td>
<td>AD237021</td>
<td>In <em>(Acacia cambagei)</em> creekline, in recent grader works</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Cenchrus ciliaris</em> D.E. Symon</td>
<td>26 Jul 2010</td>
<td>South Australia</td>
<td>Region Gairdner-Torrens</td>
<td>KInggoonya</td>
<td>B. Shepherd</td>
<td>12</td>
<td>AD237017</td>
<td>Disturbed environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Cenchrus ciliaris</em> C.J. Brodie</td>
<td>2 Aug 2010</td>
<td>South Australia</td>
<td>Region Flinders Ranges</td>
<td>On the side of the road between Hawker and Parachilna (Leigh Creek Road, 30 km N of Hawker)</td>
<td>B. Shepherd</td>
<td>1</td>
<td>AD237023</td>
<td>3 m from the road in small culvert</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Cenchrus pennisetiformis</em> D.E. Symon</td>
<td>26 Jul 2010</td>
<td>South Australia</td>
<td>Region Flinders Ranges</td>
<td>Arkaroola Wilderness Sanctuary. Around visitor centre buildings</td>
<td>B. Shepherd</td>
<td>2</td>
<td>AD237022</td>
<td>Very disturbed/artificial environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Cenchrus pennisetiformis</em> C.J. Brodie</td>
<td>2 Aug 2010</td>
<td>South Australia</td>
<td>Region Eastern</td>
<td>Wooltana Creek, Wooltana Station, E of the Northern Flinders Ranges (Arkaroola)</td>
<td>B. Shepherd</td>
<td>4</td>
<td>AD237018</td>
<td>Found in drainage line only</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setaria dielsii</td>
<td>D.E. Symon</td>
<td>27 Jul 2010</td>
<td>Infl[orescence] rather dense, (?viridis)</td>
<td>South Australia Region Lake Eyre</td>
<td>Strzelecki Desert. Moolawatana Station</td>
<td>B. Shepherd</td>
<td>6</td>
<td>AD237019</td>
<td>Within arid drainage line</td>
<td></td>
</tr>
</tbody>
</table>