

Government of South Australia

South Australian Murray-Darling Basin Natural Resources Management Board





Bush Bids Murray Plains and Rangelands

2012

South Australian Murray-Darling Basin Natural Resources Management Board

Woodland BushBids:

Conservation in the northern Murray Plains and the southern Rangelands of the South Australian Murray-Darling Basin

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Funded by the Native Vegetation Council

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Native Vegetation Council



South Australian Murray-Darling Basin Natural Resources Management Board



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Abbreviations

BBI:	Biodiversity Benefits Index
BCM:	Bushland Condition Monitoring
EMLR:	Eastern Mount Lofty Ranges
EPBC:	Environment Protection and Biodiversity Conservation Act 1999
DENR:	Department of Environment and Natural Resources
NCSSA:	Nature Conservation Society of South Australia Inc
NRM:	Natural Resource Management
RCT:	Resource Condition Targets
SABAT:	South Australian Biodiversity Assessment Tool
SADEH:	South Australian Department for Environment and Heritage
SAMDB:	South Australian Murray-Darling Basin
SAMDB NRM Board:	South Australian Murray-Darling Basin Natural Resource Management Board



Black Oak (Casuarina pauper) Woodland

Executive Summary

Woodland BushBids uses a market-based approach to allocate payments to managers of remnant vegetation for biodiversity conservation on privately managed land. The program successfully established conservation agreements over 5,337 ha of native vegetation on private land in the northern Murray Plains and the southern Rangelands of the South Australian Murray-Darling Basin. *Woodland BushBids* followed the methodology of the successful *BushBids* program, a conservation tender based in the adjacent areas of the Eastern Mount Lofty Ranges. Both these conservation tenders used a single-sealed bid reverse auction to negotiate and agree on management plans and actions for the conservation of native vegetation on private land, thereby assisting landholders to provide management services to protect and enhance native vegetation and habitat quality.

The Woodland BushBids project area (northern Murray Plains and the southern parts of the Rangelands) was targeted for a conservation tender as the area contains a concentration of remnant native woodlands on private land that are not well represented in conservation parks and reserves. Only 3% of the total native vegetation in the project area is in reserves or parks. The eastern section of the Woodland BushBids project area contains large areas of woodland and mallee woodland where habitat quality could be improved through management. The western section contains smaller areas of priority woodland types in a largely cleared landscape. Most privately owned woodlands in this area are not formally protected through Heritage Agreements. Protection and enhancement of native vegetation is necessary to retain landscape connectivity and site values for threatened woodland types such as Peppermint Box (Eucalyptus odorata) Grassy Woodland, Blue Gum +/- Peppermint Box (Eucalyptus leucoxylon ssp. pruinosa +/- E. odorata) Grassy Low Woodland and Black Oak (Casuarina pauper) Woodland, and grassland communities such as Iron-grass Natural Temperate (Lomandra effusa) Grassland. Management of native vegetation contributes to the protection of threatened fauna species such as the Pygmy Bluetongue, Malleefowl, Diamond Firetail and Regent Parrot, and threatened flora species such as Hopbush (Dodonaea subglandulifera) and Spiller's Wattle (Acacia spilleriana), and will provide habitat for significant species such as the Southern hairy nosed wombat.

Woodland BushBids allowed landholders to determine the price at which they would undertake the management actions necessary to conserve and protect the biodiversity values of the native vegetation. Eligible landholders were invited to tender a bid price for the management services they agree to undertake. A cost:benefit index called the Biodiversity Benefits Index was used to determine the relative value for money offered by each bid. This score was based on the calculated biodiversity benefits of undertaking the works on the site and the bid price. Landholders who offered acceptable value for money were offered contracts to provide the agreed management services.

Woodland BushBids conducted two bidding rounds to optimise bid selection efficiency. Twenty three cost-effective contracts were signed from 101 available sites. For bidding round 1, seventeen landholders submitted expressions of interest resulting in the development of 24 management plans (representing 66 sites). Eighteen bids were submitted and management contracts were offered to 13 successful bidders. Three management contracts were not taken up, resulting in 10 final contracts. For bidding round 2, nineteen landholders submitted expressions of interest resulting in 24 management plans (representing 47 sites). Twenty three bids were submitted and management contracts were offered to 13 successful bidders.

The project greatly exceeded the targets for area managed and conserved under covenant, with:

- nearly 5 times the expected area contracted for conservation management, and
- more than 4 times the expected area of new Heritage Agreements recruited.

Woodland BushBids was implemented at a low overhead:onground ratio through use and refinement of existing instrument protocols for the evidence-based decision making process, with approximately 72% of the funding allocated for landholder management service payments.

The project contributed to the four key ecological objectives of *Woodland BushBids* in the following ways:

OBJECTIVE 1: Protect and enhance the biodiversity values of the Woodland BushBids project area

Native vegetation is being actively managed at 70 sites (39 in round 1 and 31 in round 2); including sites where three threatened plant communities, six endangered/vulnerable fauna species and six endangered/vulnerable flora species occur. Twenty-three bidders (10 in round 1 and 13 in round 2: representing a total of 21 landholders) are receiving funds to protect and actively manage 358 ha of threatened plant communities (Peppermint Box (*Eucalyptus odorata*) Grassy Woodlands, Iron-grass Natural Temperate Grassland (*Lomandra effusa*) and Black Oak (*Casuarina pauper*) Woodlands). Thirty-two of the successfully funded sites contain habitats for one endangered, five vulnerable and 18 rare fauna species (totalling 4,044 ha). Managed sites harbour four endangered, two vulnerable and six rare plant species (totalling 2,051 ha).

OBJECTIVE 2: Improve the condition of native vegetation in the Woodland BushBids project area

Comprehensive management plans were prepared for 12,207 ha of native vegetation on private land and management of threats to the condition of native vegetation is being funded on 5,337 ha (which represents 44% of the area for which management plans were prepared). The outcomes of this management will be assessed in future years through a monitoring and evaluation process established through the *Woodland BushBids* project.

OBJECTIVE 3: Increase the area of native vegetation actively managed for conservation

The area of land being managed for conservation through *Woodland BushBids* is equivalent to 50% of the area already in parks and reserves in the *Woodland BushBids* project area.

OBJECTIVE 4: Increase the area of native vegetation protected under long-term conservation agreements

The *Woodland BushBids* sites will be protected and managed for a 5-year period under the *Woodland BushBids* Management Agreements. Sites representing 5 pending Heritage Agreements were funded for comprehensive management and an additional 6 new Heritage Agreement applications (representing 13 sites and 1,034 ha) were initiated by *Woodland BushBids*.



Peppermint Box (Eucalyptus odorata) Grassy Woodland

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1 Background

Mallee and woodland vegetation contain a great diversity of native plant and animal species. Since European settlement one third of all mammal species have disappeared from the mallee systems of south-eastern Australia, as a result of land clearance and grazing. The majority of remaining native vegetation, including mallee, occurs on private lands and private landholders play a critical role in the management of native vegetation and the conservation of Australia's biodiversity (Figgis 2003). As biodiversity conservation provides a significant public benefit, it is appropriate to provide financial assistance to landholders for management of remnant vegetation on private land (Stoneham et al. 2003).

The northern Murray Plains and the southern Rangelands of the South Australian Murray-Darling Basin were targeted for a biodiversity tender (auction) because:

- a large proportion of the remnant native vegetation in this region occurs on private land,
- priority ecosystems (Peppermint Box (Eucalyptus odorata) Grassy Woodlands, Eucalyptus leucoxylon ssp. pruinosa +/- E. odorata Grassy Low Woodland and Black Oak (Casuarina pauper) Woodlands), as well as threatened species (e.g. Pygmy bluetongue, Regent Parrot, Diamond Firetail, Dodonaea subglandulifera) occur on private land in this area, and
- most privately owned remnant native vegetation in this area is not formally protect under Heritage Agreement.

The northern Murray Plains and the southern Rangelands of the South Australian Murray-Darling Basin have also been listed as a priority natural landscape in the Biodiversity Plan for the South Australian Murray Darling Basin (2001) and the Regional NRM Plan for the SA MDB (2009).



Black Oak (Casuarina pauper)

2 Introduction

The primary aim of *Woodland BushBids* is to improve native vegetation on private land in the northern Murray Plains and the southern Rangelands of the South Australian Murray-Darling Basin by establishing multi-year protection and conservation management through agreements with private landholders. *Woodland BushBids* has extended the *BushBids* conservation tender approach in the adjacent areas of the Eastern Mount Lofty Ranges (EMLR) (O'Connor, Morgan and Bond 2008a).

Woodland BushBids is a payment for ecosystem services scheme focused on protecting and managing existing native vegetation, by providing funds to assist landholders to manage their existing remnant vegetation. The program complements investment in biodiversity conservation through projects including the River Murray Forest (Department for Environment and Heritage), Multiple Ecological Communities (Australian Government Environmental Stewardship Program) and the activities of the Local Action Planning groups. Like BushBids, Woodland BushBids was developed to provide a cost-effective, proactive approach to managing threats in high conservation value areas that are still relatively intact and to facilitate the efficient, accountable and targeted allocation of funds. The program aims to improve the conservation of biodiversity on private freehold and leasehold land by enhancing active conservation management and protection of existing ecosystems as habitat for native plants and animals.

Woodland BushBids was established with funding from the Native Vegetation Council and was delivered through the South Australian Murray-Darling Basin Natural Resource Management Board. O'Connor NRM Pty Ltd. designed and implemented *Woodland BushBids* in 2009 and 2010. Landholder contracts were designed to achieve conservation gains within a 5-year-period of comprehensive management of threats to biodiversity on private land.

The program developed a competitive market for management contracts to achieve conservation gains by:

- protection through Heritage Agreements (i.e. in-perpetuity conservation covenants),
- grazing pressure reduction and conservation grazing impact management (including fencing),
- threat abatement (including weed and feral animal management), and
- revegetation and restoration for increased connectivity of landscapes.

Detailed site assessments were carried out on the properties of participating landholders and management plans were developed in consultation with landholders. Management plans were based on the commitments and actions that landholders were willing to provide, within the guidelines of the programs objective of achieving measurable improvements in vegetation and habitat condition. Landholders submitted single-price sealed bids which were assessed using a metric developed for *BushBids* and funding was allocated to bids representing acceptable value-for-money. Landholders whose bids were successful were invited to enter into an agreement with the South Australian Murray-Darling Basin Natural Resource Management Board to implement the management plan and receive payment of the tendered price over the period of the contract.

The established *BushBids* project in the EMLR has demonstrated that a conservation auction design of this type can result in the management and protection of a large number of priority biodiversity assets. Specific priorities addressed by the *Woodland BushBids* project are:

The conservation of National, State or Regionally listed vegetation communities

The project aims to protect Peppermint Box (*Eucalyptus odorata*) Grassy Woodlands, which is critically endangered (EPBC Listed 1999), and Black Oak (*Casuarina pauper*) Woodlands, a regionally threatened community, that are underrepresented communities listed in the 2001 South Australian Murray Darling Basin Biodiversity Plan.

The enhancement of biodiversity to meet targets established in National, State and regional Natural Resources Management Plans

The project directly contributes to:

- Terrestrial biota Resource Condition Targets (RCT) in the South Australian Murray Darling Basin Natural Resource Management Board Regional NRM Plan (2009):
 - RCT B1: Native ecosystem extent increased to 53% of the region and native ecosystem condition improved across the region by 10% by 2030.
 - RCT B3: No species or ecosystem moves to a higher risk category and 50% of species move to a lower risk category by 2030.
- Targets of the SA Strategic Plan:
 - Target 69: Lose no native species as a result of human impacts.
 - Target 72: Increase participation in nature conservation activities by 25% by 2015.
- Objectives of "No Species Loss A Nature Conservation Strategy for South Australia 2007-2017":
 - Obj. 1.1: To create public and private land protected areas.
 - Obj. 1.2: To maintain, improve and reconstruct landscapes.
 - Obj. 1.3: To maintain, improve and reconstruct species and ecological communities.
 - Obj. 1.4: To facilitate the sustainable use and management of native species.
 - Obj. 2.2: To raise community capacity, stewardship and decision making for biodiversity conservation.
- Priorities for the DENR Corporate Plan 2012-2014:
 - Priority 1b: Together with partners deliver NatureLinks and the Trans-Australia Eco-Link through landscape -scale conservation and land management activities.
 - Priority 1c: Deliver a coordinated approach to improve land condition and land management practices in partnership with regional NRM boards and industry groups.

The rehabilitation, protection and management of key areas identified through biodiversity analysis

Fragmentation analysis undertaken for the *BushBids* project highlighted that the *Woodlands BushBids* project area was a highly intact landscape with high potential for biodiversity conservation gains through management and improvement of vegetation condition.

2.1 Objectives

Ecological objectives:

- Protect and enhance the biodiversity values of the *Woodland BushBids* project area, by increasing awareness of the requirements for management of native vegetation on private land in relatively intact landscapes.
- Improve the condition of native vegetation in the Woodland BushBids project area.
- Increase the area of native vegetation actively managed for conservation.
- Increase the area of native vegetation protected under formal conservation Heritage Agreements.

Project management objectives:

- Prepare management plans for a minimum of 2,450 ha of native vegetation on private land.
- Improve the condition of vegetation on a minimum of 1,650 ha through establishment of management contacts for cost effective management at priority sites (highest biodiversity gains for lowest cost) in an area with high vegetation cover.
- Increase the area of native vegetation under long-term conservation covenants (Heritage Agreements) by at least 250 ha.
- Establish baseline monitoring of vegetation condition and the outcomes of management through a Before-After-Control-Impact design (extending the scope of the *BushBids* monitoring and evaluation plan (O'Connor et al. 2008b)).

3 *Woodland BushBids* project area

3.1 Geographic area and extent

The *Woodland BushBids* project boundary in the northern Murray Plains and the southern Rangelands of the South Australian Murray-Darling Basin, initially covered an area of 403,827 ha in round 1 but was extended due to landholder interest to cover a larger area of 587,628 ha in round 2 (Figure 1). The project area includes the towns of Cambrai, Sedan, Eudunda, Bower, Robertstown, Florieton, Morgan, Blanchetown and Swan Reach, and was extended north and west in round 2 to Burra and near Bunyung. The *Woodland BushBids* area is located within the South Australian Murray-Darling Basin Natural Resources Management Region.

3.2 Land use

The main land uses in the area are grazing modified pastures and rangelands, crop/grazing rotations, horticulture, intensive animal agriculture (e.g. piggeries) and conservation.

3.3 Biodiversity

Just over half (56% for round 1 and 61% for round 2) of the total *Woodland BushBids* area is mapped as native vegetation, however only 4% of the native vegetation is found within conservation reserves and parks for round 1, and 3% for round 2. The majority (96% for round 1, 97% for round 2) of native vegetation is found on private land that has undergone differing levels of degradation. Threats to biodiversity in this area include the effects of habitat degradation and loss, fragmentation, isolation and small remnant size, competition from weed species, grazing and predation from feral animal species, competing land use priorities and inappropriate management practices.

Many plant and animal species threatened at the regional, State and National levels are found within the *Woodland BushBids* project area. In addition, the nationally critically endangered ecological communities Peppermint Box (*Eucalyptus odorata*) Grassy Woodlands and Irongrass Natural Temperate Grassland (*Lomandra effusa*), the vulnerable *Eucalyptus leucoxylon* ssp. pruinosa +/- E. odorata Grassy Low Woodland and the regionally threatened Black Oak (*Casuarina pauper*) Woodlands of South Australia are found in the project area. Remnant native vegetation in this area provides vital habitats for species and communities as well as the declining woodland birds and mammals.

The vegetation community types identified for the Murray-Darling Basin South Australia (Croft et al. 2009) include:

- Open woodlands, shrublands and grasslands on low rainfall, limestone plains
- Open mallee and low open woodlands with a chenopod shrub understorey and chenopod open shrublands
- Mallee +/- native pine with open sclerophyll and chenopod shrub understorey on calcareous loams of flats or swales
- Mallee with open shrub understorey +/- Triodia and shrublands on deep red or loamy sands
- Mallee with open sclerophyll shrub understorey on clay and clay-loam flats and swales
- Open mallee with mid-dense shrub and tussock understorey and shrublands on limestone soils
- Mallee, woodlands and shrublands with dense sclerophyll understorey on deep white sands
- Mallee and closed mallee with dense shrub understorey on shallow calcareous sands and sandy-loams
- Woodlands with an open grassy understorey and grass and mat-rush sedgelands

- Riparian, freshwater and brackish swamp and floodplain vegetation River Murray Corridor and Lower Lakes
- Saline coastal and inland swamp and riparian vegetation

Due to the location of the *Woodlands BushBids* project area, on the boundary of the Northern Yorke Peninsula and SA Murray-Darling Basin regions, the following vegetation communities described for the Northern Agricultural region (Pedler et al. 2007) are also found within the project area:

- Open forests and woodlands with a mid-dense shrub and grassy understorey
- Woodlands with an open grassy understorey and grasslands
- Low Woodlands and open mallee with dense to mid-dense shrub and/or spinifex and sedge understorey
- Inland tall shrublands





Figure 1. *Woodland BushBids* rounds 1 and 2 project boundary within the Murray-Darling Basin, South Australia

4 Development and implementation of the *Woodland BushBids* tender process

Like *BushBids, Woodland BushBids* land management contracts were developed based on field assessments of distinct units of native vegetation and on discussions with landholders about the most appropriate and achievable management actions for each site. The selection of contracts for investment was undertaken through a competitive tender, where landholders submitted a bid price to undertake the actions described in the site Management Plan. Contracts were awarded based on value for money in achieving biodiversity conservation objectives.

The steps undertaken in the development and implementation of *Woodland BushBids* and descriptions of selected aspects of these processes are outlined in Figure 2 and Table 1.



4.1 Steps involved in the development of the *Woodland BushBids* tender process

Figure 2. Woodland BushBids process showing landholder involvement

Steps	Procedures
Assessed / controlled the size of the market	The approximate area of native vegetation on private property was determined. An open-ended Expression of Interest period was used to reach the desired amount of hectares and participants.
Determined landholder and property eligibility for participation in Woodland BushBids	Project area boundaries were determined from landscape features and plant community types (refer to Figure 1).^ Sites were visited to determine eligibility (vegetation communities present, location, size, cover of native vegetation and ownership).
Determined available information and datasets on native vegetation	Used existing datasets (e.g. flora lists, locations of threatened species, Heritage Agreements, conservation reserves, native vegetation cover and floristic datasets).
Established project data and database management systems	Expression of interest data Site assessment / Management Plan data Mapping data Database generated scores Bid assessment data Management Agreement contract data Project management Annual reporting data
Established vegetation benchmarking procedures	Used the Bushland Condition Monitoring method and benchmarks for the SAMDB and NA regions [#] (NCSSA 2007 and 2009).
Established landholder essential commitments and minimum management standards	Established and communicated essential commitments and minimum management standards for management services.
Developed project management process and timeframe	Gantt chart and project milestone plan developed.
Determined best advertising/ communication methods for expression of interest from landholders	 Woodland BushBids was advertised in local papers, by regional NRM officers who contacted landholders and by word of mouth. A brochure and five factsheets were developed and disseminated detailing the project and process (Appendix 1). Two information sessions, at Mt Mary and Cambrai (Round 1) and Mt Mary and Robertstown (Round 2), were conducted for interested landholders (advertised in local papers).
Modified SABAT (SA Biodiversity Assessment Tool Database)	SABAT from <i>BushBids</i> was used with slight modifications to the landscape context for the <i>Woodland BushBids</i> area.
Used established scoring system and Biodiversity	The metric used to assess the value for money offered by bids was the same as for <i>BushBids</i> :
Benefits Index	Biodiversity Benefit Index = Conservation Value Score x Management Service Score / Bid Price
	Conservation Value Score was based on habitat condition, landscape context and conservation significance. Management Service Score was based on the management service the landholder agrees to undertake. The landholder determined the bid price. Refer to section 4.3 for a more detailed explanation.

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Table 1. The steps and procedures involved in the development of Woodland BushBids

Steps	Procedures
Used established process to interact and fit with existing schemes and legislation	Including the Native Vegetation Act 1972, Heritage Agreement scheme, fire management, Natural Resources Management Act 2004 (animal and plant control statutory obligation), non-market based incentive programs and future incentive schemes. Landholders agreeing to seek covenants under the Heritage Agreement scheme were eligible to offer the biodiversity services of permanent protection with stipulation that application to DENR must occur within the first year of <i>Woodland BushBids</i> funding.
Used established site assessment methods	Information and guidelines for site assessments were modified from <i>BushBids</i> (Bond et al. 2005). Field datasheets for the site assessments were modified from <i>BushBids</i> . Site assessors attended a session in assessing bushland condition and determining appropriate management services.
Developed Management Plan outline and mapping layout	Templates upgraded for the Management Plan, including weed and animal control procedures and mapping layout from <i>BushBids</i> .
Established site assessment data storage	SABAT database was provided for data entry. Site data was also entered into the Management Plan template.
Developed probity protocols	Probity plan Bid evaluation plan Conflict of interest policies
Established quality control protocols	Consistency protocols were established for: Site assessments Landholder discussions Management plan development Data management Information and communication management
Established rules for evaluation of bids	Developed an evaluation process (including bid evaluation plan).
Drafted contract agreement and payment schedules	Developed contract agreements and payment schedules.
Developed monitoring, evaluation and auditing methods	Guidelines and protocols from <i>BushBids</i> .

^ The boundary of round 2 was extended due to interest expressed in round 1.

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[#] Some sites located in the North West section of the *Woodland BushBids* area have plant communities of the Northern Agricultural Region.

4.2 Implementation

There were eight main steps to implementing *Woodland BushBids*. Please refer to Appendix 2 for a detailed outline of implementation and timeline.

1. Expression of Interest:

The project called for expressions of interest from landholders. Landholders registered their interest by telephoning *Woodland BushBids*. Eligible landholders had patches of eligible native vegetation located in the project area, where the vegetation patch was greater than 5 ha and 10% cover. Eligible landholders were sent information on the process.

2. Site Assessment (management):

Site assessors visited interested landholders for a discussion of best practice and achievable management actions for native vegetation on their property. For example, fence native vegetation, prevent/reduce grazing, and control weeds and feral animals.

3. Site Assessment (biodiversity value):

An assessment of the biodiversity value of each site was undertaken, including a site assessment of native vegetation structure, function and diversity; calculations of landscape values built from best available data (using GIS); and conservation priorities of the project, State and Australian Governments. In addition, 20 reference sites were assessed for biodiversity value to facilitate the evaluation of the incentive scheme outcomes during Round 1.

4. Site Information:

Landholders received Management Plans outlining agreed targets for conservation management and improvement of native vegetation condition, agreed management actions for each key threat or asset in the native vegetation for the 5-years of the contract agreement, a list of minimum standards specific to each identified threat, a plant species list and a map of the site/s. Included with this Management Plan were measures of the management service being offered, the overall bushland condition and individual indicators of the condition ('health') of the native vegetation.

5. Bidding:

The landholder was asked to submit a sealed bid nominating the price that they were seeking to implement the agreed Management Plan.

6. Bid Evaluation:

All bids were assessed objectively on the basis of current conservation value of the vegetation, the services (management actions) to be supplied and the bid price that the landholder provided. Bids were converted to a ranking of biodiversity value-for-money and the highest value-for-money options were funded to undertake the agreed actions.

7. Contract:

Successful landholders were invited to sign a Management Agreement (contract) based on the agreed Management Plan.

8. Payment:

Payments are staggered over the first 3 years of the 5-year contract based on the landholder undertaking the agreed management actions and documenting actions and progress as part of annual reporting.

4.3 Assessing bid value

The metric

The metric used was modified from *BushBids* (O'Connor et al. 2008a). Landscape context attributes were modified for relevance to the *Woodland BushBids* region.

The score used to rank the bids in order of biodiversity value-for-money is referred to as the Biodiversity Benefits Index (BBI) and was based on the calculation shown in Figure 3.

Assessing bushland condition

Woodland BushBids used the *BushBids* method for assessing bushland condition with relevant vegetation communities and benchmarks for the *Woodland BushBids* project area (O'Connor et al. 2008a).

The condition of native vegetation at each proposed site was assessed using the Bushland Condition Monitoring (BCM) method developed by the Nature Conservation Society of South Australia. This method examines a range of indicators of bushland health relating to structure, function and diversity and is based on measurements taken in representative assessment patches. Selected indicators used for *Woodland BushBids* assessments are described in more detail in Appendix 3. For a complete description of the method see Croft, Pedler and Milne (2009).

The BCM method of condition assessment was selected because it offered the best opportunity to meet multiple project objectives. The accuracy and validity of this method ensured project decisions were based on reliable and recent evidence from sites. As an assessment technique, which could be used to assess 2-3 sites per day, the BCM offered an excellent balance of accuracy and efficiency, allowing implementation costs to be kept to a minimum.

By adopting the published method, *Woodland BushBids* was able to save the cost of developing a new method and, at the same time, increase the capacity of NRM practitioners to understand the existing method's application and value. *Woodland BushBids* was also able to add value by significantly increasing the bushland condition monitoring dataset for South Australia and establish an appropriate monitoring program for the project investment. An additional benefit of using the Bushland Condition Monitoring method was that landholders could be trained in the method to monitor their sites.

Assessing landscape context

Landscape context scoring was based on the work of Oliver (2002) and Oliver and Parkes (2003) and was operationalised in the GIS environment of the South Australian Biodiversity Assessment Tool (SABAT).



to perimeter ratio

Assessing management services

Management services were classified into three groups: essential commitments, maintenance activities and improvement activities:



Management points were awarded for the maintenance and improvement activities proposed, and scoring was structured to account for the current condition of the site and the expected outcome of undertaking the proposed management services. The covenant status (Heritage Agreement) of the site was also valued in the management services score.

As part of the site assessment, *Woodland BushBids* site assessors discussed management options and intentions for management with the landholder, using the information from the site assessment as a basis for determining biodiversity assets and threats. Landholders received a record of this discussion and this information was then used to draft the Management Plan. Minimum standards for the management actions were developed and provided to landholders in a fact sheet (see Appendix 1) at, or prior to, the site assessment.

4.4 GIS and data management

Woodland BushBids, like *BushBids*, used the South Australian Biodiversity Assessment Tool (SABAT) to manage data and for the assessment of bids. Both GIS and database functions are used by SABAT to allocate a biodiversity significance index to a site or patch of native vegetation. Each patch of native vegetation was mapped using ArcGIS and both the vegetation condition information and the spatial location of the sites were stored within the Geodatabase. Modifications made to SABAT through *BushBids* included the incorporation of facilities for storing additional information, scoring conservation value and management services, and using these in the calculation of the Biodiversity Benefits Index. Refer to *BushBids* final report for more details (O'Connor et al. 2008a).

SABAT was not only used to store information and to calculate the Biodiversity Benefits Index, it was also used to provide a preliminary assessment of site eligibility (based on location); preparation for on-site assessments (reviewing existing data e.g. the presence of threatened species or previous vegetation survey sites); to map participating sites accurately and to provide this information graphically in the Management Plan. GIS was also used to assess the landscape context based on native vegetation extent mapping and on-site verification.

All data entered or calculated in SABAT were verified by cross-checking data entry and a random sampling method for identifying anomalies.

4.5 Communication

Critical to the success of *Woodland BushBids* was effective communication of the project's objectives and processes. As the tender mechanism used in *Woodland BushBids* was new to the area, some information barriers had to be overcome to provide confidence in the approach and recruit landholders willing to supply bids and enter contracts for multi-year conservation. Key approaches to ensuring effective and effectively targeted communication included:

- Understanding the market (characteristics, values, aspirations).
- Using a variety of communication channels that landholders are likely to respond to.
- Advertising the *Woodland BushBids* programme in local newspapers and providing information to NRM officers.
- Encouraging the established NRM officer networks to connect with landholders.
- Providing a 1300 number for free call access to information and registration.
- Providing information packages for interested parties.
- Holding two information sessions in the region for interested landholders for both rounds (advertised in local papers).
- Providing information on the project at appropriate stages in the process.
- Key issues communicated to participants regarding bid development.

It was made clear to the landholders that no information or advice would be given to landholders about anticipated cost of management services or likely bid prices. Participants were advised to give primary consideration to the cost of undertaking the agreed actions, and secondly to consider the competitiveness of the total cost. They were advised to seek independent advice regarding the tax implications of receiving funding through this scheme, and were at liberty to seek independent advice and support in formulating bids.

In order to assist the participants to understand how their bid might be valued in relation to the maximum value possible for their bushland, a number of scores where provided with the Management Plan package. The overall Management Services scores, Bushland Condition scores and ratings for some key Bushland Condition Indicators were provided to landholders for each *Woodland BushBids* assessment site. The Bushland Condition scores provided information about current vegetation condition. An example of the Bushland Condition ratings provided for a site is shown in Figure 4.

The **Management Services Score** (%) was calculated as a score for the actions that the landholder agreed to undertake to maintain and improve the habitat value of the sites covered by the *Woodland BushBids* Management Plan.

The **Bushland Condition Score** (%) was calculated as an aggregate score representing the current condition of the sites covered by the *Woodland BushBids* Management Plan, relative to a benchmark condition for vegetation of that type in the Murray-Darling Basin or Northern Agricultural regions.

Bushland Condition indicators were rated on a five-point scale from excellent, through good, moderate and poor, to very poor. Ratings do not necessarily indicate the conservation value of the bushland. These ratings were provided as advice about the current condition of vegetation at the sites and may also be used to assist with tracking changes in site condition over time. Figure 4 shows an example of the Bushland Condition Indicators and ratings given for a site.

	Very Poor	Poor	Moderate	Good	Excellent
Plant S	pecies Diversity: Go	od			
Weed /	Abundance and Thr	eat: Excellent			
Structu	iral Diversity A - Gro	ound Cover: Poor			
Structu	iral Diversity B - Pla	nt Life Forms: Goo	d		
Regene	eration of Native Sp	ecies: Moderate			
Fallen I	Logs and Trees: Exce	ellent			
Primar	y Canopy Health: Ve	ery Poor			
Grazing	g Pressure: Very Poo	or			
Habitat	t Trees: Moderate				
	_				

Figure 4. Bushland condition ratings for an example site

For further explanation of bushland condition indicators and interpretation of the condition rating please refer to Appendix 3.

5 Woodland BushBids results

5.1 Results of tender

The *Woodland BushBids* project (rounds 1 and 2) developed native vegetation Management Plans for 113 sites representing 12,207 ha (see Table 2 for a summary of the enquiries, expressions of interest and bids). Thirty six landholders submitted expressions of interest resulting in the development of 48 Management Plans (note some landholders had multiple plans for multiple sites). Forty one bids were submitted.

The total price for the 18 bids submitted in round 1 was \$466,282.20. The Tender Assessment Panel had discretion to recommend contracts up to a reserve price of \$600,000 under the funding arrangements with the Native Vegetation Council. However, in round 1, it was decided that the first 13 bids were the best value for money (Figure 5). The marginal cost curve showed a jump in bid price per benefit between the 13th and 14th bid, with a very large jump occurring before the last bid (bid 18) (Figure 6). The assessment panel decided that the last 5 bids represented relatively low value for money in consideration of the market price, land management costs and opportunity costs. In contrast, the first thirteen bids represented good value for money with respect to expected average costs. Overall \$366,494 was committed for investment in landholder payments for the 13 comprehensive conservation agreements (representing 6,799 ha and 49 sites).

One landholder representing three successful bids withdrew from the program before contract agreement due to internal planning decisions. These withdraw bids resulted in 10 sites and a large area of lands totalling 4,793 ha being excluded from the program. As a consequence the overall funding for Round 1 reduced to \$265,494 for the 10 bids (representing 2,007 ha and 39 sites) that accepted the agreement contract.

The unspent money from the first round was allocated to a second round of *Woodland BushBids*, to finance the program delivery and contract funding. A total sum of \$207,000 was available for allocation to contracts. The total price for the 23 bids submitted in round 2 was \$1,366,006. The first 10 bids offered 2,932 ha (80% of the total area offered in round 2), representing very good value-formoney (Figure 5). However, there was no clear gap between bid 10 and 11, but there was a gap between bids ranked 16 and 17 representing a rise in price per benefit (Figure 6). The panel recommended the first 10 ranked bids be funded with the available budget and that additional funding could be sought to fund bids ranked 11, 12 and 13. Additional funding was received from the Native Vegetation Council to fund bids 11 to 13. Overall \$393,610 was invested in landholder payments for 13 conservation agreements (representing 3,330 ha and 31 sites).

Most sites from both rounds require weed and feral animal control, while a small number of sites require fencing and supplementary planting.



Table 2. Summary of e	enquiries, expressions of	interest and bids from rou	unds 1 and 2 of Woodland BushBids
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Stages	Details	Round 1 Results	Round 2 Results
Number of	Number of interested landholders enquiring during EoI period	27	21
landholder enquiries	Number of landholders enquiring after Eol had closed	0	0
Eligible	Number of landholders	17	19
Expression of Interests	Total area of land	8,352 ha (average 348 ha per property, 127 ha per site)	3,855 ha (average 161 ha per property, 82 ha per site)
	Percentage of known (mapped) native vegetation on private property within <i>Woodland BushBids</i> project boundary	3.86%	1.12%
	Number of sites requiring management plans	66	47
	Number of management plans prepared (= number of potential bids) ¹	24	24
Bids submitted	Number of bids submitted ²	18 (55 sites)	23 (46 sites)
	Total area of land in bids submitted	6,884 ha (average 382 ha per bid, 125 ha per site)	3,673 ha (average 160 ha per bid, 80 ha per site)
	Total price of all bids submitted	\$466,282.20	\$1,366,006.00
	Average \$ / biodiversity benefit (1/BBI)	\$3.39 per biodiversity benefit	\$15.02 per biodiversity benefit
	Average bid price	\$13.55 ha/year	\$74.38 ha/year
	Percentage of known (mapped) native vegetation on private property within <i>Woodland BushBids</i> project boundary	3.18%	1.06%
Successful bids/	Number of contract agreements accepted	10 (39 sites, 9 landholders)	13 (31 sites, 12 landholders)
agreement contracts	Total land area of accepted bids	2,007 ha (average 201 ha per bid, 51 ha per site)	3,330 ha (average 256 ha per bid, 107 ha per site)
accepted ³	Total price of accepted bids	\$265,494.00	\$393,610.00
	Average \$ / biodiversity benefit	\$7.68 per biodiversity benefit	\$4.91 per biodiversity benefit
	Number of management plans that have a Heritage Agreement (HA), or HA being processed	1 bid (= 1 site, 1 landholder, 27 ha)	4 bids (= 7 sites, 4 landholders, 515 ha)
	Number of new HA applications	3 bids (= 8 sites, 3 landholders, 646 ha)	3 bids (= 5 sites, 3 landholders, 388 ha)
	Percentage of known (mapped) native vegetation on private property within <i>Woodland BushBids</i> project boundary	0.93%	0.96%

Stages	Details	Round 1 Results	Round 2 Results
Unsuccessful bids	Number of unsuccessful bids	5 (6 sites, 4 landholders)	10 (15 sites, 8 landholders)
	Total land area of unsuccessful bids	85 ha (average 17 ha per property, 14	344 ha (average 34 ha per property, 23
		ha per site)	ha per site)
	Total price of unsuccessful bids	\$99,788.20	\$972,396.00
	Average \$ / biodiversity benefit	\$48.59 per biodiversity benefit	\$89.85 per biodiversity benefit
	Number of management plans that have a Heritage Agreement (HA), or HA being processed	0	0
	Percentage of known (mapped) native vegetation on private property within <i>Woodland BushBids</i> project boundary	0.04%	0.10%

¹ includes Management Plans for multiple sites
 ² 6 landholders did not submit a bid (representing 1,650 ha and 12 sites)
 ³ 3 successful bidders withdrew from the agreement contracts in round 1. These 3 bids represented 10 sites and 4,793 ha.



Figure 5. Cumulative cost of successful and unsuccessful bids for round 1 (WBB1) and round 2 (WBB2)



Figure 6. Marginal cost of biodiversity benefits of successful and unsuccessful bids for round 1 (WBB1) and round 2 (WBB2)

5.2 Biodiversity gain in the Murray Plains and Rangelands

The locations of sites assessed in *Woodland BushBids* (successful and unsuccessful) and the reference sites (monitoring control sites) are shown in Figure 7. The successful sites are scattered throughout the *Woodland BushBids* region except for the most north east area, with a concentration of sites occurring around Robertstown, Eudunda, Morgan and Swan Reach.

Six out of the 11 main community types identified by NCSSA (Croft et al. 2009) for the Murray-Darling Basin region, were present at sites assessed for the *Woodland BushBids* project. In addition, four main communities from the Northern Agricultural region were also identified during site assessments (Pedler et al. 2007). Within some of these broad community types, several sub-community types were identified (Figure 8, Table 4). Appendix 4 describes the features and the number of sites of the community and sub-community types participating in the *Woodland BushBids* project.

Successful bids included six of the 10 plant community types from sites assessed (Table 4). There were no successful sites in the open mallee with open sclerophyll shrub understorey on clay/clay-loam flats (sub-community MDBSA 5.1) and grasslands (sub-community NA 3.2). Sub-communities MDBSA 2.1, MDBSA 3.1 and MDBSA 9.1 and NA 4.1 together represent 74% (3,966 ha) of the total area of successful bids.

Table 3 shows that the objectives of the program with respect to the area of land under management were greatly exceeded:

- nearly 5 times the expected area being recommended for contracts and
- more than 4 times the expected area of new Heritage Agreements being offered.

Project Management Objectives	Achievements from rounds 1 and 2
Prepare management plans for 2,450 ha of native vegetation on private land.	Prepared vegetation management plans for 12,207 ha of native vegetation on private land.
Improve the condition of vegetation on 1,650 ha through establishment of management contracts for cost effective management at priority sites (highest biodiversity gains for lowest cost) in an area with high vegetation cover.	Selected contracts for comprehensive management of biodiversity in 5,337 ha of native vegetation according to the <i>BushBids</i> prioritisation metric.
Increase the area of native vegetation under long-term conservation covenants (Heritage Agreements) by 250 ha.	Selected contracts containing proposals for 1,034 ha of new Heritage Agreements.
Establish baseline monitoring of vegetation condition and the outcome of management through a Before-After- Control-Impact design extending the scope of the <i>BushBids</i> monitoring and evaluation plan.	20 reference sites assessed for future monitoring.

Table 3. Woodland BushBids project management objectives and achievements

Woodland BushBids used established methods, procedures and databases to reduce development (overhead) costs and ensure cost-effectiveness in the evidence-based decision making process, with approximately 72% of the funding allocated for management service payments.

The biodiversity gains from *Woodland BushBids* are shown in Table 5, as achievements against the projects' four ecological objectives. All objectives were achieved. Threatened species and communities were protected by the project. Management plans were prepared for 12,207 ha of native vegetation, with 5,337 ha being funded for 5-years. The area of land being conserved through *Woodland BushBids* is equivalent to 50% of the area being conserved by parks and reserves in the

Woodland BushBids region. Woodland BushBids initiated 6 new Heritage Agreements, representing 13 sites.



Figure 7. Distribution of successful, unsuccessful, withdrew bids and reference sites for *Woodland BushBids*

Figure 8. Photographs of the main vegetation communities assessed



Open Woodlands with open arid-adapted shrub understorey on limestone plains (MDBSA 1.1)



Tall Shrublands with open arid-adapted understorey on limestone plains (MDBSA 1.2)



Grasslands of arid open limestone plains (MDBSA 1.3)



Open mallee or low open woodlands with chenopod shrub understorey (MDBSA 2.1)



Chenopod open shrublands (MDBSA 2.2)



Mallee with open sclerophyll and chenopod shrub understorey on calcareous loams of flats/swales (MDBSA 3.1)



Mallee with open sclerophyll and chenopod shrub understorey on calcareous loams of flats/swales (MDBSA 3.2)

Mallee with open sclerophyll and chenopod shrub understorey +/- Triodia on sandy-loam swales and isolated shallow sandy flats (MDBSA 3.3)

Open Mallee with open sclerophyll shrub understorey on clay/clay-loam flats (MDBSA 5.1)



Grass and Mat-rush Sedgelands (MDBSA 9.2) Red Gum Forests & Woodlands with open shrub, herb and grassy understorey (MDBSA 10.5)

Woodlands with an open grassy understorey Grass and Ma (MDBSA 9.1)



Open forests and woodlands with a mid-dense shrub and grassy understorey (NA 2)

Woodlands with an open grassy understorey (NA 3.1)

Grasslands (NA 3.2)



Low Woodlands and Open Mallee with dense to mid-dense shrub and/or Spinifex and Sedge understorey (NA 4.1)

Inland tall shrublands (NA 6)

Table 4. Area of funded, unfunded and non bidders / withdrew sites for round 1 (WBB1) and round 2 (WBB2), assessed by vegetation communities and subcommunities

Community	Sub- community reference	Number of hectares from landholders who were:				vere:	
		Fun	ded	Unfunded		Non bidders /	
		WBB1	WBB2	WBB1	WBB2	WBB1	WBB2
Open Woodlands, Shrublands and Grasslands on low rainfall, limestone plains (MDBSA Community 1)							
Open Woodlands with open arid-adapted shrub understorey on limestone plains Tall Shrublands with open arid-adapted understorey on limestone plains Grasslands of arid open limestone plains	MDBSA 1.1 MDBSA 1.2 MDBSA 1.3	264.1 6.3 47.1	20.2 3.4	25.9	33.3	1616.5	
Open Mallee and Low Open Woodlands with a Chenopod shrub understorey and Chenopod Open Shrublands (MDBSA Community 2)							
Open Mallee or Low Open Woodlands with Chenopod shrub understorey Chenopod Open Shrublands	MDBSA 2.1 MDBSA 2.2	352.4 173.8	620.5 61.6	15.5		98.5 2101.0	
Mallee +/- Native Pine with open sclerophyll and Chenopod shrub understorey on calcareous loams of flats or swales (MDBSA Community 3)							
Mallee with very open sclerophyll & Chenopod shrub understorey on calcareous loams of flats/swales Mallee with open sclerophyll & Chenopod shrub understorey on calcareous loams of flats/swales Mallee with open sclerophyll & Chenopod shrub understorey +/- Triodia on sandy-loam swales and isolated shallow sandy flats	MDBSA 3.1 MDBSA 3.2 MDBSA 3.3	922.0 26.7 24.8	131.0	31.6	17.7 24.6	2226.9	181.7
Mallee with open sclerophyll shrub understorey on clay and clay-loam flats and swales (MDBSA Community 5)							
Open Mallee with open sclerophyll shrub understorey on clay/clay-loam flats	MDBSA 5.1				8.9		
Woodlands with an open grassy understorey & Grass and Mat-rush Sedgelands (MDBSA Community 9)							
Woodlands with an open grassy understorey Grass and Mat-rush Sedgelands	MDBSA 9.1 MDBSA 9.2	81.2	983.9 153.3	12.1	89.2 44.8	5.7	
Riparian, Freshwater and Brackish Swamp and Floodplain Vegetation – River Murray Corridor and lower Lakes (MDBSA Community 10)							
Red Gum Forests & Woodlands with open shrub, herb and grassy understorey	MDBSA 10.5		91.3			159.8	
Open Forests and woodlands with a mid-dense shrub and grassy understorey (NA Community 2) Open Forests & Woodlands with a mid-dense shrub & grassy understorey	NA 2	84.8	378.4				

Community	Sub- community	Number of hectares from landholders who were				ere:	
	reference	Funded		Unfunded		Unfunded Non bidd Withdr	
		WBB1	WBB2	WBB1	WBB2	WBB1	WBB2
Woodlands with an open grassy understorey and Grasslands (NA Community 3)							
Woodlands with an open grassy understorey	NA 3.1		11.4		26.4		
Grasslands	NA 3.2				98.6	24.8	
Low Woodlands and Open Mallee with dense to mid-dense shrub and/or Spinifex and Sedge							
understorey (NA Community 4)							
Low Woodlands and Open Mallee with dense to mid-dense shrub and/or Spinifex and Sedge	NA 4.1		874.7				
understorey							
Inland Tall Shrublands (NA Community 6)							
Inland Tall Shrublands	NA 6	23.5				26.6	
Total area (ha)		2006.7	3329.6	85.1	343.6	6259.8	181.7

Ecological objective Achievements Comments • Protect and enhance the Two threatened and 1 regionally significant plant communities, 6 endangered / The threatened plant community *Eucalyptus leucoxylon* vulnerable fauna species and 6 endangered / vulnerable flora species occur in ssp. pruinosa +/- E. odorata Grassy Low Woodland only biodiversity values of the Woodland BushBids funded Woodland BushBids sites (Tables 6, 7 and 8). Eighteen properties with occurs at 3 unfunded sites. successful bids contain threatened / significant plant communities (Table 6). This project area represents protection for 358 ha containing threatened plant communities. Four additional endangered, 3 vulnerable and 3 rare fauna species occur at or close to unfunded sites. Note that 3 successful bidders (representing 10 sites) did not Four endangered, 2 vulnerable and 6 rare plant species were present at funded sites. The endangered Dodonaea subglandulifera occurs at 8 of the funded sites sign the agreement contract. One site had introduced (214 ha) and Acacia spilleriana (Spiller's wattle) occurs at 3 sites (1190 ha) (Table 7). fauna species for conservation, including the threatened Boodie, Woylie, Greater Bilby and Numbat. One endangered, 5 vulnerable and 18 rare fauna species occur at or near to 44 of the funded sites (4,044 ha) (Table 8). Three endangered flora species (Austrodanthonia tenuior, Maireana rohrlachii and Olearia picridifolia) only occur at unfunded sites. Comprehensive Management Plans were prepared for 12,207 ha of native • Improve the condition of native vegetation in the vegetation on private land and management of threats to the condition of native Woodland BushBids vegetation is being funded on 5,337 ha (which represents 44% of the area prepared project area for management plans) in the Woodland BushBids project area. The outcomes of this management will be assessed in future years through a monitoring and evaluation process implemented during the Woodland BushBids project. Approximately 1.6% of the known (mapped) native vegetation on private land in the • Increase the area of native vegetation actively Woodland BushBids project area is being protected and managed for biodiversity managed for conservation conservation under contracts through Woodland BushBids. The area of land being conserved through *Woodland BushBids* is equivalent to 50% of the area being conserved by parks and reserves in the Woodland BushBids Round 2 project area (10,574 ha). • Increase the area of The Woodland BushBids sites will be protected and managed for a 5-year period under the Woodland BushBids Management Agreements. Sites representing 5 native vegetation protected under longpending Heritage Agreements were funded for comprehensive management and an additional 6 new Heritage Agreement applications (representing 13 sites and 1,034 term conservation ha) were initiated by Woodland BushBids. agreements

Table 5. Achievement against Woodland BushBids ecological objectives

Table 6.	Significant ecological communities	recorded at funded a	nd unfunded	Woodland B	ushBids sites for
	round 1 (WBB1) and round 2 (WBB	2)			

Threatened plant	Threatened	No. sites (area)						
community	category		Funded ²		Unfunded ³			
		WBB1	WBB2	Total	WBB1	WBB2	Total	
Black Oak <i>(Casuarina pauper)</i> Woodland	Regionally significant	2 (149.1 ha)	1 (20.2 ha)	3 (169.3 ha)	1 (167.5 ha)		1 (167.5 ha)	
Eucalyptus leucoxylon ssp. pruinosa +/- E. odorata Grassy Low Woodland	Vulnerable			0 (0 ha)		3 (55.4 ha)	3 (55.4 ha)	
Peppermint Box <i>(Eucalyptus odorata)</i> Grassy Woodlands ¹	Critically Endangered	10 (23.1 ha)	3 (12.7 ha)	13 (35.8 ha)			0 (0 ha)	
Irongrass (<i>Lomandra effusa</i>) Natural Temperate Grassland	Critically Endangered		2 (153.3 ha)	2 (153.3 ha)		2 (132.8 ha)	2 (132.8 ha)	
Other unthreatened		27 (1,834.6 ha)	25 (3,143.4 ha)	52 (4,978.0 ha)	26 (6,177.4 ha)	11 (337.1 ha)	37 (6,514.5 ha)	
Total with threatened / significant communities (area)		12 (172 ha)	6 (186 ha)	18 (358 ha)	1 (168 ha)	5 (188 ha)	6 (356 ha)	

¹ Conservation status from DEH (2001) unpublished Provisional List of Threatened Ecosystems in South Australia http://www.environment.gov.au/cgi-bin/sprat/public/publiclookupcommunities.pl
 ² Successful bids
 ³ Unsuccessful bids, did not enter a bid or withdrew from agreement contract



Table 7. Threatened flora species recorded at funded and unfunded Woodland BushBids sites for round 1 (WBB1) and round 2 (WBB2)

			No. sites (area)					
Threatened flora	Common	Threatened		Funded ²	1		Unfunded ³	•
species	name	category	WBB1	WBB2	Total	WBB1	WBB2	Total
Acacia glandulicarpa	Hairy-pod Wattle	Endangered		2 (1144.1 ha)	2 (1144.1 ha)			
Acacia spilleriana	Spiller's Wattle	Endangered		3 (1190.0 ha)	3 (1190.0 ha)	1 (24.8 ha)	1 (28.9 ha)	2 (53.7)
Asperula syrticola	Southern Flinders Woodruff	Rare		1 (778.2 ha)	1 (778.2 ha)	2 (43.2 ha)		2 (43.2 ha)
Austrodanthonia tenuior	Short-awn Wallaby-grass	Rare					1 (34.2 ha)	1 (34.2 ha)
Austrostipa gibbosa	Spiny Spear- grass	Rare		1 (778.2 ha)	1 (778.2 ha)			
Cryptandra amara var. longifolia	Long flowered Cryptandra	Rare		1 (12.5 ha)	1 (12.5 ha)			
Dodonaea subglandulifera	Peep Hill Hop- bush	Endangered	6 (135.0 ha)	2 (79.3 ha)	8 (214.3 ha)			
Helichrysum rutidolepis	Pale Everlasting	Endangered		1 (778.2 ha)	1 (778.2 ha)			
Maireana rohrlachii	Rohrlach's Bluebush	Rare				6 (3079.2 ha) ⁶		6 (3079.2 ha)
Olearia pannosa ssp. pannosa	Silver Daisy- bush	Vulnerable		2 (109.0 ha)	2 (109.0 ha)			
Olearia picridifolia	Rasp Daisy- bush	Rare					1 (3.1 ha)	1 (3.1 ha)
Phlegmatospermum eremaeum	Spreading Cress	Rare		1 (131.6 ha)	1 (131.6 ha)			
Pimelea curviflora var. gracilis		Rare		2 (781.7 ha)	2 (781.7 ha)		1 (34.2 ha)	1 (34.2 ha)
Ptilotus erubescens	Hairy-tails	Rare		1 (91.3 ha)	1 (91.3 ha)			
Swainsona behriana	Behr's Swainson-pea	Vulnerable		1 (12.5 ha)	1 (12.5 ha)			
Number of threaten	ed flora species c	onserved	1	12	12	3	4	6
Number of sites wit	h threatened flora	a species ⁴	6	11	17	9	3	12
Number of hectares	with threatened	flora species ⁵	135	1,916	2,051	3,147	66	3,213

¹ SA conservation status from *National Parks and Wildlife Act* 1972 (Version: 1.6.2010)

http://www.legislation.sa.gov.au/LZ/C/A/NATIONAL%20PARKS%20AND%20WILDLIFE%20ACT%201972/CURRENT/1972.56.UN.PDF#page=92 ² Successful bids

³ Unsuccessful bids, did not enter a bid or withdrew from agreement contract

⁴ A site may contain more than one threatened species

⁵ The number of hectares is the total area of all sites that have one or more threatened flora species present

⁶ Note that 3,079 ha represent 3 successful bidders that did not take up the agreement contract (i.e. withdrew)

Table 8. Threatened fauna species recorded within 2km of funded and unfunded WoodlandBushBids sites

Threatened	Common	Threatened	No. sites					
fauna species	name	Category ¹		Funded ²		ι ι	Infunded ³	
			WBB1	WBB2	Total	WBB1	WBB2	Total
Acanthiza iredalei	Slender-billed Thornbill	Rare		1	1			
Anas rhynchotis	Australasian Shoveler	Rare		3	3			
Anhinga novaehollandiae	Australian Darter	Rare		6	6	3	1	4
Ardeotis australis	Australian Bustard	Vulnerable		3	3			
Bettongia lesueur ⁴	Boodie (Burrowing Bettong)	Endangered				3		3
Bettongia penicillata ⁴	Woylie (Brush-tailed Bettong)	Endangered				3		3
Burhinus grallarius	Bush Stone Curlew	Rare	4		4	3		3
Cinclosoma castanotum	Chestnut Quail-thrush	Rare	4	2	6	12	3	15
Cladorhynchus leucocephalus	Banded Stilt	Vulnerable		3	3			
Corcorax melanorhamphos	White Winged Chough	Rare	15	16	31	20	14	34
Coturnix ypsilophora	Brown quail	Vulnerable				3		3
Falco peregrinus	Peregrine Falcon	Rare		8	8	8	6	14
Falcunculus frontatus	Crested Shrike-tit	Rare		3	3		1	1
Hylacola cauta	Shy Heathwren	Rare	2		2	10	1	11
Leipoa ocellata	Malleefowl	Vulnerable				3		3
Lichenostomus cratitius	Purple-gaped Honeyeater ssp.	Rare		3	3		1	1
Cacatua leadbeateri	Major Mitchell's Cockatoo	Rare				6		6
Macrotis lagotis ⁴	Greater Bilby	Vulnerable				3		3
Melanodryas cucullata	Hooded Robin	Rare	5	16	21	2	10	12
Microeca fascinans fascinans	Jacky Winter	Rare		5	5		6	6
Morelia spilota	Carpet Python	Rare	3		3	4		4
Myiagra cyanoleuca	Satin Flycatcher	Endangered		3	3	1		1
Myiagra inquieta	Restless Flycatcher	Rare	2	5	7	10	11	21
Myrmecobius fasciatus ⁴	Numbat	Endangered				3		3
Neophema chrysostoma	Blue-winged Parrot	Vulnerable	2		2	2	2	4
Neophema elegans	Elegant Parrot	Rare		10	10	6	1	7
Oxyura australis	Blue-billed Duck	Rare					1	1
Pachycephala inornata	Gilbert's Whistler	Rare	3	3	6	10	2	12
Pachycephala rufogularis	Red-lored Whistler	Rare				7		7
Plectorhyncha Ianceolata	Striped Honeyeater	Rare	3		3	12	3	15

Threatened	Common	Threatened	No. sites					
fauna species	name	Category ¹		Funded ²		Unfunded ³		
			WBB1	WBB2	Total	WBB1	WBB2	Total
Polytelis anthopeplus monarchoides	Regent Parrot	Vulnerable	3		3			
Stagonopleura guttata	Diamond Firetail	Vulnerable	6	11	17	9	6	15
Tiliqua adelaidensis	Pygmy Bluetongue	Endangered					1	1
Trichosurus vulpecula	Common Brushtail Possum			4	4	3		3
Number of threatened fauna species conserved				18	24	24	17	29
Number of sites with threatened fauna species ⁵				22	44	24	14	38
Number of hectares with	n threatened fauna specie	es ⁶	1,224	2,820	4,044	6,113 ⁷	500	6,613

¹ SA conservation status from *National Parks and Wildlife Act 1972* (Version: 1.6.2010)

http://www.legislation.sa.gov.au/LZ/C/A/NATIONAL%20PARKS%20AND%20WILDLIFE%20ACT%201972/CURRENT/1972.56.UN.PDF#page=92 ² Successful bids

³ Unsuccessful bids, did not enter a bid or withdrew from agreement contract

⁴ Species have been introduced into sites for conservation

⁵ A site may contain more than one threatened species

⁶ The number of hectares is the total area of all sites that have one or more threatened fauna species present

⁷ Note that 3,079 ha of the total 6,113 ha represent 3 successful bidders that did not take up the agreement contract (i.e. withdrew)



6 Monitoring and evaluation

Monitoring and evaluation processes were built into *Woodland BushBids* to ensure that learning was captured and that outcomes could be measured in the future. The processes follow that of the monitoring and evaluation procedures of *BushBids*. The monitoring and evaluation approach has three components:

- Evaluation of landholder participation to improve *Woodland BushBids* between tender rounds and to learn from implementation for future conservation tenders.
- Reporting and compliance to continue to engage with participating landholders and to ensure that agreed activities are being undertaken and outputs achieved.
- Evaluation of biodiversity outcomes to measure the improvement in biodiversity conservation at funded sites.

6.1 Evaluation of landholder participation

A questionnaire has been sent to the successful and unsuccessful landholders from both rounds. The questionnaire is being analysed to:

- To gauge landholders' attitudes and satisfaction with the process to evaluate the project's performance.
- To further understand the motivations of the landholders and to understand how landholders determined their bid price.

The results from this questionnaire will be beneficial in improving on the design and implementation of future rounds of *BushBids* and other conservation tenders. In addition, pricing and motivation comparisons will be made between the two *BushBids* regions: the *BushBids* EMLR region and *Woodland BushBids* region.

6.2 Reporting and compliance

To ensure landholders are undertaking agreed management actions and meeting the obligations of the Management Agreement, landholders are required to submit annual reports in order to receive the annual staged payments. As part of the annual report process, landholders are sent an annual report form for each site. The report form is pre-filled with information on the agreed management actions specified in the Management Plan. Landholders are required to complete the annual report and return it with an invoice for payment. Each year a number of sites will be visited for compliance monitoring. Refer to the *BushBids* final report for compliance protocols (O'Connor et al. 2008a).

6.3 Evaluating biodiversity outcomes

The site assessment protocols for this project are designed as a baseline for monitoring of vegetation condition change after management. The approach to measuring outcomes at the end of the contracts will follow that established for *BushBids*. This includes:

- Using the Bushland Condition Monitoring method of the Nature Conservation Society SA as a rapid vegetation assessment method sensitive enough to detect changes due to management.
- Establishing a baseline monitoring site on nearly every site assessed.
- Establishing baseline monitoring sites as control sites on public land or where management is documented (i.e. establishing a Before-After-Control-Impact design). *Woodland BushBids*

project established 20 reference (control) sites in similar vegetation on public land in the area (Appendix 4: Table 10, Fig. 7).

• The evaluation of biodiversity gain can be undertaken after reassessment of funded (impact) and reference (control) sites and changes in vegetation condition is calculated.

The monitoring design will allow six key evaluation questions to be answered:

- 1. How much does the condition of native vegetation improve with described management?
- 2. Which indicators of vegetation condition are most sensitive (and most useful for future programs)?
- 3. How well does the transformation function (estimate of change over time with different actions) predict change?
- 4. How much does the measured improvement in vegetation condition cost?
- 5. How much improvement is due to information and how much is due to financial incentive?
- 6. What is the predicted market price of key conservation targets in the *Woodland BushBids* project area?

This approach is already operating in the *BushBids* project and can be extended to the *Woodland BushBids* project area to improve cost effectiveness. Methods are consistent with and build on other data collection being undertaken in the SA MDB region. A report on the baseline vegetation condition in the Eastern Mount Lofty Ranges was completed in 2009 (O'Connor et al. 2008b) and a Regional Baseline report has been completed for the Murray-Darling NRM Region (Mahoney et al. 2011). Currently an analysis is being carried out for *BushBids* sites to evaluate biodiversity gain. This evaluation process will be used to evaluate *Woodland BushBids* in the future.

This evaluation design has the potential to assist future programs to calculate the biodiversity gains which can be achieved through different suites of management actions.

7 References

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Woodland BushBids: Conservation in the northern Murray Plains and the southern Rangelands of the South Australian Murray-Darling Basin

APPENDICES

Appendix 1 Woodland BushBids brochures and factsheets

Brochure and factsheets can be found at these web addresses:

Woodland BushBids Information brochure

http://samdbnrm.sa.gov.au/Portals/9/PDF%27s/Biodiversity/mdb-3589%20Bushbids%20DL_FA_SP%20% 282%29.pdf

Factsheet 1 – Questions and Answers

http://samdbnrm.sa.gov.au/Portals/9/Publications%20and%20Resources/Fact%20Sheets/Biodiversity/Factsheet%201%20-%20questions%20and%20answers.pdf

Factsheet 2 – Site Visits

http://samdbnrm.sa.gov.au/Portals/9/Publications%20and%20Resources/Fact%20Sheets/Biodiversity/Factsheet%202%20site%20visits.pdf

Factsheet 3 – Management Services - Guidelines and Standards

http://samdbnrm.sa.gov.au/Portals/9/Publications%20and%20Resources/Fact%20Sheets/Biodiversity/Factsheet%203%20-%20management%20services.pdf

Factsheet 4 – Management and Vegetation Information

http://samdbnrm.sa.gov.au/Portals/9/Publications%20and%20Resources/Fact%20Sheets/Biodiversity/Factsheet%204%20-%20management%20and%20vegetation%20info.pdf

Factsheet 5 – Submission and Assessment of Bids

http://samdbnrm.sa.gov.au/Portals/9/Publications%20and%20Resources/Fact%20Sheets/Biodiversity/Factsheet%205%20-%20submission%20and%20assessment%20of%20birds.pdf

Appendix 2 Implementation timeline

Implementation component	Delivered by	Delivery time WBB1	Delivery time WBB2	Process for Woodland BushBids
Advertisement, brochure development	Delivery Consultants	October 2009 28 October	October 2010	 Local newspapers (Barossa and Herald Light, The Loxton News, The Current, Murray Pioneer, The Murray Valley Standard, The River News, Riverland Weekly). Follow-up local radio interview and re-advertisement in The Current. Email sent to NRM officers to inform them of the Woodland BushBids process and to request them to advertise Woodland BushBids by letter and word of mouth, and to support landholders.
		2009	2010	• Information Sessions were conducted in Mit Mary and Cambral for round 1 and in Mit Mary and Robertstown for round 2, to inform landholders in the region about the <i>Woodland BushBids</i> process. The details of the session were advertised in the local papers.
Opening of expression of interest	Delivery Consultants	28 October 2009	5 November 2010	 A register of expressions of interest was developed. Information packages were sent to interested landholders containing: <i>Woodland BushBids</i> information brochure Questions and answers factsheet Site visits factsheet Management services – Guidelines and Standards factsheet Management and vegetation information factsheet Submission and assessment of bids factsheet Cover letter stating that the landholder can request a copy of an example management plan, agreement, annual reporting form and instructions. Letter also detailed the timeline of the process and requested the landholder consider the site locations and management issues before the visit by the site assessment officer.
Site eligibility				 To be eligible for <i>Woodland BushBids</i>, sites must have met these criteria: The site must be located within the <i>Woodland BushBids</i> project area boundary (Note: the boundary was changed for round 2). The site must have a minimum of 10% native vegetation cover with a minimum size of 5 ha and focus on woodland and mallee communities. If not private land, the site must be managed under agreement by an entity other than the South Australian or Australian Governments.
Close of expression of interest	Delivery Consultants	21 December 2009	15 April 2011	Expression of interest closed after an adequate amount of land had been offered for assessment and inclusion in the bidding process.

 Table 9. Implementation timeline outlining the responsibility and process of implementing Woodland BushBids

Implementation component	Delivered by	Delivery time WBB1	Delivery time WBB2	Process for Woodland BushBids
Site assessment	Site assessors	November 2009 to January 2010	April to June 2011	 Site assessors contacted landholders to visit their property to undertake site assessments. The assessors discussed with the landholder about best practice and achievable management of native vegetation on their property. Each site assessment involved: Assessing and recording the condition of the site (using the BCM methodology designed by the NCSSA) and requirements of the SABAT-<i>BushBids</i> landscape context component. Identifying and discussing potential management and improvement options to mitigate threats to biodiversity values and to protect and improve native vegetation condition (e.g. fencing, weed management, feral animal management, Heritage Agreements) with landholders. Preparing site maps using GPS technology to supplement available GIS information generated from South Australian Government databases. Recording threatened species and communities detected at the site with additional information on distribution of threatened species provided from existing databases. Recording agreed management options to be used in developing draft management plans. Landholders were provided with a list of agreed management services and the location of eligible site/s early in the process. A management action list and mud map was sent to landholder as a record of the site assessment soon after the site visit.
Development of management plans	Site assessors, Delivery Consultants	January to February 2010	May to July 2011	Draft management plans were prepared in consultation with the site assessors, based on data collected and the actions that have been discussed and agreed upon with landholders. Management plans were cross checked for consistency.
Data entry into SABAT	Site assessors	February / March 2010	July 2011	Bushland condition and management services data were entered into the SABAT database.
Formation of site maps using GPS technology and GIS information	DWLBC (round 1), Delivery Consultants (round 2)	March 2010	June to July 2011	<i>Woodland BushBids</i> site maps were digitised and linked to site records in the SABAT database.
Calculation of scores for landholders	DWLBC (round 1), Delivery Consultants (round 2)	March 2010	July 2011	Management services scores, bushland condition scores and indicator ratings were calculated to provide to the landholder.
Management plan package delivered to landholders	Delivery Consultants	23 March 2010	8 July 2011	Landholders were provided with the bushland condition indicator ratings and management services score/s, management plan/s, map/s, bid price form and covering letter. The letter outlined the details of bid submission and provided basic information on site quality, and maintenance and improvement services being offered. Information about the site quality was included as part of the site assessment results (individual bushland condition indicator ratings).

Implementation component	Delivered by	Delivery time WBB1	Delivery time WBB2	Process for Woodland BushBids
Bid development period (for changes to Management Plans)	Delivery Consultants in consultation with landholder	March to April 2010	8 July to 26 July 2011	Assistance was provided to landholders wishing to modify or clarify their management plan prior to submission of bids. For round 1, all registered bidders had 10 working days to comment on management plans and 15 working days to submit a sealed bid that nominated the price to undertake the 'services' in the agreed management plan. For round 2, the landholders were given 2 weeks to comment on their management plan and 3 weeks to submit a sealed bid.
Bid receipt	Received from landholders, secured by Delivery Consultants	March to April 2010	By 9 August 2011	Bids from landholders were received and secured. A Post Office Box was established as the postal address for <i>Woodland BushBids</i> . When bids were received they were registered on arrival and secured by the delivery agent.
Calculation of scores for bid opening day	DWLBC	May 2010	August 2011	 For all sites, calculations were generated for: Bushland Condition Landscape Context Score Conservation Significance Score Management Services Score
Bid Opening day / assessment	Evaluation panel	21 May 2010	12 August 2011	Bids were opened and the price entered into database. All offered bids were ranked in order of decreasing Biodiversity Benefits Index. The cumulative dollar allocation was calculated. Funds were allocated on the basis of "best conservation value-for-money".
Letters to landholders	Delivery Consultants	17 June 2010	1 September 2011	Notified landholders of their success or otherwise after the bid assessment.
Sign contracts	Delivery Consultants	mid 2010	late 2011	Successful bidders were invited to sign a management agreement based on the agreed management plan. Included in the Agreement Contract were the management plan, payment schedule, reporting requirements and site location.
Implementation evaluation	Delivery Consultants	29 September 2011	24 November 2011	Questionnaire was sent to successful and unsuccessful participants to get feedback about the scheme.
Biodiversity gain evaluation	Delivery Consultants			An evaluation design developed and baseline data collected. Evaluation of biodiversity outcomes ongoing.
Annual reporting process	SAMDB NRM Board	Each year for the 5 years of the contract	Each year for the 5 years of the contract	Contracted landholders receive an annual report form each year for each site specified in the management plan. An example annual report and instructions to assist with completing the form is also supplied.
Annual payments issued	SAMDB NRM Board	First 3 years	First 3 years	Annual payment is subject to a receipt of a satisfactory annual report from the landholder.

Appendix 3 Explanation of bushland condition indicators

The following explanation of the indicators has been adapted from the Bushland Condition Monitoring Manual for the Murray Darling Basin, South Australia (Croft, Pedler and Milne 2009).

Plant Species Diversity: As a general rule, the greater the number of species found at a site the better its condition. Variety in plants provides habitat for a variety of animals.

Weed Abundance and Threat: Weed invasion is one of the greatest and most common threats to bushland health and ecological integrity. Weeds displace native plants and therefore reduce the amount of good habitat for animals and other native plants. An 'excellent' score for weed abundance and threat indicates a site with few or no weeds.

Structural Diversity A Ground Cover: In most healthy communities in the Murray Darling Basin the ground is protected by a layer or crust of mosses, lichens and leaf litter and there is relatively little bare ground or exposed soil. The living and litter crust helps keep a living soil, prevents soil erosion, provides a seed germination bed and helps recycle nutrients. Bare ground will decrease as plant cover, mosses and lichens and leaf litter increase.

Structural Diversity B Plant Life Forms: In healthy plant communities there will be a wide variety of native plant life forms present, such as trees, shrubs, herbs and grasses. Even in communities that naturally lack trees, there will be a wide range of life forms. Absent or reduced life forms usually indicate past disturbance. In degraded communities weed species tend to dominate the cover of one or more layers. Weeds also reduce the diversity of other life forms in the layers below, leading to a reduction in the overall score.

Regeneration of Native Species: Vegetation in good condition will continually regenerate itself. A 'poor' or 'very poor' score for regeneration indicates that very few species are either germinating or surviving through to seedling establishment. This may be due to poor health of the adult plants, reducing flowering and/or seed set, or threats that make conditions unfavourable for seed germination or seedling survival. A low regeneration score would be expected in bushland that has previously had long-term, high levels of disturbance but may also occur when the vegetation community requires relatively uncommon episodic events to trigger regeneration.

Tree Habitat: In a healthy community, there should be a range of tree sizes including some large individuals as well as seedlings and saplings. Most adult trees should have a nearly complete canopy and some trees should be old enough to contain hollows. All these factors contribute to the availability of tree habitat for fauna.

Primary Canopy Health: The health of trees and shrubs often reflects the overall ecological health of a vegetation remnant. In a healthy community, most adult trees should have a canopy which is complete or nearly complete. Poor health in trees may be caused by one or more stresses such as soil compaction, increased nutrient loads, altered soil water regimes, pathogens, drought and damage by unnaturally high numbers of insects, birds or other animals.

Tree Health Dieback: In most ecosystems, some level of stress and/or insect attack on trees is a normal component of healthy ecosystems. Dead trees still have high habitat value and play a role in the nutrient cycle.

Tree Health Lerp Damage: Lerps are small insects that suck sap from leaves. They are a natural part of plant communities and normally their numbers will fluctuate both through the year and between

years. Healthy trees will recover well from lerp damage; however prolonged heavy damage is a symptom of general stress in the ecosystem.

Tree Health- Mistletoe: Mistletoe is a native plant that attaches to trees or shrubs, using them as a source of water and nutrients, rather than rooting in the soil. Mistletoes are a vital link in the life cycle and survival of many native animal species such as butterflies and birds. A healthy tree can support, outlive, and shed the occasional mistletoe during its lifetime with no adverse effects.

Trees with a high number of mistletoes may become stressed if their ability to supply the mistletoes with water and nutrients is overstretched. This may contribute to a decline in tree health with a significant loss of foliage and vigour. However, such trees are likely to have been under stress from other causes before the mistletoes became established. Heavy mistletoe infestations are often a symptom of an ecosystem under stress from causes such as changes in watertable, soil compaction, increased nutrients and loss of diversity in the understorey.

The *Native Vegetation Act 1991* protects mistletoe and therefore any removal must be done in accordance with Native Vegetation Council requirements, policies and guidelines.

Grazing Pressure: Unnaturally high grazing levels in bushland may be the result of domestic stock grazing, feral animals and/or if they are present in unnaturally high densities, native herbivores. Heavy or inappropriate grazing may damage or remove individual plants and change the understorey composition, leading to the removal or partial removal of plants that form the natural shrub and ground layers.

Fallen Logs and Trees: Because the number of fallen logs or trees will vary between tree species, age of trees, and climatic factors, it is not possible to say how many fallen trees or logs is "natural" for a community. However, in general, the more fallen logs or trees the higher the habitat value of a bushland because animals such as echidnas, small reptiles and insects use fallen timber for food and shelter.

Appendix 4Vegetation sub-communities at Woodland BushBids sites

Table 10. Number of funded, unfunded and non bidders / withdrew sites assessed from the vegetation sub-communities in Woodland BushBids

Sub-community	No. sites from landholders who were:						No. reference
	Fur	nded	Unfunded		Non bidders/ Withdrew		sites
	WBB1	WBB2	WBB1	WBB2	WBB1	WBB2	
Open Woodlands with open arid-adapted shrub understorey on limestone plain (MDBSA 1.1)	5	1	2	2	6		5
Tall Shrublands with open arid-adapted understorey on limestone plains (MDBSA 1.2)	1	1					
Grasslands of arid open limestone plains (MDBSA 1.3)	1						
Open Mallee or Low Open Woodlands with Chenopod shrub understorey (MDBSA 2.1)	3	8	1		2		3
Chenopod Open Shrublands (MDBSA 2.2)	3	2			5		3
Mallee with very open sclerophyll & Chenopod shrub understorey on calcareous loams of flats/swales (MDBSA 3.1)	8	1	2	1	4	1	2
Mallee with open sclerophyll & Chenopod shrub understorey on calcareous loams of flats/swales (MDBSA 3.2)	1			2			
Mallee with open sclerophyll & Chenopod shrub understorey +/- Triodia on sandy-loam swales and isolated shallow sandy flats (MDBSA 3.3)	1						1
Open Mallee with open sclerophyll shrub understorey on clay/clay-loam flats (MDBSA 5.1)				3			
Woodlands with an open grassy understorey (MDBSA 9.1)	11	6	1	2	1		5
Grass and Mat-rush Sedgelands (MDBSA 9.2)		2		2			
Red Gum Forests & Woodlands with open shrub, herb and grassy understorey (MDBSA 10.5)		1			1		
Open Forests & Woodlands with a mid-dense shrub & grassy understorey (NA 2)	3	2					1
Woodlands with an open grassy understorey (NA 3.1)		2		2			
Grasslands (NA 3.2)				1	1		
Low Woodlands and Open Mallee with dense to mid-dense shrub and/or Spinifex and Sedge understorey (NA 4.1)		5					
Inland Tall Shrublands (NA 6)	1				1		
Total number of sites	39	31	6	15	21	1	20

Table 11. Vegetation sub-community types assessed in $Woodland BushBids^1$

Community Type	Overstorey dominant features	Sub-dominant features	Other features ²
MDBSA 1.1 Open Woodlands with open arid-adapted shrub understorey on limestone plains	Myoporum platycarpum, Casuarina pauper, Callitris gracillima, Eucalyptus oleosa, E. gracilis	Eucalyptus dumosa, E. socialis	Occurs on shallow to very shallow soils over a massive limestone horizon. The
MDBSA 1.2 Tall Shrublands with open arid-adapted understorey on limestone plains	Acacia nyssophylla, Dodonaea viscosa ssp. angustissima, Pittosporum angustifolium, Alectryon oleifolius		surface soils are generally calcareous brown loams. Species diversity is low.
MDBSA 1.3 Grasslands of arid open limestone plains	Austrostipa spp., Amphipogon caricinus, Enneapogon spp.		
MDBSA 2.1 Open Mallee or Low Open Woodlands with Chenopod shrub understorey	Eucalyptus oleosa, E. gracilis, Myoporum platycarpum	Alectryon oleifolius, Pittosporum angustifolium	Occurs on a range of soils from clay, clay loam, loam, sandy loam to shallow
MDBSA 2.2 Chenopod Open Shrublands	Maireana sedifolia, Maireana pyramidata, Atriplex stipitata, Atriplex vesicaria, Maireana aphylla, Maireana astrotricha		limestone soils. Species diversity is low even in healthy communities.
MDBSA 3.1 Mallee with very open sclerophyll & Chenopod shrub understorey on calcareous loams of flats/swales	Eucalyptus oleosa, E. gracilis, E. dumosa, E. calycogona	E. gracilis, E. dumosa, E. Eucalyptus socialis, E. brachycalyx, E. phenax	
MDBSA 3.2 Mallee with open sclerophyll & Chenopod shrub understorey on calcareous loams of flats/swales	Eucalyptus oleosa, E. gracilis, E. socialis, E. yalatensis, E. brachycalyx, E. phenax, E. dumosa		little outcropping limestone or on red clay flats in lower rainfall regions.
MDBSA 3.3 Mallee with open sclerophyll & Chenopod shrub understorey +/- Triodia on sandy-loam swales and isolated shallow sandy flats	Eucalyptus leptophylla, E. socialis, E. brachycalyx, E. oleosa, E. dumosa, E. gracilis		Species diversity is low to moderate.
MDBSA 5.1 Open Mallee with open sclerophyll shrub understorey on clay/clay-loam flats	Eucalyptus leptophylla, E. dumosa, E. yalatensis, E. socialis, E. brachycalyx	Eucalyptus porosa, Callitris gracilis	Occurs generally on clay or clay-loam flats. Generally a high diversity of perennial life forms. Species diversity is moderate to low.
MDBSA 9.1 Woodlands with an open grassy understorey	Eucalyptus porosa, E. odorata, Allocasuarina verticillata, Callitris gracilis		Occurs on relatively fertile soils. High diversity of annual herbaceous
MDBSA 9.2 Grass and Mat-rush Sedgelands	Austrostipa spp., Austrodanthonia spp., Lomandra effusa, L. multiflora spp. dura		species. Species diversity is high.
MDBSA 10.5 Red Gum Forests & Woodlands with open shrub, herb and grassy understorey	Eucalyptus camaldulensis	Eucalyptus largiflorens	Occurs generally on coarse grained sands, silted and river gravels. Species diversity is moderate.
NA 2 Open Forests & Woodlands with a mid-dense shrub & grassy understorey	Eucalyptus leucoxylon ssp. leucoxylon, E. leucoxylon ssp. pruinosa, E. odorata, E. goniocalyx, E. macrorhyncha, Allocasuarina verticillata	Callitris gracilis, Eucalyptus behriana, E. porosa	Occurs on soils of intermediate fertility in higher rainfall areas. Species diversity is high.

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Community Type	Overstorey dominant features	Sub-dominant features	Other features ²
NA 3.1 Woodlands with an open grassy understorey	Eucalyptus leucoxylon, E. odorata, E. camaldulensis var. camaldulensis, Allocasuarina verticillata	Eucalyptus porosa, Allocasuarina verticillata, Callitris gracilis, Eucalyptus microcarpa	Occurs generally on relatively fertile soils. Many annual herbaceous species. Species diversity is moderate.
NA 3.2 Grasslands	Lomandra spp., Themeda triandra, Aristida behriana, Austrostipa spp., Austrodanthonia spp.		
NA 4.1 Low Woodlands & Open Mallee with dense to mid- dense shrub and/or Spinifex and Sedge understorey	Eucalyptus odorata +/- E. porosa, Allocasuarina verticillata, E. leucoxylon spp. pruinosa, Callitris glaucophylla, C. gracilis, E. socialis +/- E. gracilis, E. goniocalyx		Generally occurs in dry ranges, rocky hill slopes and other skeletal, infertile soils on slopes. Species diversity is high.
NA 6 Inland Tall Shrublands	Acacia victoriae, Bursaria spinosa, Dodonaea viscosa ssp. angustissima, Eremophila longifolia, Senna artemisioides, Acacia nyssophylla		Generally occurs at lower rainfall and/or on poor or saline soils. Species diversity is moderate.

¹Vegetation sub-community types and features follow NCSSA (2007, 2009) ²Expectations for species diversity is for healthy communities.