

Native Grass Strategy for South Australia

Broadacre Adoption and Seed Production of Native Perennial Grasses in Agriculture

Chapter 6 – Appendices



Australian Government

Department of Agriculture, Fisheries and Forestry
National Landcare Programme



RURAL SOLUTIONS SA



This Strategy is funded by the Australian Government's National Landcare Program (NLP074423), through the Upper North Farming Systems Group.

This report to be cited as Reseigh, J., Brown, W., Laslett, T., Foster, P., Myers, R.J., and Carter, M. (2008) Native Grass Strategy for South Australia; Broadacre Adoption and Seed Production of Native Perennial Grasses in Agriculture, Rural Solutions SA, Adelaide. ISBN: 978-1-921399-19-0.

Disclaimer

Rural Solutions SA and its employees do not warrant or make any representation regarding the use, or results of the use, of the information contained herein as regards to its correctness, accuracy, reliability, currency or otherwise. Rural Solutions SA and its employees expressly disclaim all liability or responsibility to any person using the information or advice.

© Rural Solutions SA 2008

This work is copyright. Unless permitted under the Copyright Act 1968 (Cwlth), no part may be reproduced by any process without prior written permission from Rural Solutions SA. Requests and inquiries concerning reproduction and rights should be addressed to the Business Manager, Business Development & Marketing, Rural Solutions SA, GPO Box 1671, Adelaide SA 5001.

i CONTENTS

6. APPENDICES	211
6.1. APPENDIX 1: QUOTATIONS DETAILING THE EXTENT OF OPEN, GRASSY COMMUNITIES IN SOUTH AUSTRALIA AT THE TIME OF SETTLEMENT	211
6.2. Appendix 2: Quotations detailing the extent of open, grassy communities in south-eastern Australia at the time of settlement	212
6.3. Appendix 3: Workshop attendance summary	223
6.4. Appendix 4: Interview responses summary	224
6.5. Appendix 5: 'Native Grass Resources List' - Internet questionnaire	228

ii TABLE OF FIGURES

Table A3.1 Attendance at Shared Knowledge Workshops "Creating a vision for native grasses in SA". 223

Table A4.1: Phone interview questions and summaries of responses (questions were a guide; interview by phone discussion). 224

Table A5.1 Native Grass Resources List 228

Table A5.2 Major themes emerging from selected question from internet questionnaire (completed on the internet with no consultation). 230



6. APPENDICES

6.1. APPENDIX 1: QUOTATIONS DETAILING THE EXTENT OF OPEN, GRASSY COMMUNITIES IN SOUTH AUSTRALIA AT THE TIME OF SETTLEMENT

“...a fine and valuable grazing district, with grass of an excellent description, and of great luxuriance” Explorer Edward John Eyre describing the Mid-North of SA in 1840 (Nicholls 2001).

“Kangaroo Grass was the prevailing species, and it was up to our elbows, and in some places as thick as any good English meadow of two years of old seed grass.” James Backhouse, botanist and Quaker missionary, on the Adelaide Plains in 1837 (Backhouse 1843).

“It consists indeed of extensive level plains, over the eastern extremity of which the Mount Lofty Range is visible. They are bounded southwards by a line of trees, marking the course of the River Torrens across them, but extend northwards for many miles without any visible termination. Their monotony, however, is, at the present date, in some measure broken by belts of wood, ...” Captain Charles Sturt describing the Adelaide Plains in 1849 (Hyde 1995).

“...and he will find himself riding through an open forest, shading rich, alluvial, and grassy flats, and strictly speaking, will then be traversing the Valley of the Torrens” Captain Charles Sturt describing the Adelaide Plains in 1849 (Hyde 1995).

“The pasture is well adapted for sheep, and there are isolated valleys in which the soil is very good and fit for cultivation; but this kind of country only occupies a narrow strip of about ten miles” Captain Charles Sturt describing the Adelaide Plains in 1849 (Hyde 1995).



6.2. Appendix 2: Quotations detailing the extent of open, grassy communities in south-eastern Australia at the time of settlement

“When I first discovered this beautiful neighbourhood, it was covered with an abundance of kangaroo grass high as my horse’s belly and fitted to fatten the largest oxen I ever saw” Description of the Onkaparinga catchment near Mt Torrens by surveyor W. B. Randell in 1839 (Arnold 1991).

“...when I first crossed, had grass that rose above the horses middles as they walked through it, and looked luxuriant beyond belief” Captain Charles Sturt describing the area near Mt Barker 1849 (Hyde 1995).

“... the woods are free from underwood of every kind and the trees are as such a distance from one another that the whole Country or at least part of it might be cultivated without being oblig’d to cut down a single tree; we found the soil every where except in the marshes to be light white sand and produceth a quantity of good grass which grows in little tufts about as big as one can hold in ones hand a pretty close to one another, in this manner the surface of the ground is coated in the woods between the trees” Captain James Cook on 1 May 1770 describing Botany Bay’s southern shore (Ryan et al. 1995).

“...very barren place without wood... very few tree species, but very place was covered with vast quantities of grass... the trees were not very large and stood separate from each other without the least underwood” Joseph Banks, also at Botany Bay (Ryan et al. 1995).

“...there is a very considerable extent of tolerable land, and which may be cultivated without waiting for its being cleared of wood; for the trees stand very wide of each other, and have no underwood; in short, the woods on the spot I am speaking of resemble a deer park, as much as if they had been intended for such a purpose... The grass upon it is about 3 feet high, very close and thick” Captain John Hunter in 1788 (Ryan et al. 1995).

“The whole face of the country was abundantly covered with good grass, which, having been burnt sometime, now bore the appearance of young wheat” John Oxley at the Hastings River, 29 September 1818 (Ryan et al. 1995).

“Extensive plains are a distinguishing feature in the interior of NSW... generally a gently undulating surface, destitute of timber, and covered with grass.” James Atkinson in ‘An Account to the State of Agriculture and Grazing in the Colony of NSW’ in 1826 (Cluff 2001).

“In all these luxuriant plains there is scarcely a superfluous tree to be seen, not often above a dozen to the acre; and patches of acres are here and there met with destitute even of one, and only requiring the instrumentality of the plough to produce an abundant crop” Peter Cunningham describes the Upper Hunter Valley in 1827 (Ryan et al. 1995).

“The forest ground resembles at present one uninterrupted oat or rye field in harvest time... (Kangaroo grass) is almost the only predominant grass... grows here about three to four feet high... In a few weeks it will be burnt, to have fresh shoots” Leichhardt describes NSW vegetation in 1843 (Ryan et al. 1995).

“The ground under the trees, which would be covered with blueberry and whortleberry bushes in our oak forests, is mostly covered with kangaroo grass here... This grass ripens in October and November, when the ground under the trees looks like an even, sweeping field of oats” Leichhardt describes NSW vegetation in 1844 (Ryan et al. 1995).



6.3. Appendix 3: Workshop attendance summary

Knowledge sharing workshops were held across South Australia during May 2008 in five locations encompassing four NRM regions (Table A3.1). The purpose of the workshops was to disseminate and share information in order to facilitate and identify recommendations for the Native Grass Strategy.

Table A3.1 Attendance at Shared Knowledge Workshops “Creating a vision for native grasses in SA’.
Abbreviations: RSSA=Rural Solutions SA representing various industries and agencies; LH=landholder; NRM=Natural Resource Management Board; RV=Revegetation Industry; FG=Federal Government; DEH=Dept Environ & Conservation; LG=local government; NGRG=Native Grasses Resources Group; SARDI=South Australian Research Development Industry; and Other=not defined.

Location/town	Organisation	Number attended	Total no.	Comments
Elliston	RSSA	4	10	
	LH	3		
	NRM	2		
	DEH	1		
Tumby Bay	LH	1	11	
	Industry/RV	3		
	NRM	1		
	Other	1		
	RSSA	5		
Mt Pleasant	RSSA	9	18	
	LH	2		
	Industry	3		
	NRM	1		
	LG	2		
	NGRG	1		
Morchard	LH	2	6	Major rain: landholders seeding, reduced attendance
	NRM	1		
	RSSA	3		
Lameroo	LH	2	4	Major rain: landholders seeding, reduced attendance
	RSSA	2		
Keith	LH	2	8	Major rain: landholders seeding, reduced attendance
	RSSA	5		
	Local media	1		
Adelaide	LH	7	36	
	SARDI	2		
	DEH	1		
	FG	2		
	Industry	2		
	NGRG	4		
	NRM/LAP	5		
	RSSA	8		
	Other	5		



6.4. Appendix 4: Interview responses summary

Interviews (Table A4.1) with key people from a variety of native grass experts (identified from literature reviews and project Reference Group); seed industry leaders (identified by commercial production status and practice) and local landholders (identified by the project Reference Group) provided a perspective on industry issues particularly those related to native grass seeds and their production during April – June 2008 . From the interview responses, visits to seed production areas in south-eastern Australia were determined, and the direction of the Strategy Document and associated recommendations were refined.

Table A4.1: Phone interview questions and summaries of responses (questions were a guide; interview by phone discussion).

Question/comment	Producers n=6	Industry n=6	Researchers n=4	Yes	No	Unsure
1. What is your present occupation/ profession? and what are the key elements of your work?	Variable – responses not included					
2. How long and why have you been involved with the native grass industry?	Variable – responses not included			5	1	2
3. Do you believe native grasses/seed can become a stand alone industry? Explain.	Variable – responses not included, but most indicated 'yes'			7	1	1
4. Do you work alone or do you have business connections that form a part of the structure?	Variable – responses not included					
5. What sorts of funding does your business need and how is that achieved?	Variable – responses not included					
6. Is your business sustainable at the present time?	Variable – but most responded with 'no' if they did not have another source of income			2	2	1
7. If it is sustainable, how long has it taken you to reach your sustainability?	Variable but producers generally responded 6-10 years					
8. Have you a business plan?	Most stated 'yes' – either business or research plan			4	2	0
9. What sorts of problems have you encountered in developing your business or working in the native grass seed industry?	Industry commitment; price	Time; payment; clients; viable seed; suitable land; maintain seed source; seed ecology; site prep; maintenance; equipment	Establishment; dormancy; funding; commercial partners; loss of control; dealing with commercial industry; conflict of interest; Species ID; commercialising; establishment; harvesting; management			



Question/comment	Producers n=6	Industry n=6	Researchers n=4	Yes	No	Unsure
10. What were some significant achievements or advances in your time working with native grasses and seeds?	Row drilling; spraying; Themeda	Large stakeholders; managing weedy grasslands; removing scepticism; Establishing Themeda; seed harvester; seed drilling; mowing strategies; Broadacre cropping; selective herbicides; minimum till techniques; harvesting technology	Research; herbicides; management; Publications; networking; Students; publications; influence			
15. What are the likely commercial markets, for native grass, native grass seed or native grass cultivars?	Government; mining; roads; domestic	Councils and government Councils and government; Rail corridors; soil structure markets; Mining; councils; amenity; biodiversity	Transport corridors; stabilisation of eroded areas; curious farmers; biodiversity conservation; Amenity; roadside; revegetation; mining; pastures; Catchment Management Authorities; turf; amenity; mining; biodiversity; Mining; roads; reveg agencies; amenity; farmers;			
Do you regard the following as impediments to commercial production of native grasses/seed						
16. Site preparation				5	3	0
17. Grower availability				5	2	1
18. Species availability				3	4	1
19. Sowing technique				5	3	0
20. Germination/ dormancy/ viability				3	4	1
21. Weed control				5	3	0
22. Grass management (mowing)				2	5	1
23. Harvesting techniques				4	2	2
24. Storage				2	6	0
25. Packaging, resale				3	4	1
26. Legal and commercial				6	0	0
28. Where do you stand on provenance and the application of				2	2	4



Question/comment	Producers n=6	Industry n=6	Researchers n=4	Yes	No	Unsure
native grass/ seed/ cultivars? (support provenance = yes; did not support provenance = no)						
29. Would you develop any legal standards in the industry if you had the opportunity?	Definitions;	Purity; provenance; certified seed; viability; Quality testing;	Quality; testing; collecting from natural stands; tighter regulations and licensing; Ecovars; Quality; standards; labelling			
30. Do you think <i>plant breeders rights</i> are necessary and have they worked so far?				0	6	0
Should the grass/seed industry be pursuing						
31. Selected bushforms (ecotypes)				4	1	2
32. Selected cultivars from any source				1	2	4
33. Genetically engineered / modified forms				1	6	0
34. Plant breeders or seed producer rights				1	5	0
35. Harvesting natural stands				5	1	1
36. Importing other overseas species of grasses				0	7	0
37. Adopting local provenance at all times				2	2	2
38. Is there sufficient quantity of grass seed available				0	8	0
39. Is there sufficient high quality grass seed available				2	4	2
40. Is there sufficient variety of grass species available				2	6	0
41. is the cost of seed to farmers, other users, low				7	1	0
42. Is the price return for seed to the grower good				2	2	3
43. Is the cost to grower of site preparation low				4	2	2
44. Is the cost to grower of sowing high				4	3	1
45. Is the cost to grower of harvesting high				1	4	3



Question/comment	Producers n=6	Industry n=6	Researchers n=4	Yes	No	Unsure
46. Is the cost to grower of weed management high				6	2	0
47. Is the cost to grower of storage, cleaning, packaging high				3	1	3
48. How would you improve the present commercial production system of native grass seed to reduce costs, increase sustainability and improve economic return to those involved?	Variable – responses not included					
49. Which direction will a commercial grass/seed industry take and is that likely to be the same or different from that of the 'biodiversity conservation industry'?	Variable – responses not included					
50. If you had the opportunity and the funds to improve the industry what would you do?	Variable – responses not included					

* Questionnaire included questions 11-14 but were deleted for subsequent phone interviews as were deemed as irrelevant



6.5. Appendix 5: 'Native Grass Resources List' - Internet questionnaire

An important component of this project was to collate and synthesise a Native Grass Resource List (Table A5.1) which comprised people working in native grasses in various capacities such as in production, conservation, identification and/or the native grass seed industry and key organisations from within South Australia and interstate. An internet questionnaire was constructed and implemented during April - June 2008 to gather this information.

Table A5.1 Native Grass Resources List

Brett Bartel

Rural Solutions SA

A: GPO Box 1671 Adelaide SA 5001

E: bartel.brett@saugov.sa.gov.au

T: 8226 9771

Larry Bebbington

Habitat & Land Management Consultant

A: Box1235 North Shields SA 5607

E: lbebb@bordnet.com.au

T: 86845065

M: 0429 853 307

Bill Bellotti

School of Agriculture, Food & Wine

University of Adelaide

A: Roseworthy SA 5371

E: william.bellotti@adelaide.edu.au

T: 83037728

Ellen Bennett

A: 8 Torrens St Mitcham SA 5062

E: benje@picknowl.com.au

T: 8271 9123

Anne Brown

Greening Australia SA

A: 42 High Street Wirrabara 5481

E: brown@greeningsa.org.au

M: 0409684312

Wayne Brown

Native Grass Seed Growers

A: 51 Orontes Ave Bridgewater SA 5155

E: deck52@bigpond.net.au

M: 0408813628

Sam Buxton

Trees For Life

5 May Tce Brooklyn Park SA 5032

E: bfl@treesforlife.org.au

T: 84060500

Dr. Roger Clay

University of SA

School of Natural and Built Environments

A: Mawson Lakes SA 5095

E: roger.clay@unisa.edu.au

T: 08 8302 5172

CSIRO

A: Various locations

W: <http://www.csiro.au/>

Angela Duffy

Department of Environment and Heritage (SA)

GPO Box 1047 Adelaide SA 5001

E: duffy.angela@saugov.sa.gov.au

T: 82229275

F: 82229457

Tim Edginton

Go Native SA

A: PO Box 1499 Mylor SA 5153

E: tcfarm@adam.com.au

M: 0421 804 618

Mark Ellis

Bush for Life Program

Trees for Life Inc

A: 5 May Tce Brooklyn Park SA 5032

E: bfl@treesforlife.org.au

T: 84060500

Simon Ellis

Ellis Farm Consultancy

A: Box 119 Verdun SA 5245

E: simonellis@iprimus.com.au

T 08 83887152

Jose M. Facelli

The University of Adelaide

School of Earth and Environmental Sciences

A: DP 312 Adelaide SA 5005

E: jose.facelli@adelaide.edu.au

T: 08 8303 4559

Other details: Interested only in research

Florabank

A: PO Box 74 Yarralumla ACT 2600

W: www.florabank.org.au

Friends of Grasslands (ACT)

PO Box 987 Civic Square ACT 2608

E: info@fog.org.au

W: www.fog.org.au



Joan Gibbs
University of South Australia
School of Natural and Built Environments
A: Mawson Lakes SA 5095
E: joan.gibbs@unisa.edu.au
T: 08 83025164

Grain and Graze
W: www.grainandgraze.com.au

Steve Hughes
SARDI
A: GPO Box 397 Adelaide SA 5001
E: hughes.steve@saugov.sa.gov.au
T: 8303 9408

Land Water and Wool (LWW)
W: www.landwaterwool.gov.au

Graeme McPhee
Aussie Flora Hort/Agr. Services
A: 74 East Parkway Colonel Light Gardens SA 5041
E: graeme.mcphee@gmail.com
T: 08 8277 6624

Murray Mathison
MJM Consultants
A: PO Box 236 Crafers SA 5152
T: 8339 5148

Robert (Bob) Myers
Top Deck Native Grasses & Aussie Roots
A: P.O. Box 250 Birdwood SA 5234
T: (08) 8568 5065

Bill New
Nature Conservation Society of South Australia
A: 260 Franklin Street Adelaide SA 5000
E: bill.new@ncssa.asn.au
T: 08 7127 4630
M: 0427 236 306

New South Wales Department of Agriculture
A: Various locations
W: www.dpi.nsw.gov.au/agriculture

Chris Penfold
University of Adelaide
A: c/o Roseworthy Campus, Roseworthy SA 5371
E: chris.penfold@adelaide.edu.au

Jodie Reseigh
Rural Solutions SA
E: reseigh.jodie@saugov.sa.gov.au

Rutherglen Research Institute
Department of Primary Industries (Victoria)
A: RMB 1145, Chiltern Valley Rd Rutherglen 3685
T: (02) 6030 4500
W: www.dpi.vic.gov.au

Merrick Savage
Eyre Native Seeds
A: PO Box 1334 Pt. Lincoln SA 5606
E: saseeds@chariot.net.au
T: 08 86 826233

Neil Sleep
Willangi
A: PO Box 73 Peterborough SA 5422
E: n.a.sleep@gmail.com

John Stafford
Vegetation Management Services
A: Adelaide/Lobethal Road Lenswood SA 5240
E: vms@jtr.net.au
T: 08 8389 8347

Stipa Native Grasses Association
A: PO Box 276 Wellington NSW 2820
W: www.stipa.com.au

Jean Turner
Department of Environment and Heritage
E: turner.jean@saugov.sa.gov.au
T: 08 88413407
M: 0412617155
F: 08 88413411

Upper North Farming Systems
Michael Wurst
A: PO Box 223, Jamestown 5491
E: Wurst.michael@saugov.sa.gov.au
T: 08 86641408

University of Melbourne
Dookie Campus
A: Dookie College Victoria 3647
T: 03 5833 9200
W: www.dookie.unimelb.edu.au

University of New England
A: Armidale NSW 2351
W: www.une.edu.au

Helen Weckert
Mid North Grasslands Working Group
A: PO Box 12 Brinkworth SA 5464
E: eulunga@activ8.net.au
T: 08 8846 6086



In addition a question pertaining to the impediments of the applications of native grasses in broad scale agriculture was included to inform the Native Grass Strategy document. Responses to this question have been summarised (Table A5.2).

Table A5.2 Major themes emerging from selected question from internet questionnaire (completed on the internet with no consultation).

Emergent themes		n =
Theme 1	Seed cost and availability	11
Theme 2	Technological difficulty and establishment issues	12
Theme 3	Lack of knowledge and understanding of benefits	28
Theme 4	Unwillingness to change	3

Responses (grouped into Themes from Table A1.3) to the question ‘*Why do you think that native grasses are not being used in production systems more widely?*’ from internet questionnaire (as particularly relevant to Native Grass Strategy for SA)

Theme 1 - Seed cost and availability

- Access to technology to effectively and efficiently establish;
- The scarcity and very high cost of native grass seed deters large scale attempts at resowing;
- The stumbling block remains economical means of producing large quantities of high quality seed and developing reliable establishment technology;
- There is no local supply of native grass seed in quantity;
- Lack of technology and seed industry related to native grasses;
- Seed cost and availability;
- High cost of seed;
- Cost of seed;
- They cannot be reliably grown because quality of wild seed (undomesticated) is quite variable and unpredictable;
- Each seed lot needs to be tested to verify the germination rate;
- Dormancy factors of wild seed has not yet been established and requires further research.
- Lack of actual seed to meet demands;
- Seed industry needs major financial investment from private and public sectors to take seed growing to the next level to meet the high demands. This would allow for more research, better machinery and a dedicated resource to meet the demands;
- Cost of seed is prohibitive for broad acre application. This is further amplified in low rainfall regions where perennial native grasses have a persistence/production edge over currently available exotics. Farmers in these marginal regions are not as financial and the cost and risk of failure are already high even for conventional species with seed available at around \$8/kg and no seedling establishment/dormancy issues. In areas with unreliable rainfall, who can afford to pay a premium price for a product where establishment is not guaranteed, even under ideal sowing conditions; and
- Availability and costs of seed for broad scale establishment.

Theme 2 - Technological difficulty and establishment issues

- The mystery of establishment of these species and the mix of species required for a productive systems;
- Access to seed to effectively and efficiently establish;
- Reliable sowing and establishment methods are poorly understood for many species and environment combinations and frequent failed attempts have deterred others from trying;
- Existing machinery makes it seem too difficult;



- Unreliable establishment, expense, productivity of native grasses in some situations;
- Lack of knowledge regarding establishment techniques;
- Difficulty in sowing;
- Unreliable establishment; and
- Risks of successful establishment with cost.

Theme 3 - Lack of knowledge and understanding of benefits

- In grasslands early grazing mismanagement especially overgrazing;
- In the wool industry vegetable fault problems (from both exotic and native grasses, exotic legumes and forbs) particularly from seeds of awned grasses which also penetrated eyes and carcasses of other meat animals (*Austrostipa* spp. and *Heteropogon contortus* especially problematical in rangeland systems);
- Inappropriate cultivation and fertiliser application regimes (used to advantage with sown introduced crop and pasture species);
- Weed invasion of degraded remnant native grasslands hamper the recovery of native grasslands either by natural recruitment or attempts at resowing;
- Lack of knowledge and understanding;
- I think native grasses are unvalued by landholders and associated extension staff;
- No significant farmers or farms have native pastures on show;
- No recognised and/or easily accessible demonstration sites;
- Native grasses need promotion and large scale demonstration sites;
- Native grasses have lower production when compared to introduced species, but on our poorer country they produce well and survive;
- Poor understanding of the value of native grass (in some areas);
- The high cost of inputs to achieve high animal productivity seed, fertiliser, herbicides, pesticides, etc for introduced species could be offset by accepting lower productivity from native grasses needing little fertiliser and reliance on non-chemical weed, pest and disease control;
- Because of the misunderstandings associated with native grasses compared with the introduced species and because our early history agriculturally and botanically is not widely known;
- They are well known and valued in our region by pastoralists, but generally unknown and overlooked in farming, particularly in west coast limestone country (Eyre Peninsula) where improved productivity could be achieved with better awareness;
- Lack of information and understanding of the benefits of native grasses;
- No perceived benefits;
- Image of low producing plants;
- Uncertainty of best grazing system;
- Lack of public knowledge and awareness;
- Not enough promotion of native grasses;
- The nursery industry needs to be targeted to encourage nurseries to grow native grasses;
- Lack of basic biological properties of individual species and poor understanding of ecological processes;
- Poor extension by PIRSA;
- Our grazing in past, has resulted in most palatable species having gone or now in low numbers;
- Lack of general knowledge of the full potential of native grasses if grazed properly;
- Lack of recognition and knowledge of native grasses and native grasslands by landholders;
- Majority of landholders unsure of, or unconvinced about the benefits of rotational grazing of native grasslands;
- Lack of demonstrated applicability of intercropping systems in SA;
- Lack of knowledge; and
- Institutional issues (related to NVC Act, process).



Theme 4 - Unwillingness to change

- Native grasses have been and are still being ignored by SA agronomists and Farm Management advisors who push high production systems;
- Traditional ways - people are just used to them;
- Too expensive and farmers unwilling to try new methods; and
- Farmers live in "hope" of "the good seasons" to keep doing the same.

